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e-CMR ITALY

Towards the implementation of the e-CMR system in Italy

State-of-the-art report on current road transportation documentation

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Prepared	Fabrizio Luca	Meroni Zanetta	22/12/2022
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Summary

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Acronyms

A2A	Administration to Administration
ADM	Agenzia delle Dogane e dei Monopoli
AEOLIX	Architecture for EurOpean Logistics Information eXchange
API	Application Programming Interface
B2A	Business to Administration
B2B	Business to Business
CMR	Convention des Marchandises par Route
DLT	Distributed Ledger Technology
DTLF	Digital Transport and Logistics Forum
e-CMR	Electronic CMR
eFTI	Electronic Freight Transport Information
ERTICO	European Road Transport Telematics Implementation Coordination
eTIR	Electronic TIR
FENIX	Federated Network of Information eXchange in Logistic
IRU	International Road Transport Union
PNRR	Piano Nazionale di Ripresa e Resilienza
SELIS	Shared European Logistics Intelligent information Space
TEN-T	Trans-European Transport Network
TIR	Transports Internationaux Routiers
UN/CEFACT	United Nations/Centre for Trade Facilitation and Electronic Business
UNECE	United Nations Economic Commission for Europe

1. Introduction

The aim of this report is to illustrate the current situation, in Italy and worldwide, of the use of documentation in digital format for road freight transport.

The transport of goods by road is characterised by the need to make a set of documents, traditionally in paper format, available to different parties (not only the sender, haulier and recipient, but also customs officials and the police) that can vary according to context, e.g. national or international transport.

For several years now, these documents and, more generally, all the activities required to support the transport of goods, have been gradually digitised. It has become evident how the development of IT systems can simplify operations, making them more efficient and secure, and encourage the adoption of more sustainable practices, reducing costs and waste. In addition, the Covid-19 emergency has further motivated companies to digitise their internal and external processes in order to minimise the need for face-to-face interactions between operators and the physical exchange of paper documents.

It is therefore reasonable to assume that these more innovative practices, based on the use of electronic documentation, will complement, or entirely replace, those traditional processes that are still based on the use of paper documentation.

The report provides an initial analysis of **the current national and international scenario** with reference to the documentation required for road transport (TIR, CMR, delivery note, etc.) and then **focuses on the electronic consignment note (e-CMR)**, outlining its characteristics and investigating what the obstacles are to its dissemination and implementation. The results of the various e-CMR pilot projects conducted in recent years in Europe and the possible conclusions that can be drawn from these are also given. Lastly, the **results of a survey of more than 1,600 Italian road haulage companies** on the digitisation of processes and the use of documentation in digital format in road haulage are presented.

2. Digital documents: state of the art

2.1 International overview

The two main documents referred to in the context of international road haulage are the TIR carnet and the CMR consignment note. Both documents, introduced in 1959 and 1956 respectively and prepared in paper format, have been digitised in recent years and this section aims to illustrate the nature and type of information given in each one.

With reference to the more recent European context, of particular relevance is the so-called **European Mobility Package**, which introduced significant developments for road transport. As reported in the Official Journal of the European Union L Series, no. 249, of 31 July 2020, it is a set of three initiatives concerning the management of commercial road transport in the European Union and represents a major change in EU road transport rules:

1. **Regulation (EU) 2020/1054** of the European Parliament and of the Council of 15 July 2020 amending Regulation (EC) No. 561/2006 with regard to minimum requirements for maximum daily and weekly driving times, minimum breaks and daily and weekly rest periods and Regulation (EU) No. 165/2014 regarding the positioning of tachographs on the vehicle;
2. **Regulation (EU) 2020/1055** of the European Parliament and of the Council of 15 July 2020 amending Regulation (EC) No. 1071/2009, (EC) No. 1072/2009 and (EU) No. 1024/2012 to adapt them to the ongoing digital transformation of the road transport sector;
3. **Regulation (EU) 2020/1056** of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information.

In particular, Regulation (EU) 2020/1055, in force since 21 February 2022, transposes into Regulation No. 1072/2009[1] paragraph 4-bis of Article 8, which stipulates that in **cabotage transport**, the documentation attesting to the international carriage, which the haulier must present to the control bodies, may also be delivered **electronically** in an editable structured format that can be used directly for storage and processing by computer (an example of such documentation is the electronic consignment note e-CMR). Documents in electronic format, instead of being produced, may also be transmitted to the police directly by the company that has arranged the transport, which, for this purpose, may be contacted directly by the driver while the control is being carried out. This means that the driver will not have to pay a fine for not having the supporting documents for cabotage on board providing that, before the end of the control, he is able to have them sent to himself or transmitted to the office of the control body. The documents to be presented during the control, also in electronic form, must contain all the elements specified in the second subparagraph of Article 8(3) of Regulation No. 1072/2009, i.e.:

a) the name, address and signature of the sender;
b) the name, address and signature of the haulier;
c) the name and address of the recipient as well as his signature and the date of delivery once the goods have been delivered;
d) the place and date of delivery of the goods and the expected place of delivery;
e) the current description of the nature of the goods and the method of packaging and, in the case of dangerous goods, the generally recognised description as well as the number of packages, special marks and numbers on them;
f) the gross mass or otherwise stated quantity of the freight;

[1] Regulation (EC) No. 1072/2009 of the European Parliament and of the Council of 21 October 2009 on common rules for access to the international road haulage market

g) the registration number of the motor vehicle and trailer.

Some of these elements, including the signatures of the various parties involved and the date of delivery, must be digitally signed and date-stamped.

Regulation (EU) 2020/1056 on electronic freight transport information (eFTI) establishes a legal framework for the electronic communication of regulatory information between the relevant economic operators and the competent authorities concerning the transport of goods within the territory of the European Union (1). The regulation states:

- the **conditions** under which competent authorities are required to accept regulatory information made available in electronic form by the economic operators concerned;
- the **rules** on the provision of services that enable regulatory information to be made available to the competent authorities in electronic form by the economic operators concerned.

In summary, the regulation obliges all competent public authorities to accept electronic freight transport information (by 21 August 2024 at the latest) if companies wish to provide data in this way to prove compliance with legal requirements.

Since 2015, the European Commission has been assisted by the Digital Transport and Logistics Forum (DTLF) in developing digitisation for the transport and logistics sector and encouraging the efficient electronic exchange of information. The two main areas are:

- Adoption of the Electronic Freight Transport Information (eFTI) regulation with three objectives for action:
    - obligation for the authorities to accept the eFTI;
    - alignment of digitised processes for the control/processing of regulatory information;
    - interoperability of IT systems and solutions (eFTI platforms).
- Development, testing and validation of a federated network to interconnect existing platforms and harmonise the services they offer (digital transport corridors).

According to DTLF, the optimal solution for the IT infrastructure required in the EU for TEN-T transport corridors is the federated network of national and regional platforms for data interoperability and exchange through standardised protocols and dedicated network services. The heterogeneous IT systems of the participants of the supply chain hold all the information needed for the production of the required types of electronic transport documents. IT systems used to store the data should be able to produce different types of documents from the same set of data.

The key aspects of the EU approach:

- exchange of data rather than documents;
- standardised sets of data and protocols;
- the authorities are required to accept data as a valid source of information or documents;
- there is a federated network of platforms rather than a single centralised solution;
- security is ensured by certification of the platform;
- information can be accessed in the original certified source.

The recommendations of the groups of experts of the DTLF were used as the basis for the SELIS and AEOLIX projects and are currently being implemented and tested in the context of the FEDeRATED and FENIX projects.

2.1.1 TIR Carnet

The TIR (Transports Internationaux Routiers) Carnet is an international customs document designed to facilitate the transport of goods by road "without intermediate reloading". In particular, transport is permitted between a customs office of departure in a country that is a signatory to the TIR Convention and a customs office of destination in another country that is a signatory to the Convention without intermediate customs controls on the goods transported.

The goods shall be transported by means of suitable road vehicles, road trains (with certificate of approval under the TIR Convention) or containers, provided that part of the journey between the beginning and the end of the transport operation is carried out by road.

Goods transported in accordance with the TIR procedure on road vehicles, road trains or sealed containers are, in principle, not subject to control at customs offices of transit; the customs control will only be carried out by the customs office of departure and the customs office of final destination. The goods are therefore not subject to the obligation to pay import or export duties and taxes at customs offices of transit. A Carnet is used for each trip and is valid for 75 days from the date of issue.

The TIR Convention is one of the most successful international transport conventions and is, to date, the only universal customs transit system in existence. It was established in 1959 by the United Nations Economic Commission for Europe (UNECE) and was subsequently revised in 1975.

To date, it has 77 contracting parties, including all EU countries, most Central Asian countries and several countries in North Africa and the Middle East (Figure 1). The TIR system involves more than 30,000 authorised operators and is accepted in more than 3,500 customs offices worldwide (2).

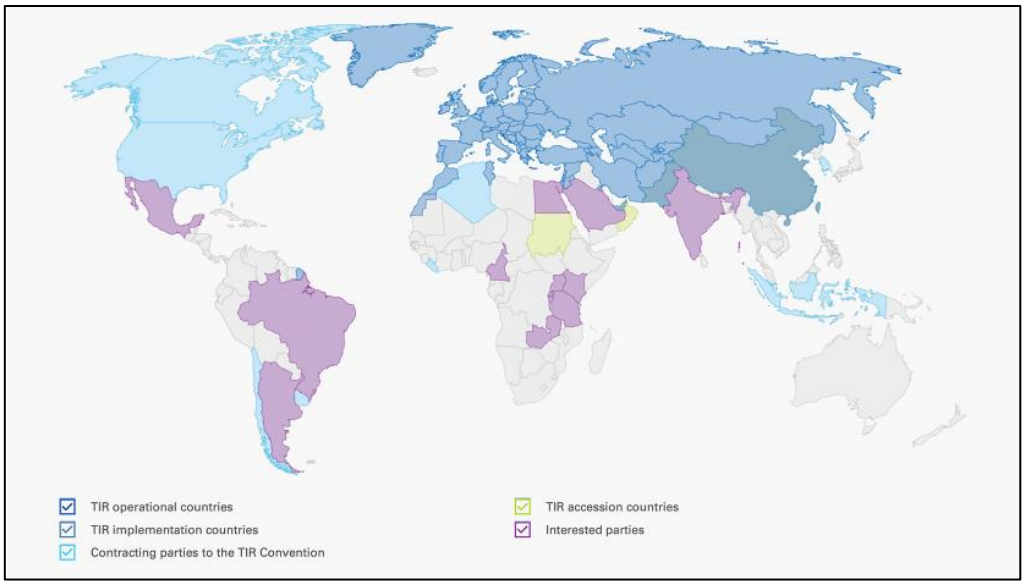

Figure 1 Countries adhering to the TIR Convention

The TIR system is based on five basic requirements, represented by the five fundamental pillars shown in Figure 2 (3):

1) goods must travel in customs-secured vehicles or containers;
2) during the journey, duties and taxes at risk must be covered by an internationally valid guarantee;
3) the goods must be accompanied by an internationally recognised customs document (TIR Carnet), acquired in the country of departure, which serves as a customs control document in the countries of departure, transit and destination;

4) customs control measures taken in the country of departure must be accepted by all transit countries and by the country of destination;
5) the TIR procedure can be accessed by
    a. national associations issuing the TIR Carnet; and by
    b. the natural and legal persons using it.

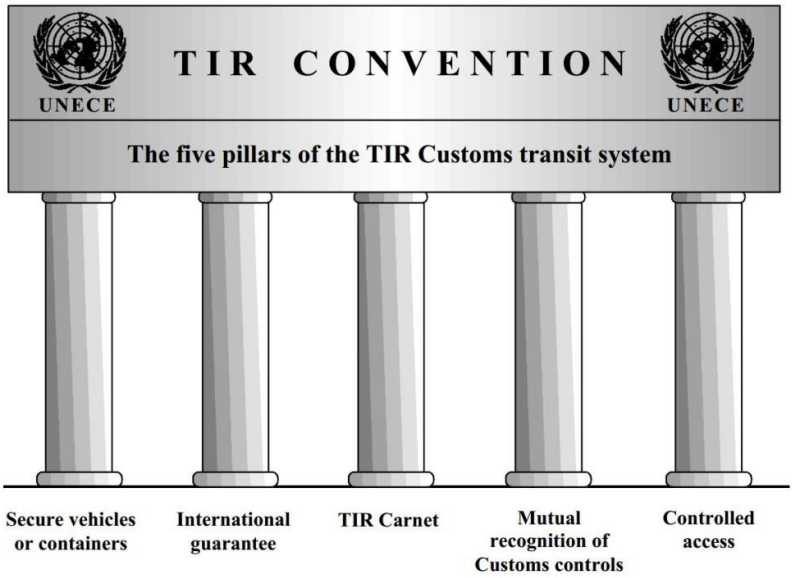

Figure 2 Principles of the TIR procedure

In Italy, as of June 2006 and by order of the International Road Transport Union (IRU) in Geneva, the body that coordinates the system at international level, only **the Italian Union of Chambers of Commerce, Industry, Crafts and Agriculture (Unioncamere),** based in Rome, is authorised to issue carnets to operators. Road haulage and own-account transport companies wishing to use TIR Carnets for international transport must apply for inclusion in a special register set up by Unioncamere. A company that applies to register with Unioncamere is checked to see if it meets the necessary requirements, as part of a process in which the Customs Agency is also involved. The applicant company then has to sign a declaration of commitment and submit a guarantee, the amount of which is established by Unioncamere, in order to obtain its registration number in the TIR Register. The registered company is then admitted to the TIR service and can apply for Carnets through Unioncamere against payment of the relevant document fee (4).

The Parties to the TIR Convention launched the so-called 'eTIR Project' in 2003, aimed at providing a digital exchange platform for all parties (customs authorities, holders and guarantee chains) involved in the TIR system, known as the 'international eTIR system'. This system aims to ensure the secure exchange of data on the international transit of goods in lorries or containers between national customs systems in accordance with the TIR Convention, and to enable customs to manage data on guarantees issued by guarantee chains to holders authorised to use the TIR system.

The main benefits of using eTIR are as follows:

- no paperwork and therefore less administration, freeing up time to concentrate on high-risk shipments;
- better security and reduced risk of fraud since identical information is made available electronically at all customs en route to the destination;
- simplification and modernisation of customs procedures at border crossings;
- increased trade due to simplified import and export procedures with a consequent increase in revenue for the state (due to taxes/duties).

