European Research Studies Journal
Volume XXVIII, Issue 4, 2025

pp. 386-400

Conditions for Implementing E-CMR in Europe in the View of Supply Chain Digitalisation Focussing Polish Experiences

Submitted 14/09/25, 1st revision 11/10/25, 2nd revision 25/10/25, accepted 16/11/25

Joanna Miklinska[1]

Abstract:

Purpose: *The main objective of this paper is to determine the organisational and legal conditions and the current state of implementation of the electronic consignment note (e-CMR) in Poland against the background of the challenges associated with the digitisation of supply chains, taking into account the experiences of other countries joining this regulatory system.*

Design/Methodology/Approach: *In order to achieve the main objective of the paper, secondary sources of information were mostly used. Literature on the digitisation of supply chains, international transport documents and the digitisation of consignment notes was analysed, including the legal aspects of this issue. In addition, the study utilised data from UNECE, Eurostat, General Inspectorate of Road Transport, as well as institutions, organisations and consulting agencies concerning the development of the road transport market in Europe and Poland and the digitisation of transport documents. In order to achieve the objective, an in-depth analysis of a number of legal acts was also carried out, including the provisions of the CMR Convention, the e-CMR Protocol to the Convention and the Regulation of the European Parliament and of the Council, as well as national acts concerning the issue in question.*

Findings: *The results of the study indicate that the implementation of e-CMR in Europe is proceeding with some delays, although the system is expected to be operational in two years. A large group of countries (38) have already ratified the 2008 protocol on e-CMR, while 20 have not yet done so, even though they are parties to the CMR Convention. In addition, changes to the internal regulations of individual countries are being identified and gradually introduced, and preparations are underway to implement the provisions of the eFTI Regulation, which will come into full force on 9 July 2027. The adopted solution for the digitisation of consignment notes assumes the operation of certified platforms connecting participants involved in the exchange of information. The article reviews the experiences of various countries on the road to e-CMR. Particular attention is paid to Poland, where further measures discussed are also being pursued. The paper also discusses the multidimensional benefits of using electronic consignment notes, which can be viewed more broadly as those resulting from the digitisation of supply chains and constitute an argument for such measures.*

Practical Implications: *An analysis of secondary sources has identified the legal and organisational conditions for implementing the solution and a range of multidimensional benefits of introducing e-CMR, from formal and organisational to environmental, which may serve as arguments encouraging various stakeholders to join the initiative. At the same time, the identified actions and practices from various countries, including Poland, may be*

[1]*Gdynia Maritime University, Poland, e-mail: j.miklinska@wznj.umg.edu.pl;*

important for those starting this process, as well as other partners in supply chains.
Originality/Value: *This article attempts to identify the conditions and methods of digitising the supply chain in terms of the digitisation of transport documents, specifically e-CMR. This approach, which takes the form of a specific case study of the conditions for the application of convention provisions and, in addition, the EU Regulation, together with the experiences of concrete countries undergoing this process, aims to enrich the literature on the subject with theoretical and practical aspects.*

Keywords: *Digital technologies, electronic consignment note, e-CMR, eFTI, supply chain management.*

JEL Classification: *K19, L99, O39.*

Paper type: *Research paper.*

1. Introduction

Intensive digitisation currently affects many areas of life, economic activity and, consequently, numerous areas of supply chain operations. Naturally, it also encompasses logistics and, within that, transport. Transport documents deserve special attention here. It should be noted that the process of introducing electronic transport documents is proceeding at different rates in various modes of transport. They are used, for example, in rail and maritime transport (Dziechciarz, 2018).

However, attention should be paid to the situation in road transport. Although the scale of transport carried out by this mode is significant, and in Europe its share in the total volume of land transport is over 70%, the implementation of the e-CMR solution is being delayed.

Currently, the electronic version of the CMR accounts for only about 1% of all consignment notes in the EU alone (Świeboda *et al.,* 2022), which, given the number of operations carried out by this mode of transport, is worrying and represents a significant disproportion compared to the degree of digitisation of documents also found in other areas of economic activity.

This issue is important not only from the point of view of individual companies and countries, but also for the EU as a whole. Currently, it must compete particularly intensively with other global economic powers in various areas. Hence, the efficiency of freight transport and logistics is crucial for the growth and competitiveness of the EU economy, the functioning of its internal market and social and economic cohesion (Regulation (EU) 2020/1056).