On 4 February 2020, the TIR Administrative Committee approved a number of changes to be introduced in the TIR Convention as well as the new Annex 11 on the use of eTIR, providing the legal basis for the digital operation of the TIR system. None of the Contracting Parties to the TIR Convention objected to the proposals and introduction of the new Annex 11 on eTIR, as notified by the Secretary-General of the UN TIR Convention, as depositary, on 3 March 2021.

The new legal framework for the full digitisation of the TIR system in the 77 participating countries in five continents then officially came into force on 25 May 2021.

2.1.2 CMR

The international carriage of goods by road is regulated by the CMR Convention (Convention des Marchandises par Route), signed in Geneva on 19 May 1956, with the main objective of harmonising supporting documentation and facilitating the transport of goods in general. To date, the text of the Convention has been ratified by 58 states, which are listed in Table 1 (5).

Table 1 Participating States of the Convention on the Contract for the International Carriage of Goods by Road (CMR)

Country	Date of signature	Date of ratification, accession(a), succession(d)
Afghanistan		7 October 2020 (a)
Albania		20 July 2006 (a)
Armenia		9 June 2006 (a)
Austria	19 May 1956	18 July 1960
Azerbaijan		18 September 2006 (a)
Bielorussia		5 April 1993 (a)
Belgium	19 May 1956	18 September 1962
Bosnia and Herzegovina		1 September 1993 (d)
Bulgaria		20 October 1977 (a)
Cyprus		2 July 2003 (a)
Croatia		3 August 1992 (d)
Denmark		28 June 1965 (a)
Estonia		3 May 1993 (a)
Finland		27 June 1973 (a)
France	19 May 1956	20 May 1959
Georgia		4 August 1999 (a)
Germany	19 May 1956	7 November 1961
Greece		24 May 1977 (a)
Hungary		29 April 1970 (a)
Iran		17 September 1998 (a)
Ireland		31 January 1991 (a)
Italy		3 April 1961 (a)
Jordan		13 November 2008 (a)
Kazakhstan		17 July 1995 (a)
Kyrgyzstan		2 April 1998 (a)
Latvia		14 January 1994 (a)
Lebanon		22 March 2006 (a)
Lithuania		17 March 1993 (a)
Luxembourg	19 May 1956	20 April 1964
Malta		21 December 2007 (a)
Mongolia		18 September 2003 (a)
Montenegro		23 October 2006 (d)
Morocco		23 February 1995 (a)
North Macedonia		20 June 1997 (d)
Norway		1 July 1969 (a)
Oman		23 September 2020 (a)
The Netherlands	19 May 1956	27 September 1960
Pakistan		30 May 2019 (a)
Poland	19 May 1956	13 June 1962
Portugal		22 September 1969 (a)
United Kingdom of Great Britain and Northern Ireland		21 July 1967 (a)
Syrian Arab Republic		10 September 2008 (a)
Czech Republic		2 June 1993 (d)
Republic of Moldova		26 May 1993 (a)
Romania		23 January 1973 (a)
Russia		2 September 1983 (a)
Serbia		12 March 2001 (d)
Slovakia		28 May 1993 (d)
Slovenia		6 July 1992 (d)
Spain		12 February 1974 (a)
Sweden	19 May 1956	2 April 1969
Switzerland	19 May 1956	27 February 1970
Tajikistan		11 September 1996 (a)
Tunisia		24 January 1994 (a)
Turkey		2 August 1995 (a)
Turkmenistan		18 September 1996 (a)
Ukraine		16 February 2007 (a)
Uzbekistan		28 September 1995 (a)

The Convention defines the data that must appear in the **consignment note signed by the sender, the carrier who takes on the consignment, and the recipient on receipt of the goods**. Due to its characteristics and legal value, the CMR letter is considered the main document for proof of transport. The CMR consignment note is in fact a paper document certifying that the consignment has been taken over in connection with the transport of goods by road when the place of loading and the place of delivery are located in two different countries. It represents, to all intents and purposes, an agreement between three parties: the sender, the carrier and the recipient of the goods.

The text of the Convention (6) stipulates that the consignment note must contain the following information:

- place and date of its completion;
- name and address of the sender;
- name and address of the carrier;
- place and date of receipt of the goods and expected place of return;
- name and address of the recipient;
- current nature of the goods, type of packaging and, for dangerous goods, the generally recognised name;
- number of packages and their particular markings and numbers;
- gross weight or otherwise stated quantity of the goods;
- transport costs (transport price, ancillary costs, customs duties and other costs incurred from conclusion of the contract of carriage to redelivery);
- instructions required for customs and other formalities;
- indication that, notwithstanding any clause to the contrary, carriage is governed by this Convention;

If applicable, the consignment note must also contain the following information:

- prohibition of transhipment;
- costs to be borne by the sender;
- amount of the payment to be collected upon return of the goods;
- declared value of the goods and the sum representing the special interest on redelivery;
- instructions given by the sender to the carrier regarding insurance of the goods;
- time limit within which carriage must be carried out;
- list of documents delivered to the carrier.

The IRU has developed a standard CMR consignment note (Figure 4) based on the Convention. A minimum of four copies of the consignment note are printed in different colours:

- red: copy for sender;
- blue: copy for recipient (this copy accompanies the goods throughout transport);
- green: copy for courier/carrier;
- black: copy kept for administrative procedures.

All copies of the consignment note must be completed in the same way. It is possible that when filling out the consignment note, some data may be unknown (e.g. information on subsequent couriers). These data can be added later to the available copies.

The CMR consignment note number appears in two positions: at the top right of the page and at the bottom left of the page. The country (‘Pays’ in French) in which the consignment note was issued is also indicated at the top of the page.

Until recently, the CMR consignment note was only produced in paper format, whereas today, in the light of the digital transformation of logistics and transport, business operators and governments are pushing for a

switch to the electronic format of this document. The Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR) concerning the electronic consignment note called e-CMR (7) is of particular importance in this regard. This Protocol entered into force on 5 June 2011 and has now been ratified by 29 countries, i.e. half of the 58 member states of the CMR Convention. On 5 April 2022, Germany started to accept the electronic consignment note, becoming the 30th country to ratify the Protocol. The countries that have ratified the e-CMR Additional Protocol to date are shown in blue in Figure 3.

The details of the e-CMR are given in section 3.

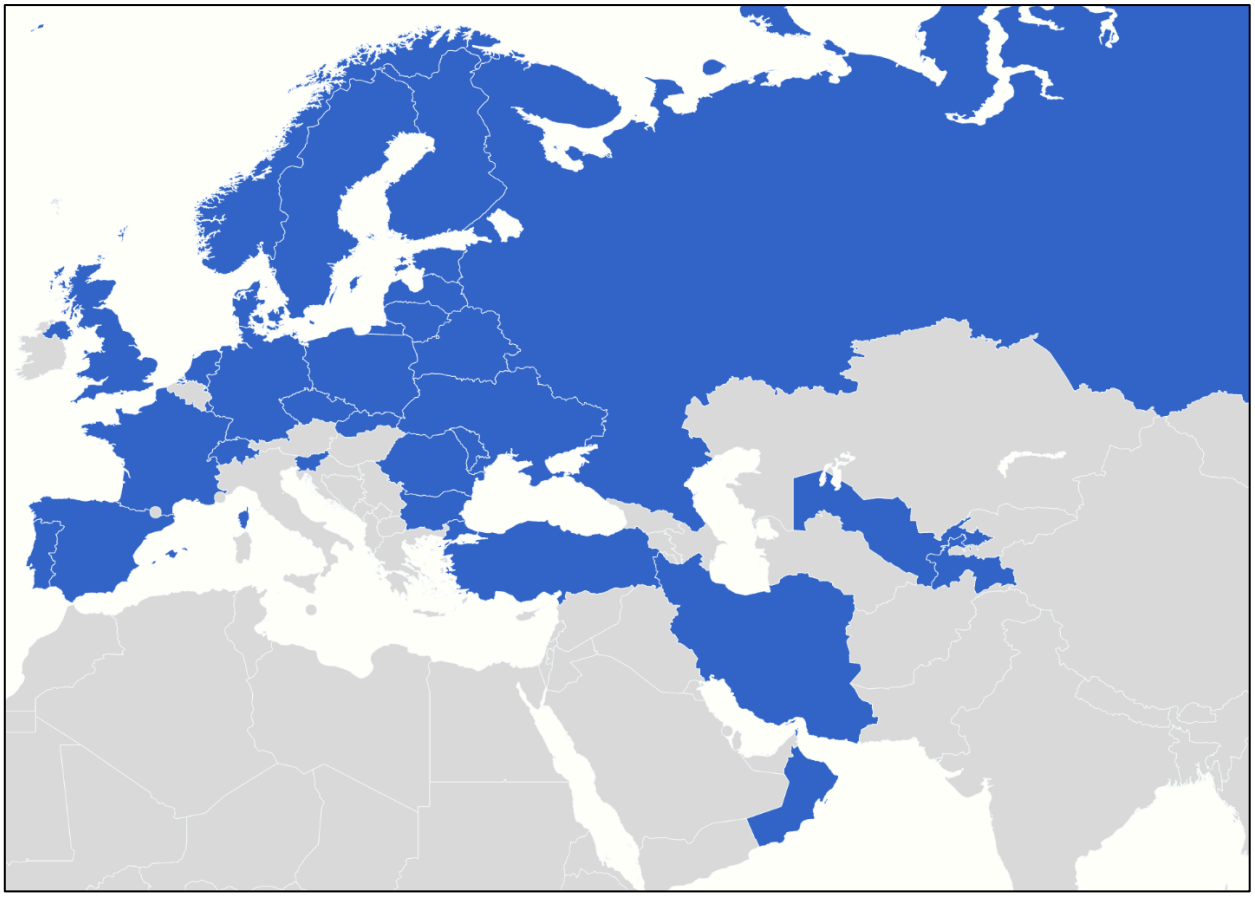

Figure 3 Countries that have ratified the Additional Protocol on e-CMR

It should be emphasised that the CMR consignment note is not a substitute for the contract of carriage, the existence of which can be proved by other means. The consignment note does not in fact constitute a title of availability, but only a title of legitimation for carriage.

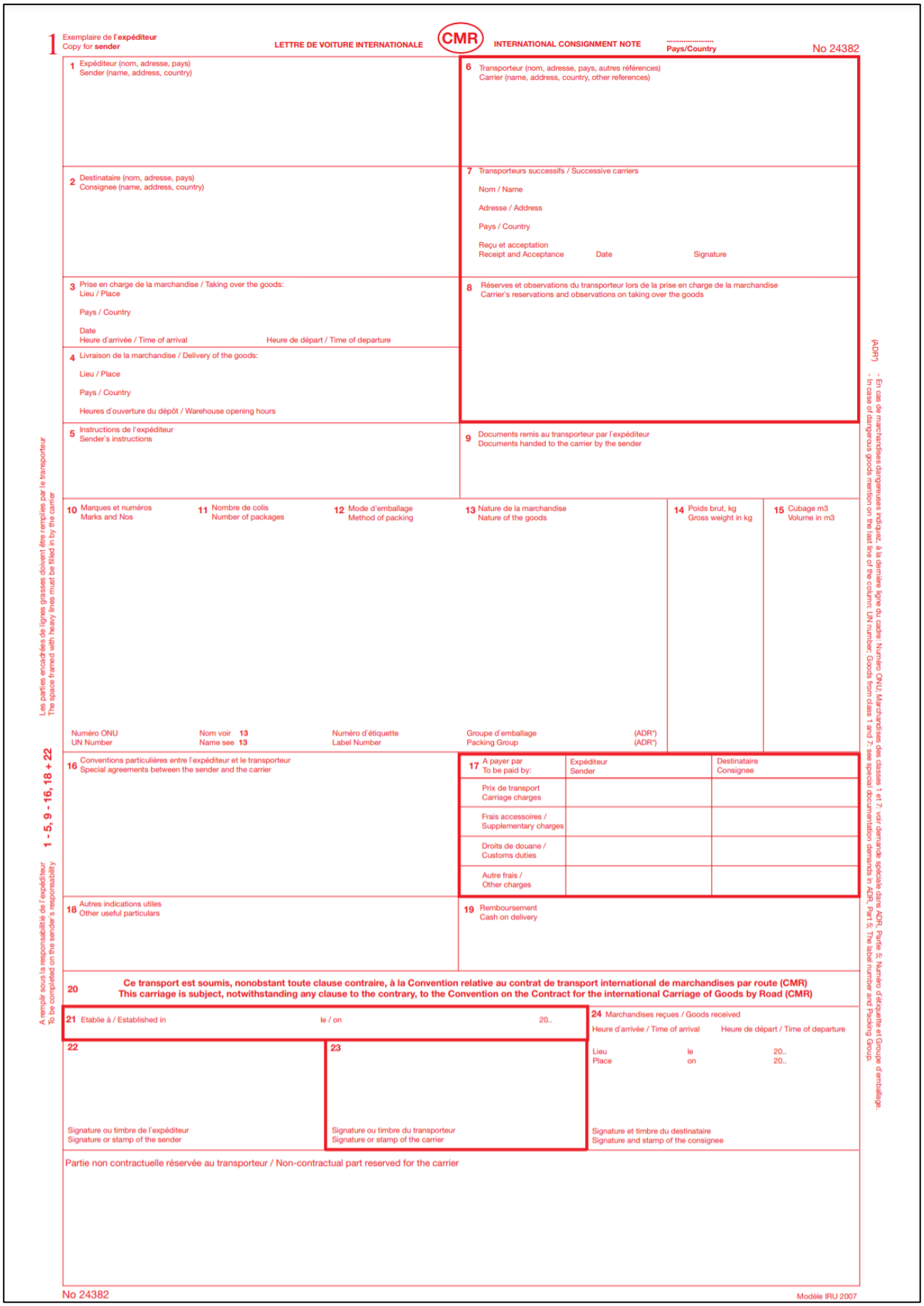

Figure 4 Template of the consignment note (IRU, 2007)

2.2 The situation in Europe

All EU states have joined the TIR Convention and expressed interest in the transition to the electronic eTIR version. However, it should be emphasised that since the right to free circulation of goods originating in Member States and goods originating from third countries with free circulation regime[2] in Member States is in force, **TIR documentation is only necessary for carriage involving non-EU countries**.

In contrast, with regard to the CMR Convention, while all EU Member States have acceded to the 1956 Convention, there are still some countries (including Italy and Austria) that have not yet ratified the additional protocol (e-CMR).