The introduction of e-CMR may therefore affect many areas of social and economic life, and will involve more than just a simple change in the type (form) of information recording and a transition from paper to electronic documents. In order for e-CMR consignment notes to be issued in individual countries, it is necessary to create a specific "trusted" system of IT connections between the entities concerned, which is a significant challenge. Hence, the issue in question is undoubtedly one of the vital solutions in digital supply chains.

It should be noted that the implementation of digital technologies in supply chains involves significant organisational challenges and entails high costs. However, these solutions are an important resource (Nowicka, 2019), affecting the competitiveness and efficiency of the entire system and bringing a number of other benefits.

The introduction of e-CMR in individual countries is a rather lengthy process, and the deadline for wider use of this document is being delayed. However, it is undoubtedly worth undertaking the effort involved in its implementation, as the digitisation of transport documentation has multidimensional effects, both nationally and internationally.

Therefore, in analysing the problem, the initiatives and experiences of various countries, which are discussed later in this article, are valuable. To specify the subject of this study, it should be noted that its last part concerns Polish experiences. As is well known, the scale of road transport here is significant, and Polish carriers are leaders in Europe, thus constituting an important link in the circulation of transport documents – currently CMR consignment notes, and in the future e-CMR consignment notes.

2. International Electronic Consignment Note – E-CMR in the Era of Supply Chain Digitalisation – Literature Review

2.1 Legal Basis of the Issue

International road freight transport is regulated by the Convention on the Contract for the International Carriage of Goods by Road (CMR) (UN, 1956), which (thanks to successive ratifications) has expanded its scope of application since the second half of the 1950s.

Currently, nearly seventy years after this event, 58 countries have ratified the convention (UN, 2025). Over the years, two important protocols have been prepared for this legal act, undoubtedly with the aim of bringing the legal provisions in line with contemporary requirements.

The first one (from 1978) introduced the SDR unit of account, while the second one dates back to 2008 and concerns the solution discussed in this paper – e-CMR – Additional Protocol to the Convention on the Contract for the International

Carriage of Goods by Road (CMR) Concerning The Electronic Consignment Note. It is indicated here that: "Electronic consignment note" means a consignment note issued by electronic communication by the carrier, the sender or any other party interested in the performance of a contract of carriage to which the Convention applies, including particulars logically associated with the electronic communication by attachments or otherwise linked to the electronic communication contemporaneously with or subsequent to its issue, so as to become part of the electronic consignment note" (UNECE 2008).

The Protocol on e-CMR is a fairly general document and contains basic solutions concerning: „scope and effect of the electronic consignment note, authentication of the electronic consignment note, conditions for the establishment of the electronic consignment note, implementation of the electronic consignment note, documents supplementing the electronic consignment note" (UNECE, 2008).

The literature on the subject emphasises that this document created a legal framework for issuing consignment notes using modern means of communication, but did not make this dependent on a specific technology (Judek, 2021).

With regard to the scope of application of the e-CMR provisions, it should be noted that not all countries that are parties to the 1956 Convention have ratified the 2008 Protocol. Currently, according to information provided on the UN website (as of 27 October, 2025), 38 countries have acceded to it and one has signed the document (Belgium), while EU countries such as Cyprus, Croatia and Malta, and non-EU countries such as Ireland, Albania and Serbia, have not yet done so (UN, 2025).

This situation may give rise to legal problems. It should be pointed out that a characteristic feature of international road transport within supply chains is that it can be carried out by one or more carriers from different countries. These may be countries that have adopted the additional protocol or not, and this raises the question of the effects of using an electronic consignment note (Judek, 2021). The application of the protocol may also necessitate changes to other internal legal provisions.

P. Judek also indicates that even if transport takes place between countries that have adopted the protocol, the use of such documents may be associated with difficulties (e.g., during inspections) until electronic consignment notes are universally accepted in the internal legislation of the countries through which the goods are transported (Judek, 2021).

When considering the issue of e-CMR implementation, it is important to note that, with regard to EU countries, regulations have been created that apply to electronic documents in various modes of transport (including road transport). The following legal acts have been published in this regard (European Commission, 2025b):

- Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic Freight Transport Information (hereinafter referred to as eFTI).
- Commission Delegated Regulation (EU) 2024/2025 of 15 July 2024 supplementing Regulation (EU) 2020/1056 by amending its Annex I Part B.
- Commission Delegated Regulation (EU) 2024/2024 of 26 July 2024 supplementing Regulation (EU) 2020/1056 by establishing the eFTI common data set and eFTI data subsets.
- Commission Implementing Regulation (EU) 2024/1942 of 5 July 2024 laying down common procedures and detailed rules for accessing and processing electronic freight transport information by competent authorities in accordance with Regulation (EU) 2020/1056 of the European Parliament and of the Council.

The eFTI Regulation establishes a legal framework for the electronic transmission of regulatory information related to the transport of goods within the EU between interested economic operators and competent authorities (Regulation (EU), 2020).

Given that the implementing and delegated acts concerning eFTI have also entered into force, Member States can, in principle, begin developing IT systems – secure IT platforms, discussed in the next section of this paper. These will enable the aforementioned transition from paper-based documentation to electronic information (European Commission, 2025b).

The discussed eFTI regulations and the changes they entail will apply not only to entities directly involved in freight transport (shippers, carriers and consignees), but also to other stakeholders in the transport process. They apply, for example, to various control authorities operating within the EU, which will have to be given the ability to receive electronic information about these shipments, and these services will be required to accept digital versions of documents (Greentransit, 2023). This also gives rise to obvious changes in the regulations governing these services in individual countries.

The process of sharing digital information is to begin on 9 July 2027, when the eFTI Regulation comes into force. As mentioned, standard data will be made available to both administrative bodies and business entities (European Commission, 2025b).

2.2 Conditions and Organisational Aspects of Implementing the E-CMR Consingment Note Against the Backdrop of International Experience and the Challenges of Supply Chain Digitalisation

The digitisation of supply chains involves the implementation of digital solutions in various areas of their operation. The literature identifies the most important digital technologies in supporting supply chain management. These include, cloud computing, digital platforms, Big Data Analytics, robotics, blockchain, automation, the Internet of Things, autonomous vehicles, machine learning, 3D printing, drones, AI and augmented reality (Nowicka, 2019). It should be noted that digital platforms figure prominently among these solutions. This is also confirmed by other studies on the digitisation of supply chains (GS1 Polska, Łukasiewicz IliM, 2021).

It is therefore important to understand the "path" and the organisational and technological solutions used, from the classic CMR to the e-CMR issued using digital platforms. The conditions for its implementation are discussed below.

The CMR consngment note is a document used in international road transport of goods across a very large area of countries that are parties to the CMR Convention. In practice, this area is even larger, as the Convention stipulates that it is sufficient for at least one of the countries (the place of taking over the goods or the place of delivery) to be a party to the Convention (UN, 1956). This condition means that the scale of use of this document is significant.

It is to be expected that, ultimately, the area of application of the e-CMR, with the gradual implementation of the 2008 protocol by successive countries, will be similar to that of the CMR.

With regard to the basic principles of e-CMR, it should be emphasised that the electronic consignment note contains the same data as the paper CMR consignment note (UNECE, 2008).

The provisions of the 2008 Protocol, although rather general, contain the basic conditions for drawing up an e-CMR - "the procedure used to issue the electronic consignment note shall ensure the integrity of the particulars contained therein from the time when it was first generated in its final form. There is integrity when the particulars have remained complete and unaltered, apart from any addition or change which arises in the normal course of communication, storage and display" (UNECE 2008). "The particulars contained in the electronic consignment note shall be accessible to any party entitled thereto" (UNECE, 2008).

As mentioned earlier, in the EU, the conditions for issuing electronic consignment note are specified in the eFTI Regulation of 2020. The solutions contained therein allow the digital transport document to be viewed as "electronic freight transport information", which means "a set of data elements that are processed by electronic means for the purpose of exchanging regulatory information among the economic operators concerned and between the economic operators concerned and competent authorities" (Regulation (EU), 2020).

In order for such an exchange to take place, special platforms connecting the participants (groups of entities) involved in the exchange must be created. The basic elements of this system are shown in Table 1.