The European Commission's report states that, even today, most road freight transport takes place with the use of paper documentation even in countries that have ratified the e-CMR: as shown in Table 2, the percentage of use of electronic documentation is estimated at 1% for road transport (8).

Table 2 Estimated use of electronic transport documents in relation to modes of transport (2018)

Modes of transport	Share of electronic transport documents (2018)
Road	1%
Plane	40%
Maritime	0%
Railway	5%
Inland waterways	0%
Multimodal	0%

However, this figure has changed drastically in recent years, especially since 2020, when, due to the global pandemic, interest in digitisation has grown exponentially and there has been more widespread use of services for the issuing and management of electronic transport documents, which, together with electronic signatures, limit the exchange of paper documents between parties.

As far as transport within national borders is concerned, individual countries generally use 'national' types of consignment notes, e.g. the Carta de Porte is used in Spain and the Lettre de Voiture in France; while in Italy, the Documento di Trasporto (DDT) is the main document of reference.

2.3 The situation in Italy

With regard to the documentation required for the transport of goods in Italy, a distinction must first be made between domestic transport and international transport (to and from Italy). The type of documentation required depends in fact on the places of origin and destination and whether the foreign countries in question are in or outside the EU.

The following documents are required at a minimum for the domestic transport of goods: the **transport document (DDT), the packing list and the document of origin**.

In the case of international transport, on the other hand, the **CMR consignment note** and, if outside the EU, the **customs bills/export declaration (or TIR Carnet)** are required.

[2] Release for free circulation - https://www.adm.gov.it/portale/dogane/operatore/regimi-e-istituti-doganali/i-regimi-doganali/libera-pratica-1

Traditionally, all documents accompanying goods are used in paper format, but in light of innovations in digitisation and the increased accessibility of electronic platforms and smartphone applications, the Italian government has recognised the need to modernise current practices, and has mentioned this in the PNRR.

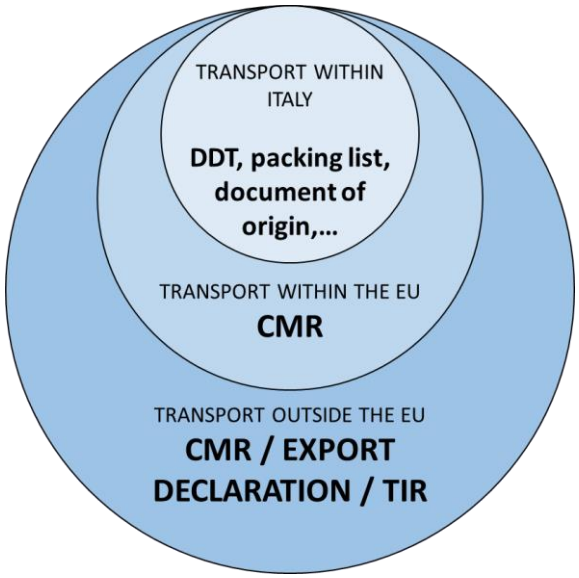

Figure 5 Current overview of the main documents required for the transport of goods by road to/from Italy

2.3.1 Use of digital documents for transport

Reform 2.3 of the National Recovery and Resilience Plan (Piano Nazionale di Ripresa e Resilienza, PNRR) envisages the **simplification of logistics procedures and the digitisation of documents**, with particular reference to the adoption of e-CMR, the modernisation of freight forwarding regulations, and the identification of accredited testing laboratories for goods controls (9).

The text of the reform recognises how the digitalisation of transport documents is a fundamental element of the EU strategy - shared by the Italian government - for the efficient carriage of goods by all modes of transport. This is demonstrated by European Regulations 2020/1056 and 2020/1055, aimed, respectively, at facilitating the exchange of electronic information and providing for the use of the electronic "Convention relative au contrat de transport international de marchandises par route" (e-CMR) as part of the controls on road cabotage operations.

The **main benefits** expected from the introduction of e-CMR in Italy are:

- Increased security and speed of exchange of information;
- Simplification of information flows between players in the supply chain;
- Reduction of documentation management costs;
- Less chance of errors and discrepancies between the data in the documentation held by the sender, carrier and recipient of the goods;
- Increased transparency and ease of control, particularly with regard to intermodality and duplication of controls, due to the constant monitoring of operations and the possibility of accessing information in real time;
- Promotion of the competitiveness of Italian road haulage companies in the acquisition of international transport contracts to and from States that already apply the aforementioned Protocol.

The PNRR also highlights the need for action on the **regulation of rights and obligations between customers and service providers** in the logistics value chain dating back to 1942, in the wake of developments in international shipping.

Finally, in order to speed up the control of goods and, consequently, the entire logistical flow, the PNRR provides for the possibility of contracting analytical laboratories that, in collaboration with or on behalf of the administrations in charge of controls, can help carry out these activities.

2.3.2 The transport document (DDT)

The transport document (in Italian '*Documento di trasporto'*, DDT) is a document legally required in Italy as an accompanying document for the transport of goods. It was introduced on 14 August 1996 with Presidential Decree 549, replacing the '*bolla di accompagnamento*' or '*bolla accompagnatoria'* which has since been virtually abolished.

The transport document does not have a specific template. However, Presidential Decree 472 stipulates what information the DDT must contain and that it must be completed in duplicate. The former remains with the seller of the goods, while the latter may travel together with the goods (or shipped separately, provided it arrives by midnight on the day of dispatch) and be delivered to the buyer.

In particular, the transport documents must contain:

- **sequential numbering of the DDT**: as with many other documents useful for tax purposes, DDTs must bear sequential numbers different from those used for other documents;
- **date of delivery**: the date of delivery of the goods must always be stated on the transport document, even when this, for reasons related to company organisation, does not coincide with the actual date of completion of the document;
- **details of the seller**: as in the case of any other tax document, the details of the seller (company or natural person) must be given;
- **details of the buyer**: similarly, the transport document must also contain the buyer's details;
- **details of the carrier**: if the goods are sent by a third-party carrier, then the transport document must also contain the details of the company in charge; if several carriers are used, it is sufficient to indicate the first of them;
- **information on the goods transported**: finally, the transport document must also indicate the quantity and type of goods transported.

The transport document must be issued if deferred invoicing is to be used: it does not necessarily have to accompany the goods supplied but may also be sent by courier or fax or be issued in the form of an electronic document. Any tax document can be treated as a transport document, provided it contains the above information. Any other document (e.g. delivery note, consignment note, bill of lading, etc.) is therefore equivalent to this document, as long as it contains the mandatory details. In addition, the DDT must specifically state whether the transport also includes hazardous materials and what kind, also specifying their weight and quantity.

To date, one of the main factors often holding back the full digitisation of the purchasing and sales cycle is the misconception that the DDT must be available in the vehicle during the delivery of goods, or that there is a regulatory obligation to require the domestic customer to sign the copy of the DDT once the goods have arrived at their destination. In reality, the DDT must be issued before the transport of the goods begins and can be transmitted electronically as long as this is done by the day on which the transport of the goods begins. Also, the signature of the recipient is not an obligation, but is often only given as proof of the actual delivery of the goods (10).

Since it is already technically possible to automatically link an electronic invoice and electronic order, it is easy to see the **potential and benefits** of this in terms of simplification of the process with the introduction of the digital DDT and the complete dematerialisation of the order cycle (11). Management in purely electronic form can save time and printing costs and facilitate the sharing of information, as the DDT can be consulted even before the goods arrive at their destination.

2.3.3 Other initiatives

Several aspects of the transport process can be optimised through digitisation and are already being implemented, for example:

- The E.V.A. (*E-Port Viaggi Autotrasporto*) system was implemented in the port of Genoa to facilitate transport operations. A dedicated smartphone application can be used to anticipate information on the pick-up and delivery of goods, thereby reducing waiting times and allowing the goods to pass straight through at the port and automated gates of terminals.
- The Port of Trieste has implemented Sinfomar software in the Port Community System (PCS) for managing the embarkation and disembarkation of inbound and outbound vehicles and goods. It is a shared platform organised and used by public and private stakeholders, including:
    - Shipping companies;
    - Customs;
    - Logistics Providers/Dispatchers;
    - Government agencies;
    - Terminal Operators/Port Authorities;
    - Warehouse operators.
- The National Logistics Platform (PLN), an implementation tool of the Ministry of Infrastructure and Transport's National Strategic Plan for Ports and Logistics. In summary, the PLN is an Intelligent Transport System (ITS) that:
    - allows carriers to communicate with modal interchanges, ports, freight centres and logistics hubs;
    - improves the efficiency and security of Italian logistics by simplifying communication processes between operators and agencies.

3. E-CMR

3.1 Operation and details

According to the Additional Protocol to the CMR Convention (7), the CMR consignment note, as well as any request, declaration, instruction, reservation or other communication relating to the performance of a contract of carriage to which the Convention applies, may be prepared in electronic form. An electronic consignment note that complies with the provisions of the Additional Protocol is considered equivalent to a paper consignment note and will therefore have the same evidentiary value.

The electronic consignment note must contain all the mandatory details of the paper consignment note.

Furthermore, the e-CMR must be authenticated by the Parties to the transport contract with a reliable electronic signature. The reliability of an electronic signature is a given, until proven otherwise, if it:

- is exclusively linked to the signatory;
- allows the signatory to be identified;
- was created by means over which the signatory can retain exclusive control;
- is linked to the data to which it relates in such a way as to make it possible to detect whether those data have subsequently been modified.

The electronic consignment note may also be authenticated by any electronic authentication process permitted by the law of the country where the electronic consignment note was prepared.

The use of the CMR consignment note regulates and harmonises the contractual conditions for the international road transport of goods. The adoption of the e-CMR digital consignment note aims to eliminate the use of paper documentation, thereby reducing environmental impact, improving the speed and reliability of the exchange of information, and reducing costs. With the use of e-CMR, the parties involved in transport will be able to upload data in electronic format in many different languages - limiting the risk of errors and allowing logistics information to be stored more efficiently - as well as exchange data in real time.

3.1.1 Transport within the EU

In general, goods sent between EU countries are not subject to EU customs duties and are considered non-taxable for VAT purposes because the principle of taxability in the country of destination applies.

Transactions that jointly meet these four requirements are considered as such:

- cost of the operation;
- acquisition or transfer of the right of ownership or other proprietary rights over the goods;
- economic operator status of the seller and purchaser;
- actual movement of goods from one EU state to another.

It is not necessary to define which party is in charge of the shipment/transport of the goods (seller/purchaser/third party on behalf of one of the above). In other words, the supply can be either 'free at destination' or 'ex works[3]'.

[3] 'Free at destination' is when the transport costs are borne by the seller and 'ex works' is when the transport costs are borne by the buyer. 'Ex-works' entails a minimum level of obligation for the company, which only has the responsibility to make the goods and related documentation available at its warehouse. Statistics show that 'ex-works' is the preferred method in Italy: the average is around 73%, while the European average stands at 23%.

In order to benefit from non-taxable status, and therefore be able to issue an invoice without VAT, it is necessary that:

- the seller and purchaser are present in the VIES archive[4];
- the seller is in possession of suitable documentary evidence of the movement of the goods.

With regard to this last point, Directive 2006/112/EC leaves it up to the individual Member States to define what form and type of proof of transport of the goods is appropriate, but Italian law does not provide for any specific provision in this regard.

According to Resolution No. 19/E of 25/03/2013 of the Italian Revenue Agency, the CMR constitutes, in both paper and electronic format, a suitable means of proof that the goods have left the national territory and is valid as proof of intra-community supply.

The recovery of the consignment note signed at destination is therefore the main element to prove to the competent control bodies (Revenue Agency, Customs and Monopolies Agency, *Guardia di Finanza*) that the goods have been delivered in an intra-community context, and therefore that the corresponding sales invoice is not subject to VAT.

It can be seen in Figure 6 how the functions of the e-CMR fit in with the provisions of **Regulation (EU) 2020/1056** of the European Parliament and of the Council of 15 July 2020 on electronic information relating to freight transport.

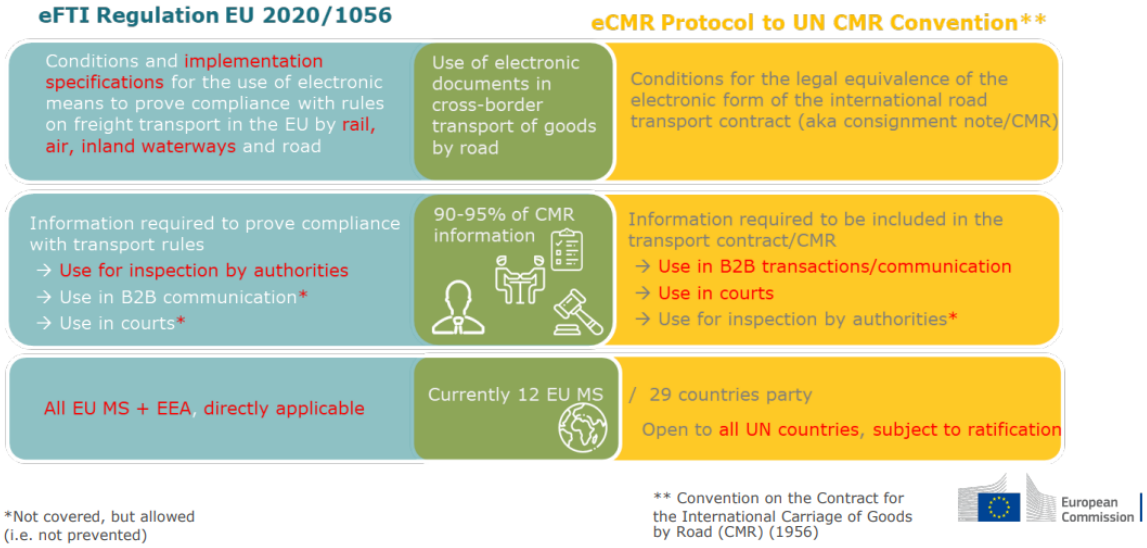

Figure 6 eFTI and e-CMR (European Commission)

3.1.2 Transport outside the EU

In international non-EU trade, the seller issues an invoice to the foreign customer and must prove by means of appropriate documents that the goods have actually left the European Union within 90 days from the date of delivery.