Table 1. *Main componentes of the eFTI system*

Term	Definition
"eFTI platform"	"a solution based on information and communication technology (ICT), such as an operating system, an operating environment, or a database, intended to be used for the processing of eFTI"
"eFTI service provider"	"a natural or legal person which provides an eFTI service to the economic operators concerned on the basis of a contract"
"eFTI service"	"a service consisting of eFTI processing by means of an eFTI platform, alone or in combination with other ICT solutions, including other eFTI platforms"
"economic operator concerned"	"a transport or logistics operator, or any other natural or legal person, who is responsible for making regulatory information available to competent authorities in accordance with the relevant regulatory information requirements"
"competent authority"	"a public authority, agency or other body which is competent to perform tasks pursuant to the legal acts referred to in Article 2(1) and for which access to regulatory information is necessary, such as checking, enforcing, validating or monitoring compliance on the territory of a Member State"

Source: *Elaborated based on Regulation (EU) 2020.*

The process of creating platforms is subject to the requirements set out in the eFTI Regulation. It is important to ensure their interoperability in order to facilitate data exchange, and in view of gaining the trust of both public authorities and economic operators, these platforms should be certified, as well as eFTI service providers (Regulation (EU), 2020).

It should be emphasised that providers of ICT systems that are already in use to participate in the exchange of information after the full implementation of the solutions must apply for the relevant certifications (Regulation (EU) 2020). Special guidelines on this matter are being developed by the Digital Transport and Logistics Forum (DTLF) (Świeboda *et al.,* 2022).

This process should also take into account the principles and recommendations set out in the Commission's Communication of 23 March 2017, "European Interoperability Framework – Implementation Strategy", which contains an approach to the provision of European digital public services jointly agreed by Member States (Regulation (EU), 2020).

With regard to the security of the solution in question, it should be noted that only authorised, registered users will be able to enter data into the system. For the purposes of control by the relevant authorities, data on the e-FTI platform will be made available upon explicit request, e.g., by providing unique access links in machine-readable formats (e.g., in the form of a QR code). (Świeboda *et al.,* 2022; European Commission, 2025a)

Due to the eFTI Regulation, electronic freight transport information will have to be recognised by all public authorities in the European Union (European Commission as cited in Świeboda et al., 2022). Therefore, it is obvious that e-CMRs will have to be accepted uniformly throughout the EU.

2.3 Benefits of Implementing E-CMR – An Overview of the Issue

The benefits of using e-CMR can be analysed in the context of various approaches, including for individual companies, but also more broadly as economy-wide and society-wide benefits, or in terms of their impact on other entities in the supply chain. They can also be divided into different groups. Due to the limited scope of this study, Table 2 lists the basic benefits mentioned in the literature on the subject as examples.

Table 2. *Examples of the multidimensional benefits of using e-CMR*

Formal benefits related to the flow of information/documentation
Elimination of errors and data accuracy; transparency and streamlining of document circulation; no possibility of losing documents; reduced possibility of fraud; enabling shipment management; unambiguous identification of entities involved in transport; better control and monitoring of shipments; access to information on transport status; faster payments thanks to reliable information; improved cooperation with insurers
Benefits associated with reducing costs and eliminating unnecessary operations and activities
No need to handle paper documents (issuing, copying, faxing, archiving etc); streamlining of administrative procedures; reduced staffing requirements
Environmental benefits
Thanks to the availability of information more effective planning of logistics operations, vehicle loading and route planning resulting in decarbonization; reduction of paper and ink consumption; and thus decarbonisation of the supply chain.

Source: *Own elaboration based on: Judek, 2021; Świeboda et al., 2022; IRU, 2025; Fraunhofer 2023, European Commission, 2025a.*

The catalogue of benefits of e-CMR may grow as the system's functionality evolves. The adopted model of information exchange may be expanded in the future – integrated with other services provided by logistics operators, e.g., customs declarations or fleet management services (IRU 2025) and thus extend to a number of other entities in the supply chain, benefiting various participants and stakeholders in transport operations (Antov, 2020).

Real-time information on a given transport operation can be helpful in preventing various risks, e.g. during the transport of dangerous goods, and contribute to an effective response in the event of a collision (Ponzoa Casado, Gómez Funes, and García-Doncel 2021). The implementation of e-CMR can contribute to increased road safety, as the system can be linked to eCall for trucks, which will alert the emergency services (IRU, 2025).

As Antov rightly states, *"The main purpose of the use of electronic documents (not only in transport) is to create opportunities for the exchange of information contained in them, not just their existence"* (Antov, 2020). Today, information is becoming an extremely valuable resource, and its effective exchange allows companies to gain a competitive advantage.

The introduction of e-CMR in international road transport as part of the broader digitisation of the supply chain is becoming a breakthrough solution. Duda and Korczak point out that it can significantly increase the possibility of creating added value for the entities involved in the chain (Duda and Korczak, 2021).

2.4 Experiences of Various Countries in Implementing E-CMR

The first transport operation using e-CMR, as indicated in the literature, was the transport of oranges in 2017 from Huelva in Spain to Perpignan in France, organised with the support of the IRU and national transport organisations from the countries concerned (Dziechciarz, 2018).

This initiative has undoubtedly encouraged decision-makers from various countries to take action aimed at implementing e-CMR (Dziechciarz, 2018). Numerous publications discuss experiences related to the implementation of e-CMR in various countries, both EU members and non-EU countries.

Preparations for the introduction of e-CMR are underway in Germany, among other countries. Legal studies are analysing the interaction between existing national law (including the Handelsgesetzbuch - HGB) and e-CMR regulations, including the nature and function of the electronic consignment note (Schoen, 2021).

An important project in this country, Silicon Economy, refers to practical implementation and technological solutions. It is a large-scale initiative, but also covers the issue of 'Transport Information'. The hardware and software components were developed by the Fraunhofer IML; an open source online service for generating, storing and transmitting e-CMRs was also developed, which has the potential to become a European standard (Silicon Economy, 2025; Fraunhofer, 2023).

In the context of the conditions for the implementation of e-CMR in the Netherlands, it should be emphasised that a larger-scale pilot project was carried out here for three years (from 1 December 2017) – in the BeNeLux countries for transport between these states and also for national transport and cabotage (de Groot, 2018), which undoubtedly allowed for the accumulation of a great deal of valuable experience.

One of the arguments for implementing e-CMR in the Netherlands is the enormous amount of paper used to issue traditional documents – approximately 40,000,000 paper CMR letters per year in this country, compared to 377,000,000 in cross-border traffic throughout the EU (de Groot, 2018). This is a valuable point for all those implementing e-CMR in Europe and beyond.

In Italy, a special project supported by IRU and Unioncamere was also implemented to promote e-CMR. It identified the relatively low level of digitisation in the road transport sector, legal barriers (including those relating to digital signatures) and expectations regarding e-CMR (Unioncamere and Uniontrasporti 2022).

Antov (2020), in the context of considerations regarding e-CMR, notes the dissonance that exists between the existing level of digitisation of customs controls in the EU (which is one of the highest in the world) and the transport documentation that still functions in paper form, even though these are related areas (Antov, 2020). The latter undoubtedly requires rapid improvement and the introduction of appropriate solutions.

With regard to non-EU countries in the Western Balkans, there is discussion of the benefits that countries in the region (the Republic of Albania, Bosnia and Herzegovina, North Macedonia, Kosovo, Montenegro and the Republic of Serbia) could achieve as a result of the digitisation of freight transport information exchange and the pilot introduction of eFTI, ultimately in conjunction with the EU. The need to review internal legislation in order to eliminate restrictions in the area of digitisation of transport information exchange is also highlighted (EY, 2022).

Referring to the Republic of Uzbekistan, Ismailova points out that the introduction of the electronic consignment note (e-CMR) will result in greater transparency in road freight transport and a reduction in certain costs. Here, the paper consignment note has gradually begun to be replaced by its electronic version, thanks in part to a relevant decree of the President of the Republic of 2020 and the use of electronic signatures (Ismailova, 2020).

3. Research Results

3.1 Conditions for the Implementation of E-CMR in Poland – Discussion

When considering the conditions for the use of e-CMR in Poland, it is important to refer to the significance of road freight transport for the TSL market in this country. In the modal split of land freight transport in Poland, its share is over 75% (Eurostat as cited in UTK, 2025). Carriers transport freight in domestic and international transport, as well as in cabotage and cross trade. In 2023, lorries registered in Poland accounted for one fifth (20.3%) of road freight transport (in tonne-kilometres) carried out by vehicles registered throughout the EU (Eurostat, 2024).