[4] VAT Information Exchange System (VIES) - Parties subject to VAT must be included in the VIES file in order to be able to carry out intra-Community transactions. The option to carry out these operations may be expressed directly in the declaration of commencement of business or, subsequently, electronically, either directly or through the persons entrusted with this task pursuant to paragraphs 2-bis and 3 of Article 3 of Presidential Decree 322/1998.

The export of goods was formerly confirmed with a copy of an invoice with a customs stamp, but the process has now been computerised. The transport of goods outside the borders of the EU can be tracked by means of the MRN (Movement Reference Number), i.e. the identification code of each individual customs declaration transmitted electronically.

The MRN streamlines and speeds up administrative procedures, but is also problematic, since not all non-European countries have adopted the MRN code system. In certain situations, therefore, obtaining the export declaration may be difficult. If the exporting company is unable to prove exportation within 90 days of delivery, it is forced to pay VAT (theoretically not due) and also risks penalties for a possible breach of VAT law.

3.2 Parties involved

The parties involved in the e-CMR procedure are as follows:

- **Freight forwarder/exporter** – the company that ships goods and is listed as the Shipper in the CMR Convention;
- **Recipient/Importer** – the company that receives a shipment of goods and is listed as Recipient in the CMR Convention;
- **Carrier/haulier** – the company that provides transport services and is listed as Haulier in the CMR Convention;
- **Driver** – the person who reports to the Carrier and physically carries out the transport;
- **Government authority** – any government supervisory or control body that carries out controls on the movement of goods.

3.3 Procedure

Several solutions for application of the e-CMR are commercially available that are based on the same basic operating process. It consists of the transfer of goods from company 1 in country A to company 2 in country B of destination and the use of the electronic consignment note (e-CMR) to confirm that the goods have been received. This transport activity is carried out by company 3.

The procedure can be summarised in six steps:

1) **Company 1 (forwarder/exporter)**, as the purchaser of transport services, prepares the goods for shipment and generates and sends the e-CMR data to the carrier via an e-CMR platform.
2) The **carrier (company 3)** can access the data entered by company 1 in the e-CMR platform via the Internet, with username and password, or directly, if this platform is integrated with its IT system. The carrier, before loading and transporting the goods, checks the data and enters the vehicle and driver information on the e-CMR platform.
3) Once the various fields of the e-CMR are filled in, the sender (forwarder/exporter) and the carrier sign the e-CMR document.
4) The driver receives the e-CMR for the transport service in the mobile application. Upon arrival at the pick-up point, the driver confirms his presence in the application, which records the time and location (geolocalisation). The driver checks the status and quantity of the goods, attaching notes and photos in case of discrepancies with the e-CMR, which are uploaded to the platform: in this way, the sender and the carrier both have proof of the 'status' of the shipment in real time. They then digitally sign the document.
5) Upon arrival at the delivery point, the driver confirms his presence and, as before, the time and location are recorded. The **recipient (company 2)** can ask the driver to enter any notes and photos on the status of the goods in the app (if they do not match the e-CMR) and these are immediately

uploaded to the platform. The recipient signs the e-CMR in the driver's application or, if able to do so, by accessing the e-CMR platform.

6) The signed e-CMR document is received instantly by the sender and carrier, and also by the recipient if able to access the platform. The recipient is otherwise sent the document by e-mail.

3.4 Benefits

Firstly, the use of e-CMR significant increases the efficiency of the supply chain. It allows for greater transparency, more accurate data, reduced storage costs and a lower risk of human error.

In addition, it allows real-time monitoring of shipments and increased visibility to support controls and the customs system.

Lastly, it significantly reduces environmental impact, as paper documents are no longer required.

The main benefits - for each of the three main figures involved in the process in particular - are outlined in Table 3.

Table 3 Benefits of using the e-CMR

Forwarder/exporter	Carrier/haulier	Recipient/importer
• Elimination of paper documents (fewer errors, easier searching and archiving) • Tracking of the progress of transport in real time • Proof of delivery in real time • Improved management of inventory • Reduced administrative costs • Possibility of attaching photos, receipts, documents	• Elimination of paper documents (fewer errors, easier searching and archiving) • Proof of delivery in real time • Reduced administrative costs • Better customer service • Faster invoicing • Improved management of vehicles • Possibility of attaching photos, receipts, documents	• Elimination of paper documents (fewer errors, easier searching and archiving) • Possibility of attaching photos, receipts, documents • Registration of time of arrival • Tracking of the progress of transport in real time

3.5 Limitations

To date, however, there are a number of factors limiting the diffusion and immediate adoption of electronic CMR, in particular:

- Limited number of countries that have ratified the e-CMR Protocol – a practical difficulty in the use of e-CMR arises when the countries of origin and destination (parties to the e-CMR protocol) are non-adjacent, requiring the shipment to pass through third countries that do not accept e-CMR. In this respect, with reference to the various pilot projects already implemented and those relating to e-CMR Italy, it is possible to use a hybrid system that combines paper CMR with e-CMR. In any case, this is an issue that will be overcome by August 2024 at the latest with the entry into force of the eFTI Regulation, as reported in 2.2;
- The electronic platforms generating e-CMR are not interoperable with each other - to date, the IT environment is fragmented and no binding rules on electronic data interchange have been defined. Initiatives such as the e-CMR Hub[5] propose to define specifications for the compatibility of e-CMR

[5] e-CMR Hub(https://i4trust.org/experiments/e-cmr-hub/) was launched in 2022 and is part of the larger i4Trust project, which aims to promote the development of innovative data value chain services across multiple sectors and geographical areas in Europe.

solutions developed by different vendors, enabling shippers/exporters and carriers to choose their own e-CMR solution regardless of the choice made by the other party for a freight service;

- Adaptation of corporate IT systems – companies will have to adapt their IT systems to be able to interface with commercially available e-CMR platforms and thereby facilitate data entry operations;
- Lack of universal recognition of the legal equivalence of electronic documents and signature methods by the competent authorities in the various states.

3.6 Level of implementation in the various states and pilot projects

To date, 30 countries have ratified/adhered to the Additional Protocol, which entered into force on 5 June 2011 (see Table 4 and Figure 3).

The use of e-CMR was first promoted by the International Road Transport Union, the Spanish hauliers' association Asociación de Transporte Internacional por Carretera (ASTIC) and the French Fédération Nationale des Transports Routiers (FNTR). The first transport of goods using the e-CMR electronic consignment note, took place between Spain and France in January 2017.

In 2018, the Dutch Minister of Infrastructure emphasised the importance for the transport sector in Europe that countries such as Germany, Italy and Austria proceed to accept the e-CMR (12).

At the moment, only Germany has taken up the call by formalising its accession to the Additional Protocol on 5 January 2022, bringing the number of EU Member States recognising the e-CMR to 18.

In practice, this means that transport companies have to assess, depending on the countries of origin and destination of transport of the goods, whether or not they can use the electronic consignment note while still retaining the paper CMR option.

In addition, some Member States use different rules for conventional CMR consignment notes in the case of transit (e.g. Belgium), further complicating the picture.

Table 4 Countries participating in the Additional Protocol on the electronic consignment note

Country	Date of signature	Date of ratification	Date of accession
Bielorussia			7 February 2019
Belgium	27 May 2008		
Bulgaria			15 September 2010
Denmark			28 June 2013
Estonia			2 November 2016
Russian Federation			6 March 2018
Finland	27 May 2008	11 January 2019	
France			5 October 2016
Germany			5 January 2022
Iran			8 November 2017
Latvia	27 May 2008	3 February 2010	
Lithuania	27 May 2008	7 March 2011	
Luxembourg			26 December 2017
The Netherlands	28 May 2008	7 January 2009	
Norway	27 May 2008	11 June 2020	
Oman			23 September 2020
Poland			13 June 2019
Portugal			26 September 2019
Czech Republic			14 April 2011
Republic of Moldova			14 March 2018
Romania			14 March 2019
Slovakia			21 February 2014
Slovenia			15 August 2017
Spain			11 May 2011
Sweden	27 May 2008	9 March 2020	
Switzerland	27 May 2008	26 January 2009	
Tajikistan			9 July 2019
Turkey			31 January 2018
Ukraine			10 July 2020
United Kingdom and Northern Ireland			20 December 2019
Uzbekistan			16 October 2020

Several states, both adhering and non-adhering to the Additional Protocol, and private sector entities, conducted pilot e-CMR projects on a national, bi-national and multi-national scale (13). However, these all differed in focus: some focused on the exchange of information between companies ('business to business, B2B'), while others focused mainly on the exchange of information between companies and administrations/governmental bodies ('business to administration, B2A') and between different administrations/governmental bodies ('administration to administration, A2A').

Some of these pilot projects are described below.

3.6.1 Benelux – Belgium, Luxembourg and the Netherlands

The Benelux pilot project, which started in 2017, aims to introduce the e-CMR in Belgium, the Netherlands and Luxembourg. The transition from paper to electronic format in the three states involved would, according to the IRU, result in economic savings of €270 million (14).

The pilot project is based on Order M (2017) 12 of the Benelux Committee of Ministers by which the three countries (signatories of the CMR Convention) decided to temporarily suspend the paper CMR as a necessary requirement in international road freight transport between their countries. The aim is to establish a regulation within Benelux that favours the introduction of e-CMR by pushing transport carriers towards the sole use of electronic consignment notes in transport processes. Although the use of electronic consignment notes was encouraged, the use of paper consignment notes was also permitted.

The project started on 1 December 2017 and was initially intended to last three years, ending in 2020. However, due to its success and the Covid-19 pandemic, it was extended to eight years and is now scheduled to end in 2025.

The B2B e-CMR information exchanges were carried out through the services of four accredited IT service providers: Collect+Go (Dutch), Transfollow (Dutch), Pionira (Belgian) and Truckfly (French/Luxembourgish). In order for electronic consignment notes to be considered as valid business documents as for paper consignment notes, they had to be:

- compliant with Articles 1 to 6 of the e-CMR Protocol;
- issued by an IT service provider in a Benelux country using technology authorised by the competent authorities;
- used by users reported by IT service providers to the competent authorities.

With regard to B2A information exchanges, the authorities could have access to the databases of IT service providers to check the information of an electronic consignment note. IT service providers needed accreditation to participate in the pilot project and each of the Benelux countries had to designate a competent authority to carry out the accreditation process and implement Decision M (2017) 12. Accreditation was subject to compliance with certain requirements described in Article 4 of Decision M (2017) 12.

Decision M (2017) 12 also established data protection measures to ensure that the use of the data is limited to the actual implementation of the e-CMR in a way that does not violate existing legislation on the protection of road transport data or personal data. As a further safeguard, Benelux specified that:

- only designated authorities could use the data;
- the data could not be used for purposes other than the pilot project;
- data could not be shared with other authorities, except for the reporting of irregularities.

With regard to A2A information exchanges, the designated national authority had the role of contacting the authorities of the other Benelux countries to update them on information relating to the pilot project (e.g. the list of suppliers applying for participation in the project with their authorisation status). The countries agreed to amend their legislation and regulations to implement the pilot project, if necessary.

Evaluations so far indicate that the use of electronic consignment notes within the Benelux countries is steadily increasing. In 2020, during the Covid-19 pandemic, the use of e-CMR increased by 50% as it facilitated the reduction of physical contact. The pilot project proved that the use of electronic consignment notes is at least as safe and reliable as the CMR under the conditions specified in the project.

The Benelux governments recently announced that an Access Point would be developed and integrated into the Benelux system to facilitate communication between carriers, authorities and governments (B2A and A2A information exchanges). The Access Point was planned for 2021.

In summary, it was observed that the implementation of e-CMR can:

- make CMR paper consignment notes, which cost up to €4.50 each, no longer necessary;
- reduce the administrative burden of businesses;
- reduce the risk of error when filling in the consignment note;
- promote centralised archiving and permanent access to consignment notes;
- track & trace on behalf of the carrier (e.g. in the event of a delay) or on behalf of the emergency services (e.g. in the event of an accident); this includes the careful integration of privacy requirements and the possibility of integrating with other digital files, e.g. for customs duties or invoicing, where other digital procedures are already in use.

COUNTRIES INVOLVED	STATUS	YEAR	TYPE
Belgium Netherlands Luxembourg	Ongoing	2017-2025	B2A

Figure 7 The Benelux pilot project

3.6.2 The Digital Innovation Network (DIGINNO) - Estonia, Latvia, Lithuania and Poland

The DIGINNO-Proto project was carried out as part of the DIGINNO (Digital Innovation Network) project between 2017 and 2020, and involved four countries in the Baltic Sea Region (Estonia, Latvia, Lithuania and Poland). The e-CMR pilot project was designed and conducted over one and a half years in the period 2019-2020 with funding of €134,000 provided by the Nordic Council of Ministers.

The pilot project focused on improving B2A, rather than B2B, information exchanges. It also tested A2A information exchanges.

For B2B information exchanges, an electronic consignment note was issued by the senders during handover of the goods to the carrier. To issue the electronic consignment note, senders used an IT service provider (also called EDI, Electronic Data Interchange, provider) whose software allowed companies to create, access and modify their electronic consignment notes.

In the case of B2A information exchanges, the IT service providers would enter the electronic consignment note in a national e-CMR register. The system was developed with distributed ledger technology (DLT, [6]). At the border or at any checkpoints, authorised government authorities were granted access to the e-CMR via an API (Application Programming Interface).

For example, in Estonia, once the transport process had started and an electronic consignment note had been created, cameras were used at the Estonian border to identify the vehicle's registration plate number. After identification, the system requested the Estonian electronic tax and customs service to identify the goods inside the vehicle. The control institute then requested the data of the electronic consignment note from the IT service provider through the information available in the e-CMR. The data provided the authorities with information on the goods on board the vehicle and enabled them to carry out a risk analysis on whether or not to carry out an inspection.

The e-CMR index registry system that had been set up enabled the updating of e-CMR indexes, the registration of e-CMR index views, the registration of the time and name of the user who made changes to an index, and the definition of functionalities according to user rights (authorities and companies had different types of access rights to the e-CMR).

The system was compliant with EU standards and adopted the UN/CEFACT technical standards on the e-CMR. This approach involved the development of a national e-CMR register that was interconnected with the registers of the countries involved.

[6] Distributed Ledger Technology (DLT): a database shared and synchronised consensually across multiple sites, institutions or geographical areas, accessible by multiple people. At each node on the network, the participant can access the information shared on that network and possess an identical copy of it. There is no central administrator.