It should also be added that over 45,000 entities in Poland hold a Community licence for international road haulage (as at the end of 2024), and over 340,000 trucks are used for these operations (GITD, 2025). These figures clearly illustrate the large scale of international road transport operations. Hence, the implementation of the e-CMR solution, with all the beneficial effects that this entails, is also important in the context of Polish solutions.

Poland acceded to the CMR Convention as early as 1962, and on 8 August 2019, it adopted an additional protocol to the Convention concerning e-CMR. However, Polish literature on the subject points to the irregularity of the ratification procedure for this additional protocol, which was carried out under Article 89(2) of the Constitution. This means that these provisions are lower in the hierarchy of Polish law than the provisions of the CMR Convention and also lower than the provisions of Polish statutes. As a result, the provisions of the protocol will only be applicable if they do not conflict with higher-ranking acts (Judek, 2021).

It should also be emphasised that, as indicated by the experiences of other countries, Poland also needs to amend several national regulations in order to prepare for the introduction of e-CMR.

Legislative work in this area is already underway, resulting in a draft amendment to, among others, the Road Transport Act, dated for the end of 2024, which relates to the use of electronic consignment notes in Poland (Huczko, 2025).

On the road to implementing e-CMR, due to Poland's membership in the European Union, it is also bound by the provisions of the aforementioned eFTI Regulation of 2020.

With regard to organisations that support the implementation of e-CMR, it should be noted that these include GS1 Polska. In its case, these activities are part of broader efforts to digitise documentation, including in the areas of trade and logistics. In this regard, GS1 Polska is implementing the Model Paperless initiative. It covers numerous commercial and transport communications, as well as the GS1 logistics label, enabling the complete elimination of traditional paper documents (GS1 Polska a).

GS1 Polska has developed a standard for electronic consignment notes in accordance with UN/CEFACT specifications and is currently working on possibilities for its implementation in Poland and abroad (GS1 Polska b).

Various digital platforms (including those for generating e-CMRs) are already operating on the Polish market, which, in accordance with the provisions of the eFTI Regulation, will be able to fulfil the role specified in these regulations after obtaining the relevant certification (Świeboda *et al.,* 2022).

The role of these platform providers will be to ensure a secure and recorded connection to eFTI gateways (access points) for business entities and control authorities (Greentransit, 2023).

Concerning the promotion of the concept of electronic consignment notes in Poland, it should be noted that in February 2022, GS1 Polska established an independent eCMR Forum. It brings together various stakeholders, including organisations and associations related to the TSL industry, businesses and IT solution providers – eCMR platforms (Horzela, 2022; 2023).

Another important initiative on the road to e-CMR was a survey conducted by the Polish Road Transport Institute together with GS1 Poland in 2021, aimed at, among other things, assessing the readiness of Polish companies to implement e-CMR (Świeboda *et al.,* 2022).

This survey shows that there are high expectations for a reduction in the number of errors in documentation after the introduction of e-CMR. So far, only 22% of consignment notes contain up-to-date data, while 15% of consignment notes contain no errors, only 10% of them are complete and 25% are legible (Karcz, Kushta, Świeboda, Wolak as cited in Świeboda *et al.,* 2022). This clearly demonstrates that the situation needs to be improved.

Despite the large number of entities enthusiastic about the introduction of e-CMR in Poland due to its many advantages, there are also those who are deterred by this solution, for example, due to unfamiliarity with the technology. On the other hand, there are also entrepreneurs for whom the use of paper versions of documents allows for a kind of extension of payment periods (Świeboda *et al.,* 2022).

4. Conclusions

The digitisation of transport documentation is one of the important areas of the broader process of supply chain digitisation that is currently underway. Due to the huge number of operations carried out by road transport, the implementation of e-CMR is now a priority. The results of the study indicate that the implementation of e-CMR in Europe is proceeding with some delays, but the system is expected to be operational in two years.

The first important step on this path has already been taken – a large group of countries (38) have already ratified the 2008 protocol on e-CMR, while 20 have not yet done so, even though they are parties to the CMR Convention, which is important for the smooth operation of transport in various relations.

The difficulties in implementing e-CMR arise from the fact that a number of changes need to be made to the internal regulations of individual countries, which differ from one another. The scale of these changes depends on the shape of regulations concerning, among other things, road freight transport, or even the extent to which a given country has already introduced legal and organisational solutions in the field of digitisation.

In EU countries, the 2020 eFTI Regulation was an important step towards the digital transformation of supply chains in the area of digitisation of freight transport information (including e-CMR). It provides for the use of special, certified platforms for this purpose (European Commission, 2025b).

The system will therefore include digital service providers, relevant public authorities that will ensure its security, and public services that will, as mentioned, verify these documents. The system has the potential to include other areas of activity, facilitating the transfer of information, for example within the eCall framework.

The experiences of various countries show that the path to introducing electronic consignment notes can be quite difficult, and the implementation of e-CMR faces many legal, technical and organisational barriers (EY, 2022). For this reason, it is so valuable to carry out a series of pilot projects in different countries and promote the idea among various stakeholders.

As the analysis has shown, significant steps have already been taken in Poland towards the implementation of e-CMR, although there is still much to be achieved. The e-CMR protocol has been adopted and the solutions of the eFTI Regulation are being introduced. Many stakeholders are active in promoting new solutions, e.g. GS1 Polska, members of the e-CMR Forum.

Here, too, the digitisation of supply chains in terms of transport documentation is encountering various obstacles. Errors have also been made, for example in the process of ratifying the Protocol to the Convention on e-CMR, which may give rise to legal problems. The pace of necessary changes in national legislation also seems to leave much to be desired.

The experiences discussed in relation to the digitisation of transport documentation enrich those that, in a broader sense, concern the digitisation of various supply chain operations, constituting an important component of these processes. They may also provide an interesting lesson for various stakeholders. Due to the limited scope of this study, the issue of e-CMR implementation costs was not addressed, which should undoubtedly be the subject of further research.

References:

Antonov, M. 2020. Possibilities for Application of e-CMR from a Customs Point of View, 1st international scientific conference, Conference Proceedings: Economic and Business Trends Shaping the Future, Available at: https://www.academia.edu/44841864/Possibilities_for_application_of_e_CMR_from_a_customs_point_of_view.

de Groot, D. 2018. The use of the e-CMR in The Netherlands and in the BeNeLux. Ministry of Infrastructure and Water Management, 4 April.

Duda, S., Korczak, A. 2021. Digital e-CMR consignment note – added value for supply chain partners involved. Economics and Organization of Logistics, 6(4), 5-19. doi: 10.22630/EIOL.2021.6.4.25.

Dziechciarz, M. 2018. Zastosowanie elektronicznego listu przewozowego (e-CMR) (en The use of electronic consigment note e-CMR), Europa Regionum 2/2018, vol XXXV, 21-32. doi: 10.18276/er.2018.35-02.

European Commission. 2025a. Mobility and Transport, eFTI Regulation. Digitalising freight transport across the European Union, Available at: https://transport.ec.europa.eu/transport-themes/logistics-and-multimodal-transport/efti-regulation_en.

European Commission 2025b. Directorate-General for Mobility and Transport. Towards Paperless Freight Transport: EU takes a step forward with eFTI Regulation implementation, 9. January 2025, Available at: https://transport.ec.europa.eu/news-events/news/towards-paperless-freight-transport-eu-takes-step-forward-efti-regulation-implementation-2025-01-09_en.

Eurostat. 2024. Key Figures On European Transport 2024 Edition, Available at: https://ec.europa.eu/eurostat/web/products-key-figures/w/ks-01-24-021.

EY. 2022. Deployment of e-freight in the Western Balkans and implementation of the Regulation (EU)2020/1056 on electronic freight transport Information, Final Report.

Fraunhofer. 2023. Silicon Economy The digital consignment note (e-CMR), silicon economy, Kontakt Patrick Becker, M.Sc., Maximilian Schellert, M.Sc.

GITD. 2025. General Inspectorate of Road Transport, Report Documents issued by the General Inspectorate of Road Transport from 1 January 2024 to 31 December 2024 and valid in legal transactions as at 31 December 2024, Warsaw, Poland.

Greentransit. 2023. Wytyczne Komisji Europejskiej dla platform eFTI (en European Commission guidelines for eFTI platforms). Available at: https://greentransit.pl/aktualnosci/wytyczne-komisji-europejskiej-dla-platform-efti/.