With regard to A2A information exchanges, the national e-CMR index registers enabled the exchange of information on e-CMR indices across borders. Information in the e-CMR index registers could be exchanged through the distributed register system (as in the B2A case).

After evaluation, the test was considered successful, since:

- all functionalities and the exchange of data worked successfully at national and cross-border level;
- haulage companies in cooperation with EDI providers shared two document formats via the e-CMR:
  - CMR document structured in XML format by UN/CEFACT;
  - CMR document in PDF format;
- the PDF files are sufficient for visual inspection, but in the near future control institutions expect all data in the CMR document to be machine-readable (this would allow the use of modern analytical tools based on risk models).

The authorities evaluated the e-CMR pilot project positively for the work done and the guidance provided. The final report of the project specifically recommended:

- legalisation of the concepts of the prototype;
- promotion of its expansion into other countries;
- expansion of e-CMR pilot projects across Europe;
- raising awareness of the need for implementation of the e-CMR.

COUNTRIES INVOLVED	STATUS	YEAR	TYPE
Estonia Latvia Lithuania Poland	Completed	2019-2020	B2A

Figure 8 The Digital Innovation Network (DIGINNO) pilot project

3.6.3 Architecture for EurOpean Logistics Information eXchange (AEOLIX) – Living Lab12 - Czech Republic, Germany, Greece, Romania and Serbia

In September 2016, the Digital Transport and Logistics Forum (DTLF) launched the AEOLIX project to connect logistics information systems in EU member states by enabling real-time information exchange between companies and competent authorities to improve efficiency of the sector and value chain.

The AEOLIX project involved the creation of several Living Labs (LLs) with different focuses. Living Lab 12 (LL12) was launched in April 2019, with a focus on the implementation of the e-CMR in critical corridors within Europe. The pilot project was scheduled for completion in August 2019.

The targets to be tested were:

- the reduction of administrative work by replacing paper consignment notes with electronic ones;
- faster inspection of trucks;
- the promotion of more environmentally sustainable transport operations.

LL12 covered four critical areas for road freight transport in Europe: south-eastern Europe (Greece and Romania), the Balkans (Romania and Serbia), central Europe (Germany and the Czech Republic) and central Europe towards the Mediterranean (Greece, Serbia and Germany). The IRU, private sector entities and national authorities from the Czech Republic, Germany, Greece, Romania and Serbia participated in implementation of the pilot project.

As part of the LL12 impact assessment, a survey was carried out which showed that participating companies experienced a reduction in waiting times for trucks at the terminal. Other benefits included a reduction in the time taken to create electronic consignment notes, a reduction in the average time needed to complete the signature process, a reduction in the average time spent on roadside checks, and a reduction in the average time spent on administrative work. Costs related to the processing of transport documents in the case of lost, damaged and delayed goods were also reduced.

COUNTRIES INVOLVED	STATUS	YEAR	TYPE
Czech Republic Germany Romania Serbia	Completed	2019	B2A

Figure 9 AEOLIX pilot project

3.6.4 First intermodal route in Europe: Spain-Italy

The Trans Italia Srl and Grimaldi Groups were the protagonists of the first intermodal transport with e-CMR in Europe, more precisely from Spain to Italy, carried out in 2019. The cargo departed from Madrid with final destination Verona. The route was travelled by lorry from Madrid to the port of Valencia; from there it was taken by sea to the port of Livorno, and then by road to Verona.

The project was supported by the Spanish association ASTIC (*Asociación de Transporte Internacional por Carretera*) and the Italian association ALIS (*Associazione Logistica dell'Intermodalità Sostenibile*)

COUNTRIES INVOLVED	STATUS	YEAR	TYPE
Italy Spain	Completed	2019	B2B

Figure 10 First e-CMR intermodal route in Europe

3.6.5 France, the Netherlands and the United Kingdom

In February and March 2019, an e-CMR pilot project was conducted between France, the Netherlands and the UK using Transfollow's e-CMR platform.

The goods were transported from France to the UK: first by road from France to the Netherlands, and from there the vehicle was transported by ferry to the UK.

The UK government ratified the e-CMR in December 2019, a few months after conclusion of the pilot project.

3.6.6 Slovenia

Slovenia joined the e-CMR in August 2017 and then contacted other countries to gauge their interest in participating in pilot projects.

Slovenia's first pilot project started in March 2019 and involved the road transport of goods from Zagreb, Croatia, to Novo Mesto, Slovenia. Although the Croatian authorities were not involved in the pilot project, the Slovenian authorities tested the use of an electronic consignment note for the entire journey. It should be noted that paper consignment notes were used on Croatian territory and electronic consignment notes were used on Slovenian territory.

The sender used the Transbook platform to create the electronic consignment note. After receiving the goods, the recipient was required to acknowledge receipt and sign the electronic consignment note to confirm completion of the transaction.

The authentication process included signing on glass, which was outsourced to an IT solution provider other than Transbook. The process involved the acquisition of the signatures of the sender, carrier and recipient (or their agents) during transport of the goods as part of an iterative process, and, in the event of changes made to the electronic consignment note, the acquisition of new signatures of all the parties that had signed the document up to that point. After the recipient had signed, the content of the electronic consignment note was saved in PDF format in secure cloud storage and could no longer be modified.

For B2A information exchanges, authorities had temporary access to the electronic document via a QR code that the carrier showed them at the border and/or checkpoints. The full details of the consignment note, instead, could be accessed via the platform of the IT service provider.

The pilot project did not entail significant direct financial costs for the government. The software service was offered free of charge to the companies involved in the pilot project. The drivers were trained to use the application of the IT solution and learnt how to interact with the authorities in the case of an electronic consignment note instead of a paper one.

The participating companies gave positive feedback. They expressed their wish that the use of e-CMR be extended as soon as possible, and for transport with neighbouring countries in particular.

3.6.7 The Accudire platform and Italy Smart Export

With reference to Italy, an important initiative on the digitisation of consignment notes and logistics processes in general was launched on the Italy-Turkey route with the support of the ACCUDIRE platform.

The participants in the project were: the Benetton Group, the Customs Agency, the Port of Trieste, the Port Authority of the Adriatic Sea and Accudire Srl. The project involved the shipment of goods with roll-on/roll-off (ro-ro) trucks from the Benetton factory to the company's hub in Turkey with digital management of the advance notice of the arrival of goods at the port by means of Accudire's technology platform, which included the dematerialisation of the international consignment note.

COUNTRIES INVOLVED	STATUS	YEAR	TYPE
Italy Turkey	Completed	2021	B2B B2A

Figure 11 Italy Smart Export

3.6.8 Federated Network of Information eXchange in LogistiX (FENIX) - Trieste

FENIX is a European project coordinated by ERTICO-ITS Europe (European Road Transport Telematics Implementation Coordination) with 43 beneficiaries including 25 implementing organisations and 2 Member States. FENIX aims to develop Europe's first federated data sharing architecture to serve the European logistics community of shippers, logistics service providers, mobility infrastructure providers, cities and authorities by enabling interoperability between existing and future individual platforms. FENIX envisages the implementation of 11 pilot sites located in 9 TEN-T corridors in 9 European countries.

In particular, a case study was carried out at the Trieste pilot site (involving the Mediterranean and Baltic-Adriatic corridors) whereby the various parties of a freight transport operation requested in an e-CMR application exchanged data via the FENIX platform. The FENIX partners involved in this use case are the Codognotto Group, as user of the e-CMR, and Pionira providing the e-CMR platform, who defined the process and developed the software applications required to ensure a secure administrative-logistics process with particular reference to supplier certification and qualification, proof of delivery, invoicing and payment.

In summary, the aim of the project is to:

- Test the e-CMR platform;
- Implement a digitised administrative system linked to the introduction of the e-CMR;
- Implement an IT platform for the certification of supplier transports.

COUNTRIES INVOLVED	STATUS	YEAR	TYPE
Italy Corridors: • Baltic Adriatic • Mediterranean	Ongoing	2019-2022	B2B B2A

Figure 12 FENIX project: Trieste pilot site

3.6.9 Slovenia and Turkey

In November 2019 and January 2020, Slovenia and Turkey carried out two e-CMR pilot projects for road freight transport both with a focus on B2B and B2A information exchange and with A2A coordination.

The goods were transported from Maribor, Slovenia, to Istanbul, Turkey. Customs officers verified the e-CMR by reading the QR code on the carrier's mobile device with the camera on a phone. In one pilot project, e-CMR access to the electronic consignment note at a border crossing point was granted to the Slovenian authorities, and, in the other pilot project, to the Turkish authorities.

It was noted that the operational process was made much faster with the use of the electronic consignment note, information was immediately accessible, and the possibilities of tracking goods were improved. In addition, errors when filling in consignment notes were reduced. Finally, the parties involved in the project pointed out that digitisation has increased the possibility of integrating e-CMR systems with other digital transport documents.

3.7 Suppliers of e-CMR solutions

Several platforms are currently available on the market that enable the issuing and management of electronic CMR consignment notes. The main ones are listed in Table 5 and all have the following functions:

- possibility of online access;
- transmission of information in real time;
- geolocation;
- availability of a smartphone app;
- online archiving of the e-CMR;
- integrability with company management systems.

Table 5 Platforms for issuing and management of the e-CMR

Platform	Registered office	Start of activities e-CMR	Additional functions*
Transfollow	Switzerland	2013	• Photos can be attached • Interfacing possible offline • 'Successive carriage' function for switching the e-CMR from one driver to another
Pionira	Belgium	2010	• Photos can be attached • 'Successive carriage' function for switching the e-CMR from one driver to another • Possibility of requesting the driver to enter parameters such as the temperature inside the container before the start of transport
Collect + Go	The Netherlands	2015	• Additional information on the transport of dangerous goods
Dashdoc	France	2018	• Photos can be attached • Interfacing possible offline • Possibility of requesting the driver to enter parameters such as the temperature inside the container before the start of transport
Accudire	Italy	2019	• Single portal for managing the documentation required for intra- and extra-EU exports • Digitisation of customs files and administrative and logistical documentation
Dornach	France	N/A	• Photos can be attached
Transbook	Slovenia	N/A	• Photos can be attached • Chat function for the various parties
LZP	The Netherlands	N/A	• Photos can be attached

* Information gathered from direct discussions with platform representatives and website consultations

3.8 High-level architecture of the e-CMR and access by authorities

The Working Group on Road Transport (SC.1), belonging to the UN Economic and Social Council, pointed out that the various pilot projects adopted different business and technological approaches. It pointed out that the stakeholders involved in the different projects did not discuss and consider the possibility of coordinating their approach with others, and suggested that a high-level architecture for data exchange between the various parties should be set up (15).

The SC.1 Working Group then defined four possible options for the creation of a high-level architecture (16):

- **Option 1 -** Establishment of a national e-CMR register in each country;
- **Option 2 -** Creation of regional e-CMR registers;
- **Option 3 -** Creation of a single international e-CMR;
- **Option 4 -** No e-CMR register, only e-CMRs generated by private sector IT companies.

With the aim of overcoming fragmented implementation, Working Group SC.1 recommended the creation of an **international e-CMR (option 3)**. The characteristics of the four possible options for implementing the high-level architecture are briefly outlined below.

Option 1 - Creation of a national e-CMR register in each country

- Option 1 envisages the development by each country of a national e-CMR **register**. These national e-CMR registers should be interconnected with each other ensuring a secure and real-time exchange of data relating to e-CMR electronic consignment notes;
- Both senders and carriers, including forwarders, agents and other relevant users, in each country, should be registered in these national e-CMR registers and have a unique code, if they wish to use the e-CMR service;
- The registry should provide and guarantee the authentication of each user on the basis of national laws;
- ***Operation:***
  1) One of the users (sender or carrier) initiates the transport contract. To do this, they use the unique code (provided by the register) of their contract partner (sender or carrier). The other partner receives a notification (by e-mail or phone) that a new transport contract has been initiated, requesting confirmation and all the information required by the CMR consignment note. The new electronic transport contract is issued in one of the following ways:
     a. Using the national e-CMR register application;
     b. Using an application within their company IT system connected to the national e-CMR;
     c. Using a third-party IT application that ensures proper interconnection (via web) with the national e-CMR register.
  2) The national e-CMR register transmits the relevant information from the electronic consignment note to all national e-CMR registers identified in the itinerary described in the electronic consignment note.
  3) The carrier uses a mobile application with which it receives the electronic consignment note (via QR code/PDF file/encrypted file, etc.). At border checkpoints, customs authorities can scan the QR code (or enter the unique code of the PDF file) and automatically check the correctness and integrity of the data in relation to the data given in their national e-CMR register.
  4) The same procedure as in point 3 may be carried out in the event of police checks.
  5) If the carrier needs to change the consignment note during the journey, it may do so by sending the changed data for approval by the other users involved. Once approval is obtained, the consignment note is modified and the new dataset is entered into the national e-CMR associated with the location where the change was made, and from there it is forwarded to all other national e-CMR registers identified in the itinerary.
  6) The same procedure as in point 5 is carried out with the proof of delivery. When the goods arrive, the recipient can take photos of the load and upload them to the register via an app on a mobile device and approve the delivery, adding any comments. This information is then sent to the sender via the national e-CMR register of the country of destination and the contract is finalised.
  7) Relevant data are kept in all the registers for at least 10 years, ensuring their integrity and preservation in case any authorities (courts, banks, etc.) require access to this information.