GS1 Polska, Łukasiewicz ILiM 2021. Digitalizacja łańcuchów dostaw w środowisku portowym. Wyzwania i możliwości. Raport podsumowujący realizację prac badawczych i wdrożeniowych w latach 2018-2020, Poznań.

GS1 Polska a, Model paperless, Available at: https://gs1pl.org/handel-i-produkcja/paperless/.

GS1 Polska b, Wymogi unijne dla elektronicznego listu przewozowego, Available at: https://gs1pl.org/transport-i-logistyka/e-cmr-elektroniczny-list-przewozowy/.

Horzela, A. 2022. TSL Manager GS1 Polska, Linkedin, Available at: https://pl.linkedin.com/posts/agatahorzela_ecmr-efti-elektronicznylistprzewozowy-activity-6987697612011253760-h54u.

Horzela, A. 2023. TSL Manager GS1 Polska, e-CMR - czy rząd polski jest gotowy, Linkedin, Available at: https://pl.linkedin.com/posts/agatahorzela_ecmr-polski-rz%C4%85d-gotowy-na-2024-activity-7087733943893934080-tqMZ.

Huczko, P. 2025. eCMR – w Polsce i Europie - harmonogram wdrożenia. Elektroniczne listy przewozowe opóźnione ponad 2 lata - Infor.pl; Available at: https://ksiegowosc.infor.pl/obrot-gospodarczy/dzialalnosc-gospodarcza/6846913,ecmr-w-polsce-i-europie-harmonogram-wdrozenia-elektroniczne-listy-przewozowe-opoznione-ponad-2-lata.html.

IRU. 2025. Making freight truly paperless: e-CMR. Available at: https://www.iru.org/what-we-do/facilitating-trade-and-transit/e-cmr.

Ismailova, R. 2020. E-CMR as a basic condition on fulfillment of obligations under agreement for international carriage of goods by road, in Science, Special Issue 2, No 1, 177-183.

Judek, P. 2021. Prawne aspekty stosowania elektronicznych listów przewozowych w krajowych i międzynarodowych przewozach drogowych, Judek. Górska. Radcy Prawni. Doradcy Podatkowi, Poznań.

Nowicka, K. 2019. Digital Innovation in Supply Chain Management. Research Papers of Wrocław University of Economics, vol. 63, nr 8.

Ponzoa Casado, J.M., Gómez Funes, A., García-Doncel, J.G. 2021. Digital Transformation: Advantages and opportunities of E-CMR in international cargo logistics. EDEIJ Digital Economy and Innovation Journal, v1 n1, e004. doi: 10.55234/edeij-1-1-004.

Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information (Text with EEA relevance), Official Journal of the European Union.

Schoen, H. 2021. LL.M. e-CMR der elektronische CMR-Frachtbrief, Symposium der Deutschen Gesellschaft für Transportrecht. Bundesministerium der Justitz und Verbraucherschutz.

Silicon Economy. 2025. The New „Ecosystem of Artifical Intelligence“; Electronic Transport Information. https://www.silicon-economy.com/english/.

Świeboda, J.(ed.), Chwalczuk, Ł., Horzela, A., Jemiołek, M., Kushta, Y., Majowicz, A., Zając, K. 2022. e-CMR Czy jesteś gotowy? Polski Instytut Transportu Drogowego, GS1 Polska, November, Wrocław.

UN. 1956. Convention on the contract for the international carriage of goods by road (CMR) done at Geneva on 19 May 1956.

UN. 2025. United Nations Transport Legal Instruments under ITC's purview Status at 27/10/2025. https://unece.org/sites/default/files/2025-10/agree_e_2025-10-27.pdf.

UNECE. 2008. Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR) Concerning the Electronic Consignment Note. Available at: https://unece.org/DAM/trans/conventn/e-CMRe.pdf.

Unioncamere, Uniontransporti. 2022. e-CMR Italy. Towards the implementation of the e-CMR system in Italy. Project Final Report.

UTK. 2025. Sprawozdanie z funkcjonowania rynku transportu kolejowego 2024, Warszawa, Available at: https://dane.utk.gov.pl/sts/analizy-i-opracowania/22463,Sprawozdanie-z-funkcjonowania-rynku-transportu-kolejowego-w-2024-r.html.