Option 2 - Creation of regional e-CMR registers

- Option 2 envisages the development by a number of countries of **regional e-CMR registers**;
- These regional e-CMR registers are securely interconnected and ensure a real-time exchange of data relating to e-CMR electronic consignment notes;
- Both senders and carriers, including shippers, agents, etc., must be registered in these regional e-CMR registers according to their country if they wish to use the service, obtaining a unique code. This registration should include certain financial data that guarantee the authentication of each user by

the regional e-CMR. Countries participating in these regional e-CMR registers should agree on how users will be authenticated and how these regional registers will be developed (funding, operational and maintenance costs, etc.);

- ***Operation*:**
  1) One of the users (sender or carrier) initiates a transport contract. To do so and to involve the other partner, the latter must know and use the unique code of the other contractual partner (sender or carrier). The other partner receives a notification (by e-mail or phone) that a new transport contract has been initiated, requesting confirmation and providing all the information required by the CMR consignment note. The new electronic transport contract is issued in one of the following ways:
     a. Using the application of the regional e-CMR register;
     b. Using a corporate IT systems application that ensures proper interconnection with the regional e-CMR register;
     c. Using a third-party IT application that allows proper interconnection with the regional e-CMR register.
  2) The carrier (haulier) uses a mobile application to receive the e-CMR (QR code/PDF file/encoded file etc.). At border checkpoints, customs authorities will be able to use their mobile application to scan the QR code or enter the unique code of the PDF file and automatically verify the correctness and integrity of the data in relation to the data given in their regional e-CMR register.
  3) The same procedure may be carried out when the police stop the haulier to check the e-CMR.
  4) If the consignment note needs to be changed during the journey, the carrier may do so by sending the changed data to the sender for approval via the regional e-CMR register of reference. Once approved, the consignment note is modified and, if necessary, the new dataset is transmitted from the regional e-CMR register containing the changed data to all other regional e-CMR registers identified in the itinerary.
  5) The same procedure is carried out with the proof of delivery. The recipient should be registered in the regional e-CMR register of his country and should have already received the relevant transport data. When the goods arrive, the recipient can take photos of the load and upload them via a mobile app to the register and approve the delivery with or without comments. This information will then be sent to the sender via the regional e-CMR register of the country of destination, and the contract is finalised.
  6) Relevant data should be kept in all the registers for at least 10 years, ensuring their integrity and preservation in case any authorities (courts, banks, etc.) should require access to this information.

Option 3 - Creation of a single international e-CMR register

- Interconnection with the customs authorities of each Contracting Party ensuring a secure real-time exchange of data relating to e-CMR electronic consignment notes;
- Registration of senders and carriers, including shippers, agents, etc., from each participating country in this international e-CMR register, which generates the respective unique code, if they wish to use the service. Countries participating in this international e-CMR register should agree on how users will be authenticated and how this international e-CMR register will be developed (funding, operational and maintenance costs, etc.).
- ***Operation*:**
  1) Initiation of the transport contract by one of the users (sender or carrier). To do this and to involve the other partner, the latter must know and use the unique code of the other contractual partner (sender or carrier). The other partner receives a notification (by e-mail or phone) that a new transport

contract has been initiated, requesting confirmation and providing all the information required by the CMR consignment note. The new electronic transport contract is issued in one of the following ways:

   a. Using the international e-CMR register application;
   b. Using a corporate IT systems application that ensures proper interconnection (web services) with the international e-CMR register;
   c. Using a third-party IT application that ensures proper interconnection with the international e-CMR register.

2) The international e-CMR register transmits the relevant information to all the customs identified in the itinerary and to the destination identified in the itinerary described in the e-CMR consignment note.
3) The carrier (haulier) uses a mobile application to receive the e-CMR (QR code/PDF file/encoded file etc.). Customs authorities at border crossings will already know who is coming with what goods, etc., and based on the risk analysis they will decide whether or not they should check the lorry. The customs officer can then use his mobile application to scan the QR code or enter the unique code of the PDF file provided by the driver and automatically verify the correctness and integrity of the data.
4) The same procedure may be carried out when the police stop the haulier to check the e-CMR.
5) If the carrier needs to change the consignment note during the journey, it may do so by sending the changed data to the sender for approval via the international e-CMR register. Once approved, the consignment note is amended and the new dataset is registered in the international e-CMR register.
6) The same procedure is carried out with the proof of delivery. The recipient should be registered in the international e-CMR register and should have already received all relevant data. When the goods arrive, the recipient must be able, using his mobile device, to take photos of the goods and upload them to the register and approve the delivery with or without comments. This information will then be sent to the sender via the international e-CMR register and the contract will be finalised.
7) Relevant data should be kept in the international e-CMR register for at least 10 years, ensuring their integrity and preservation in case any authorities (courts, banks, etc.) should require access to this information.

Option 4 - No e-CMR register, only e-CMRs generated by IT companies

- The architecture does not foresee the development of any e-CMR register but electronic consignment notes would be generated by authorised or unauthorised IT providers, following or not following UN/CEFACT standards;
- The applications developed by these companies are not necessarily interoperable either with the applications of other companies or with those used by customs authorities;
- Both the sender and the carriers in each country have to be registered in the database of one of these IT companies if they wish to use the e-CMR service, obtaining a unique code. The authentication mode is set by the company providing the e-CMR service.
- ***Operation*:**
  1) One of the users (sender or carrier) initiates a transport contract. To do this and to involve the other partner, the latter must know and use the unique code of the other contractual partner (sender or carrier). The other partner receives a notification (by e-mail or phone) that a new transport contract has been initiated, requesting confirmation and providing all the information required by the CMR consignment note. The new electronic transport contract is processed on the platform of the e-CMR service provider chosen by the user who initiated the contract.
  2) The carrier (haulier) uses the mobile application of the e-CMR service provider to receive the e-CMR (QR code/PDF file/encoded file etc.). Customs authorities at border crossings should check the e-

CMR code. It is unclear how national customs authorities will have access to the e-CMR service provider's database and how they can trust the data contained therein (which could potentially lead them to request a paper consignment note).

3) The same as in point 2 can happen when the police stop carriers to check their electronic consignment notes.
4) If the consignment note needs to be changed during the journey, the carrier can do so by modifying the data and informing the sender. The ability to make changes and the process involved will depend on the solution implemented by the e-CMR service provider.
5) The same procedure is carried out with the proof of delivery. The recipient should be registered on the platform of the e-CMR service provider and should have already received all relevant data. When the goods arrive, the recipient should be able, using his mobile device, to take pictures of the goods and upload them to the platform of the e-CMR service provider, approve the delivery with or without comments, reservations etc. This information will then be sent to the sender via the e-CMR platform and the contract will be finalised.
6) Relevant data should be kept by the e-CMR service provider for at least 10 years, ensuring their integrity and preservation in case any authorities (courts, banks, etc.) should require access to this information. The courts may also require information from the IT company on how they store the data, how to access them (under which law), etc.

4. Digitisation of the operational processes of Italian road haulage companies

With the support of the Format Research institute, a survey was conducted among Italian road transport companies in order to determine:

- the state of **digitisation of processes**;
- knowledge of the **required standards and documentation** with particular reference to the legislation on electronic freight information (EU Regulation 2020/1056);
- knowledge of the e-CMR, expected benefits and possible critical issues relating to **adoption**;
- the use of the **TIR (Transport International Routier) and eTIR** international customs documents.

The national sample, assessed as statistically representative of the universe of Italian companies operating in the road haulage sector, counts around 1600 companies, of which 500 are companies operating in the international road haulage sector.

Some details on the composition of the sample can be found in Figure 13, Figure 14 and Figure 15.

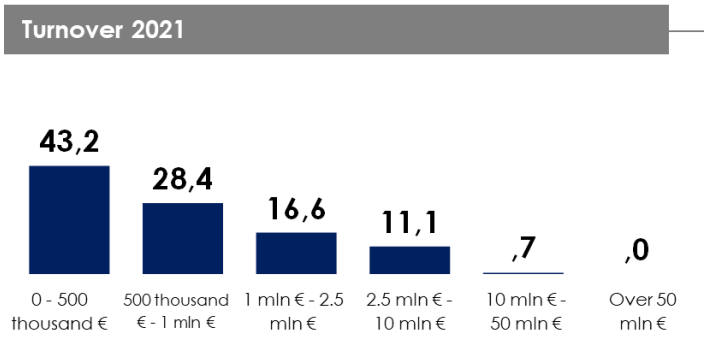

Figure 13 Turnover in 2021 of the total survey sample

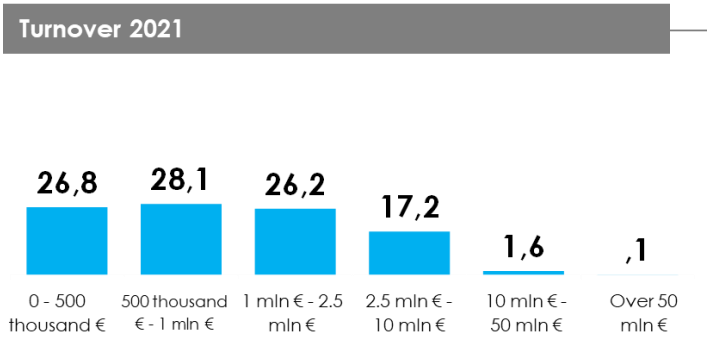

Figure 14 Turnover in 2021 of the 'international' survey sample

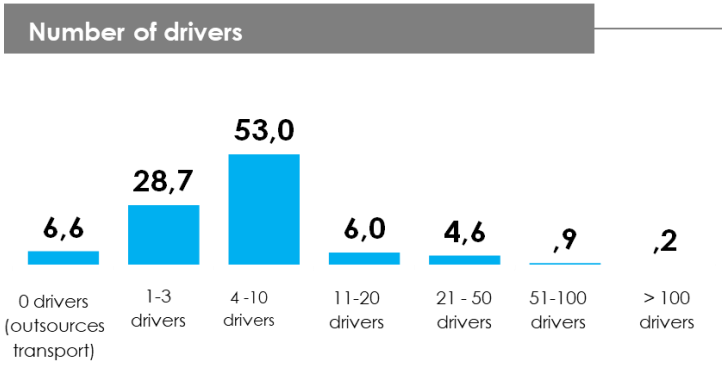

Figure 15 Number of drivers in the 'international' survey sample

4.1 Digitisation of the processes

The analysis of the level of digitisation of processes revealed that road transport companies are more 'digitised' with regard to **administrative processes** (i.e. processes related to order management, invoicing, etc.) than to **operational processes**: 94.0% state that their administrative processes are at least partly digitised, whereas with regard to operational processes (i.e. related to goods transport operations, warehouse logistics, etc.) the percentage is lower at 70.7%.

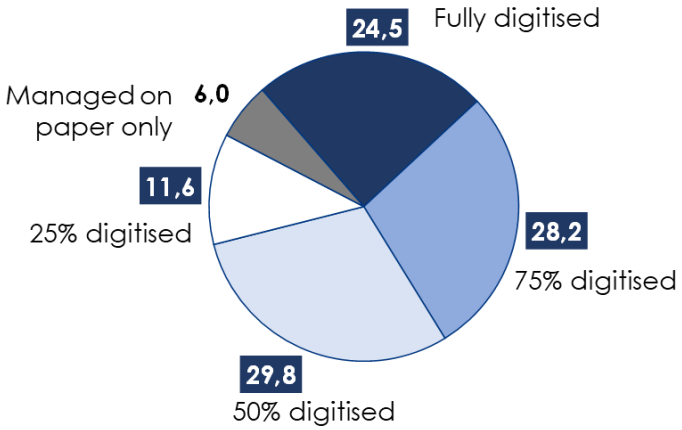

Figure 16 Digitalisation of administrative processes

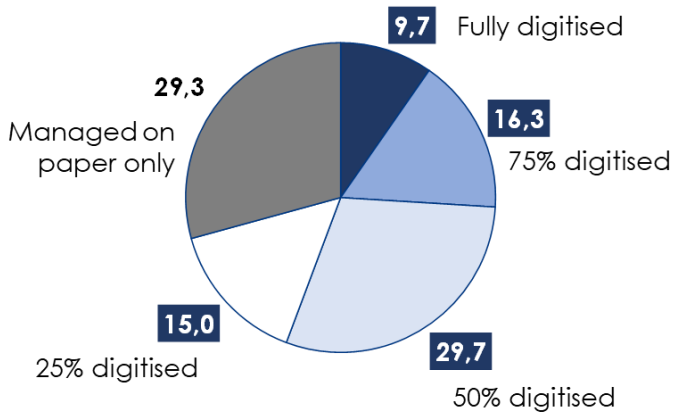

Figure 17 Digitisation of operational processes

95.3 per cent of the companies communicate with their customers by e-mail, 25.7 per cent in paper form, and 14.7 per cent through a direct interface of IT environments (this percentage increases in the case of companies with at least 50 employees).

Mostly invoices and/or payments (96.3%) are communicated electronically, followed by orders (59.8%), complaints and/or disputes (41.9%), and order status messages (35.9%).

Among the documents that road transport companies would like to manage electronically (Figure 18), the **Transport Document (DDT)** comes first at 44.0%. Of the companies surveyed that do trade internationally, 23.6% would like to be able to manage the CMR electronically.

	Total companies	International
Transport Document (DDT)	44,0	37,3
Single Administrative Document (SAD)	11,0	10,8
CMR	5,4	23,6
Waste transport notification	4,6	3,9
Packing list	3,6	7,0
DIA (Declaration of Commencement of Activity)	3,6	5,0
ATP Certificate	3,2	3,7
Export declarations	3,0	13,2
Dangerous Goods Safety Instructions	2,9	4,1
TIR	2,6	11,4
Export Accompanying Document (EAD)	0,7	3,3
Documents for the transport of live animals	0,5	0,1
Movement Reference Number (MRN) (Export Notification)	0,4	1,8
Other	0,8	0,0
None in particular	32,2	17,0

Figure 18 Survey results of documents that companies would like to manage electronically

The percentage of companies that would like to use e-CMR increases with the number of employees and the turnover of the company itself: more than half of the companies with an annual turnover of more than 50 million would like to be able to manage the e-CMR electronically.

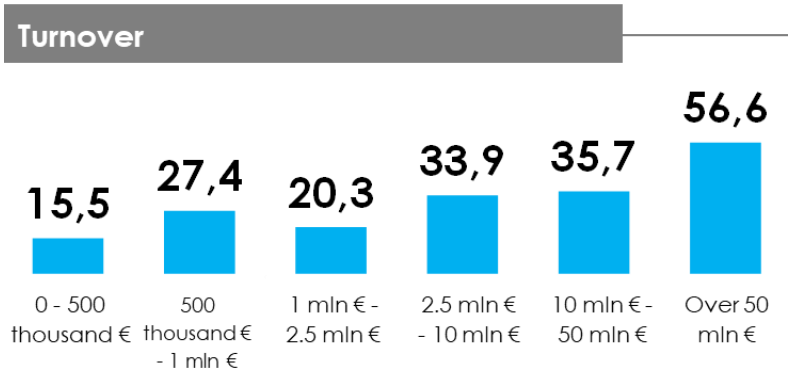

Figure 19 Percentage of companies that would like to manage the CMR electronically

Among the potential advantages of using digital documents (Figure 20), the road transport companies surveyed mentioned **greater environmental sustainability** due to the reduction in the use of paper (36.0%),

the possibility of being able to **exchange information in real time** (35.3%), the **greater security of a digital rather than a physical archive** (32.7%), and the speeding up of the invoicing and payment process (32.6%).

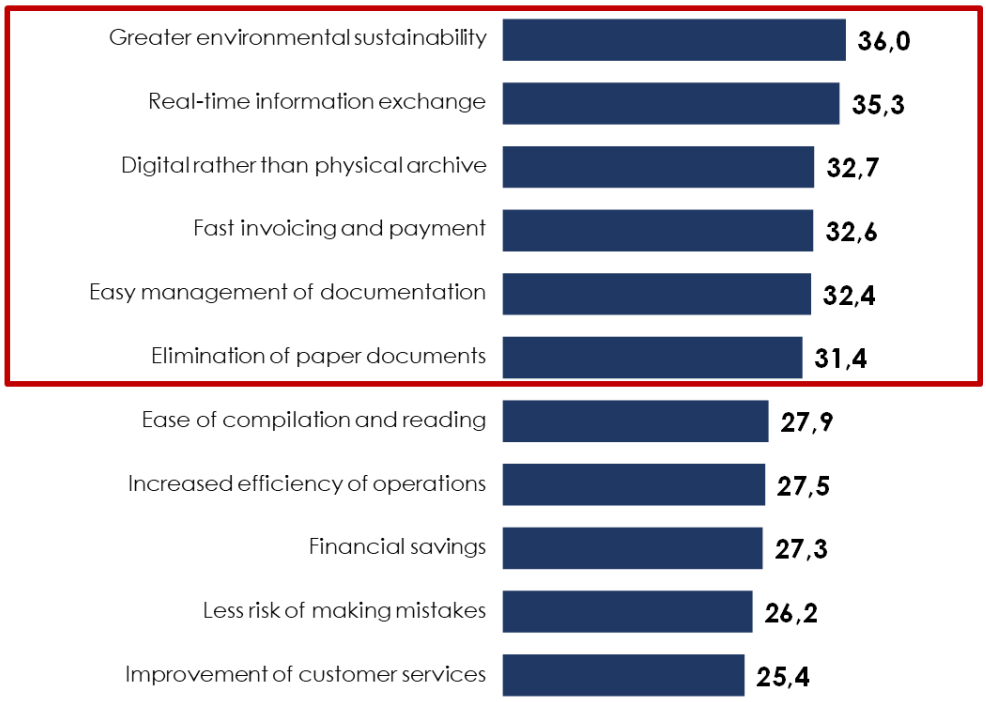

Figure 20 The expected advantages of electronic documentation

A key factor that would support the transition to the use of digital documents is the provision of appropriate devices by companies and operators. It was found that drivers for 91.8% of the companies surveyed use a mobile device for work which, in the vast majority of cases, is an Android smartphone (84.8%).

Only in 32.7 per cent of cases is the device provided by the company, compared to 67.3 per cent where the device is owned by the driver.

8 out of 10 respondents who have a mobile device said they are always connected while travelling.

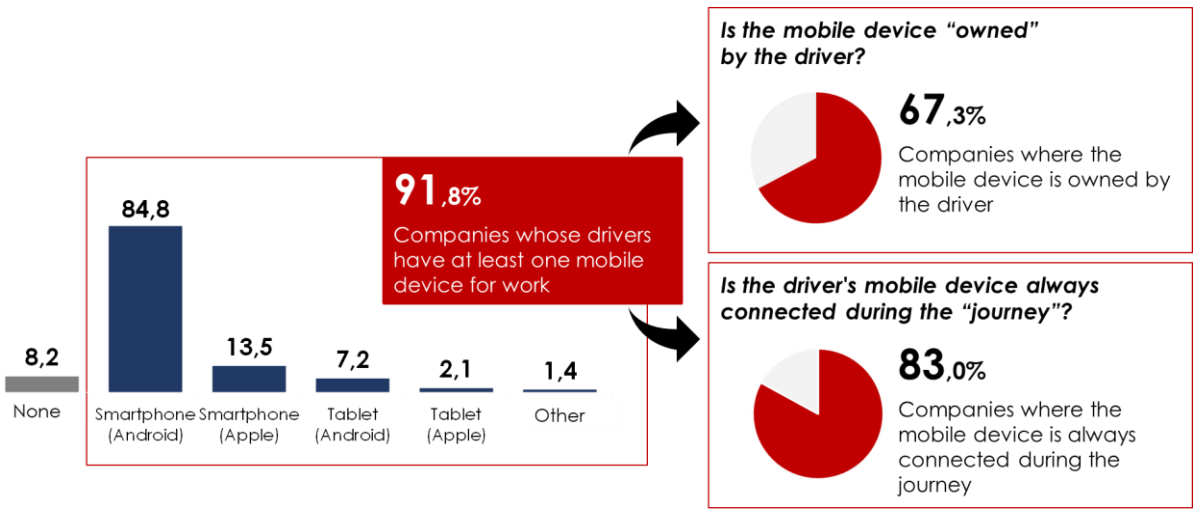

Figure 21 Mobile devices used by drivers

46.9 per cent of the drivers employed by the companies surveyed use other digital work applications on their mobile device: in eight out of 10 cases for GPS navigation, in just over one in three cases for managing documents and taking photos, and in less than one in five cases for track & trace.

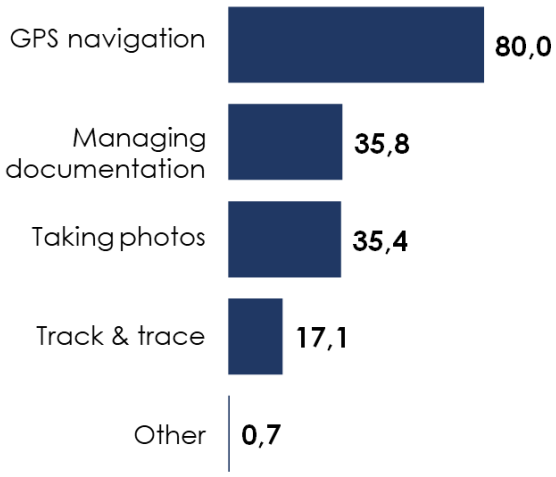

Figure 22 Results of the survey on the use of digital applications on mobile devices

On the other hand, drivers in 40.7 per cent of the sample used digital applications to work on the on-board unit, using them to navigate GPS in nine out of 10 cases, to manage documentation in one out of five cases, for track & trace in 17.5 per cent of cases and to take photos (11.5 per cent).

4.2 Paper CMR and e-CMR

With regard to international transport, it was found that seven out of ten companies are involved in the preparation of the CMR - in almost all cases as hauliers - and around 80 per cent of them prepare it by hand on the paper form (Figure 23): these are predominantly micro-companies (companies with up to nine employees); in the case of companies with more than 50 employees, the percentage of companies that complete the CMR by hand drops to 43.2 per cent.

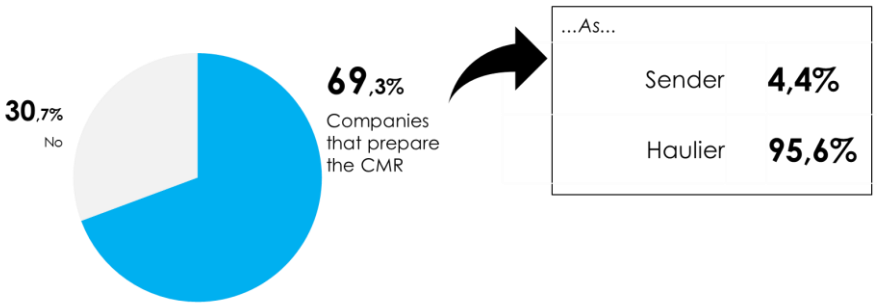

Figure 23 Who is responsible for the preparation of the CMR?

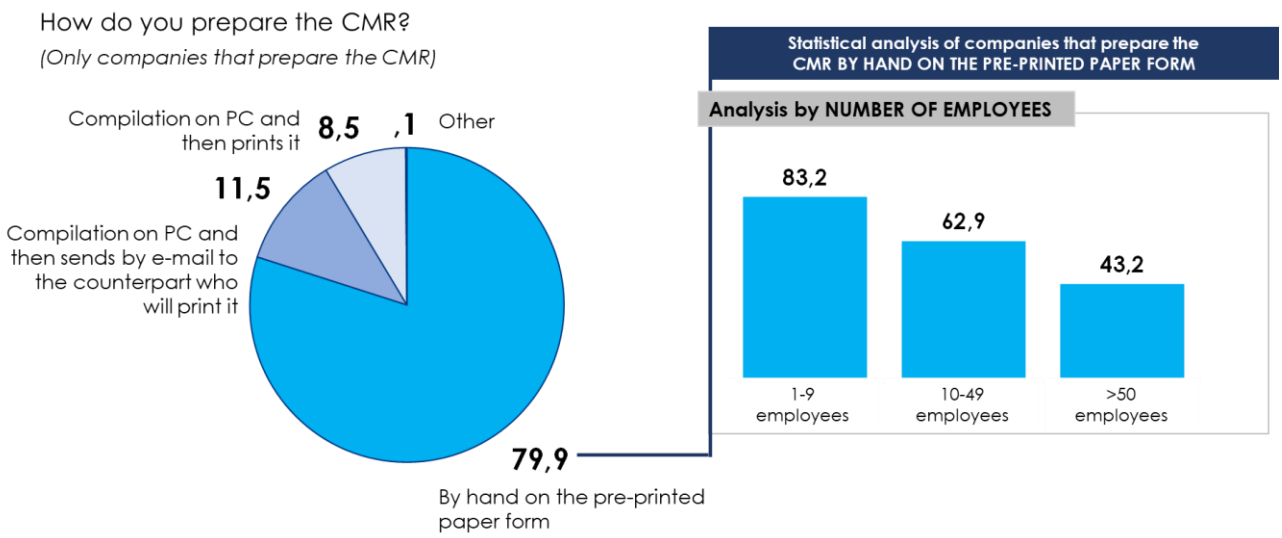

Figure 24 How is the CMR prepared?

In 73.7% of the cases, companies receive the CMR directly by hand from the sender/forwarder.

To file the CMR, 41.6 per cent scan the document, while the remaining 58.4 per cent file the paper directly. Again, larger companies show a greater propensity to use technology: 58.1% of companies with 50 or more employees scan the document and archive both the paper and digital versions.

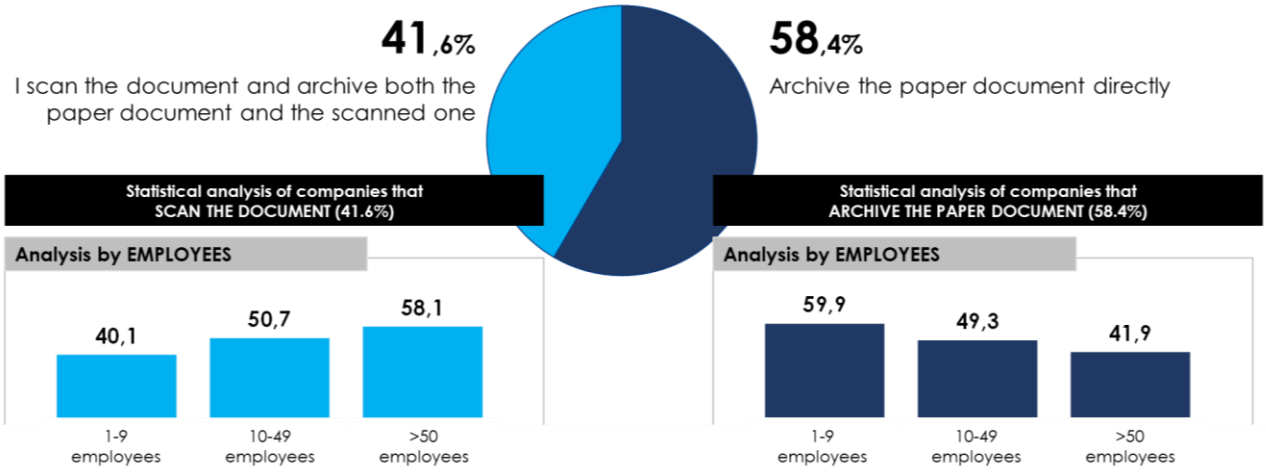

Figure 25 Archiving the CMR

On average, the number of CMRs managed by Italian haulage companies in a year is 5,000 with, however, more than half of the companies (58.1%) managing no more than 1,000 (38.1% between 1,000 and 10,000, 3.8% over 10,000).

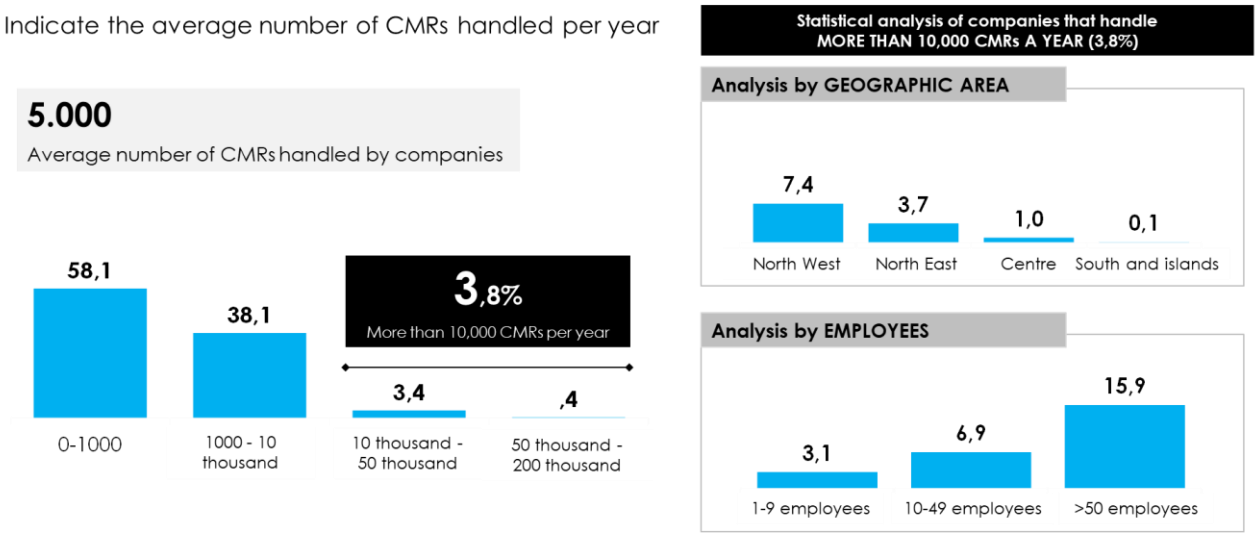

Figure 26 Number of CMRs handled annually

45.3% of international haulage companies are familiar with e-CMR. Among them, 48.4% received information from the Internet, 26% from supplier customers, and 25% from associations (Figure 27).

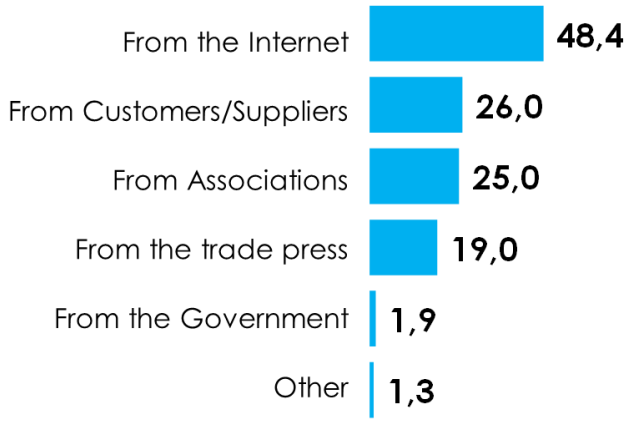

Figure 27 What are the main sources of information on the e-CMR?

Only companies engaged in international trade were asked whether they consider the adoption of e-CMR useful and/or urgent: 44.3% of the sample considered the adoption of e-CMR **useful** – a figure that rises to 65.4% if we consider larger companies (with more than X employees) – but only 18.9% consider its introduction urgent – and in this case too, the percentage for large companies is higher at 32.7%. It can therefore be seen that for most companies, the e-CMR appears to be a viable and beneficial solution but not one of great priority.

With regard to the sample of companies that are involved in international trade and already aware of what the **e-CMR** is, **73.9 per cent of these companies consider the e-CMR useful and 29.8 per cent consider the transition to be urgent**.

Respondents were then asked about some specifics of the e-CMR and their expectations in this regard, with particular reference to the cost and potential savings.

Slightly less than two out of three companies expect a cost for using and operating the single e-CMR of no more than EUR 2 (Figure 28).

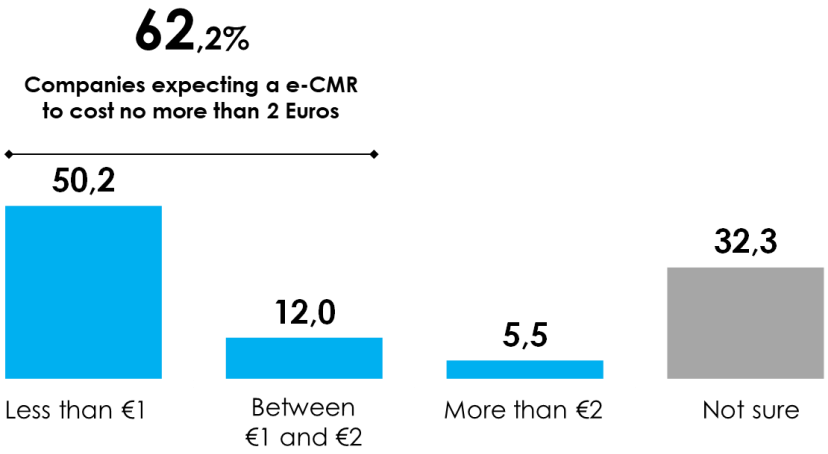

Figure 28 Cost expectation per individual e-CMR

40.2 per cent of the sample of companies involved in international trade believe that the introduction of the e-CMR will lead to **a reduction in operating costs** (of 10 per cent according to 23.3 per cent of the companies), with 6.2 per cent expecting an increase.

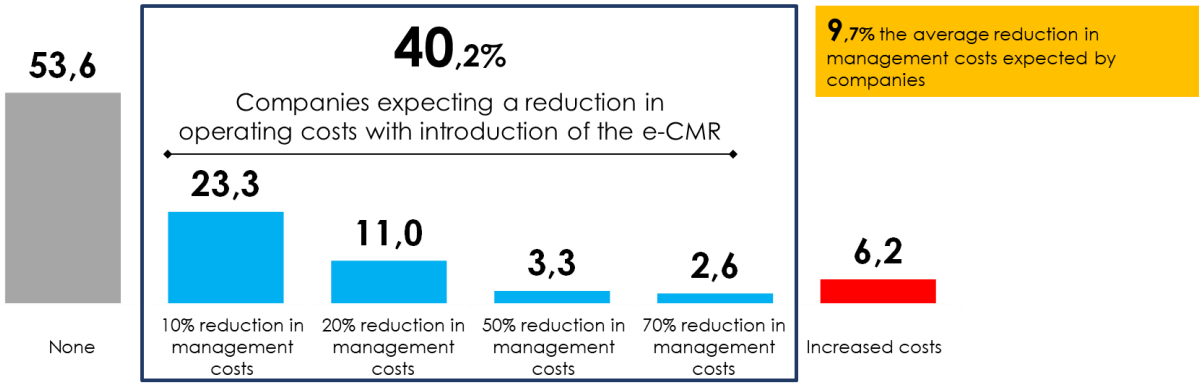

Figure 29 Expected economic impacts of the e-CMR

Among the main benefits expected from the use of the e-CMR are secure archiving, easy management of documents and the elimination of paper. The ease of reading and distribution of the e-CMR and the speed of invoicing due to real-time proof of delivery should also be emphasised.

	Slightly/not at all advantageous (0-6)	Very/quite advantageous (7-10)
No risk of losing old CMRs	55,6	**44,4**
Easy exchange of documents (CMRs and also photos and attachments)	56,9	**43,1**
Digital rather than physical archive	57,5	**42,5**
Elimination of paper CMR	57,7	**42,3**
Easy retrieval of documents	57,8	**42,2**
Easy creation of the e-CMR and distribution to drivers	58,7	**41,3**
Easy to read thanks to the absence of handwritten parts	58,7	**41,3**
Fast invoicing and settlement of payments thanks to proof of delivery in real time	59,5	**40,5**
Collaboration between the various parties concerned in real time	60,4	39,6
Facilitation of inspection and control processes	60,5	39,5
Controlled compilation (no redundant data)	61,3	38,7
Automation of processes (e.g. opening of barriers/security gates)	62,8	37,2
Reduction of administrative burden for the driver	64,2	35,8
Improvement of Customer Service thanks to management in real time	66,0	34,0

Figure 30 Benefits of the e-CMR

With regard to the barriers to the adoption of the e-CMR, what concerns companies most is the willingness of drivers to use it.

	Slightly/not at all critical (0-6)	Critical (7-8)	Very critical (9-10)
Capacity/availability of drivers to use the e-CMR	72,0	17,1	**11,0**
Interoperability between e-CMR platforms/solutions	73,8	18,4	7,8
Integration with internal systems	74,3	18,1	7,7
Interactions with authority platforms (e.g. police, customs)	77,8	14,7	7,5
Costs	78,0	15,7	6,4

Figure 31 Critical aspects of the e-CMR

With regard to the more operational aspects of the use of the e-CMR, 61.3% would like to fill it in by accessing the platform of the e-CMR provider, while for signing they would prefer the on-screen signature mode (40.6%). It should be emphasised that, of the various options, the on-screen signature appears to be the most immediate, similar to the paper one and less demanding for the recipient. Furthermore, it has been observed that the recipient more often has a PC than a tablet when the goods are delivered.

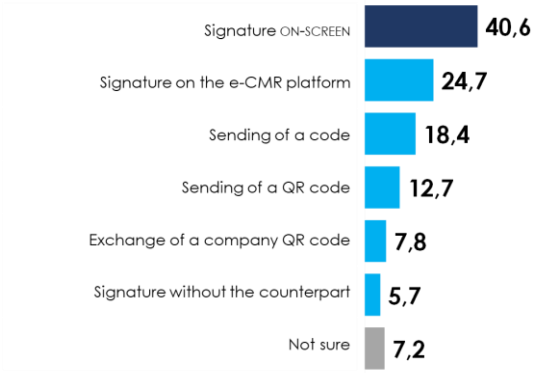

Figure 32 Preferred method for digital signature

4.3 Knowledge of regulations

Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic information relating to freight transport is known to 43.9 per cent of companies: 7.2 per cent are familiar with it, 36.8 per cent have heard of it.

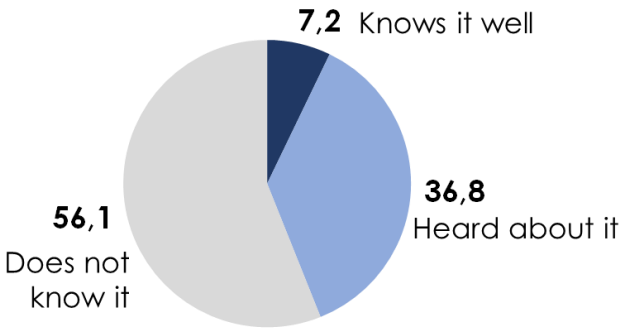

Figure 33 Knowledge of Regulation 20/1056

Communicating transport information electronically and no longer in paper format is considered important for 77.7% of the companies surveyed, and nine out of 10 companies believe that the future of documentation in the transport sector is electronic with the complete replacement of paper documentation.

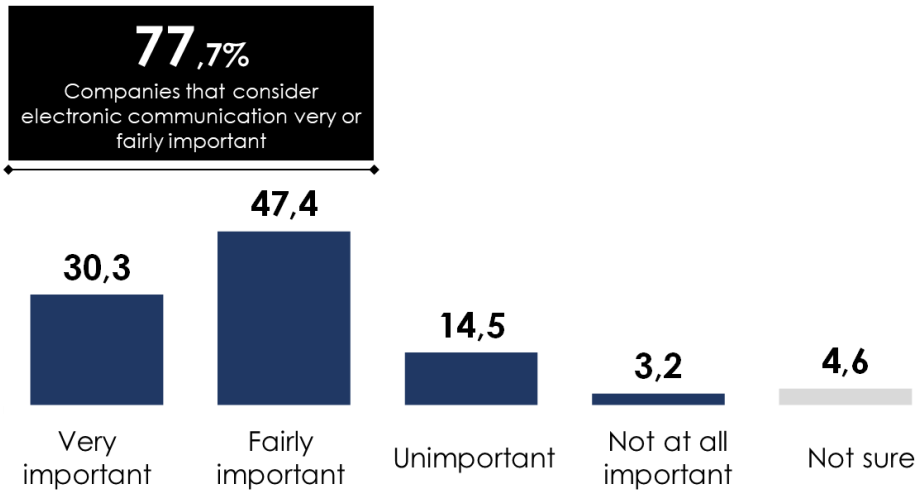

Figure 34 Importance of electronic communication for transport

According to the companies, to stimulate the dissemination of electronic documentation, the public administration should leverage, for 42.6 per cent of the companies, the instrument of financing; for 30.7 per cent, the adaptation of laws and regulations; and, for 24.8 per cent awareness-raising.

Almost one in two companies would also welcome a possible obligation to use electronic instead of paper documentation.

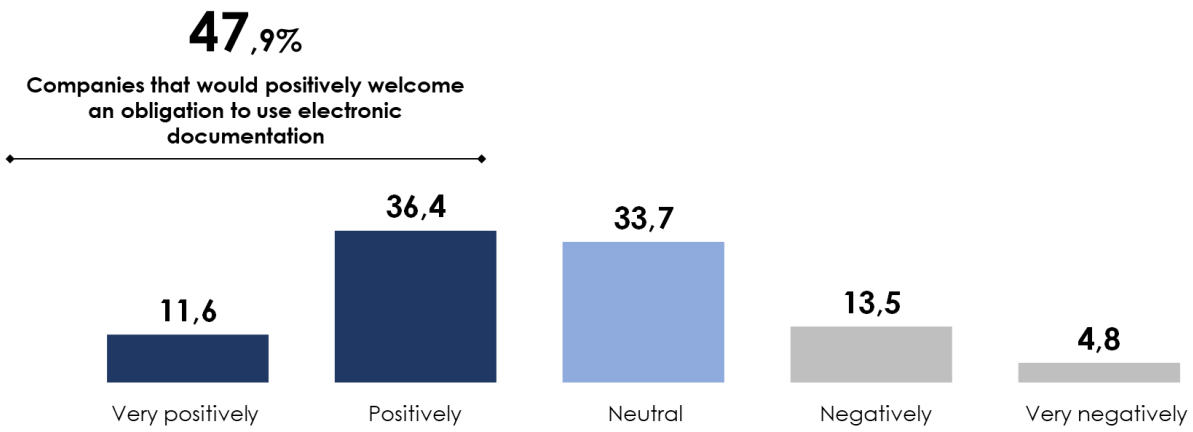

Figure 35 Opinions on mandatory use of electronic documentation

4.4 TIR (Transport International Routier) ed eTIR

This section of the survey was only aimed at companies engaged in international transport

Only one in five companies use the TIR predominantly in paper format (68.8% of companies using it).

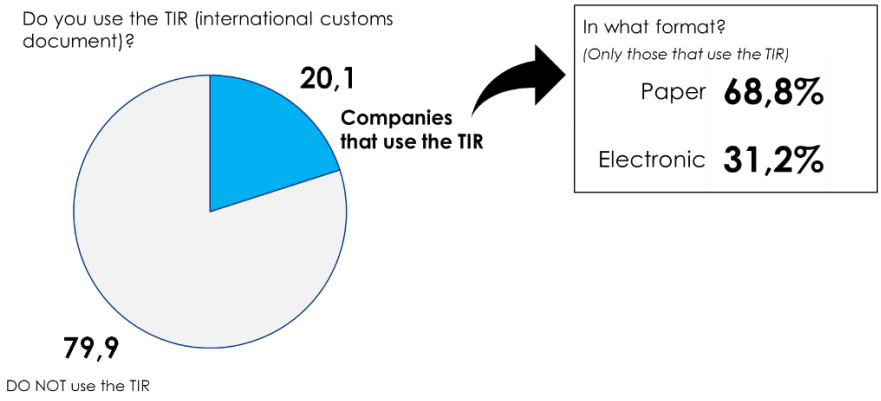

Figure 36 Use of the TIR

18.0% of all companies surveyed consider adoption of e-TIR useful, but of those companies that use the TIR, more than half (56.1%) consider the electronic version to be useful.

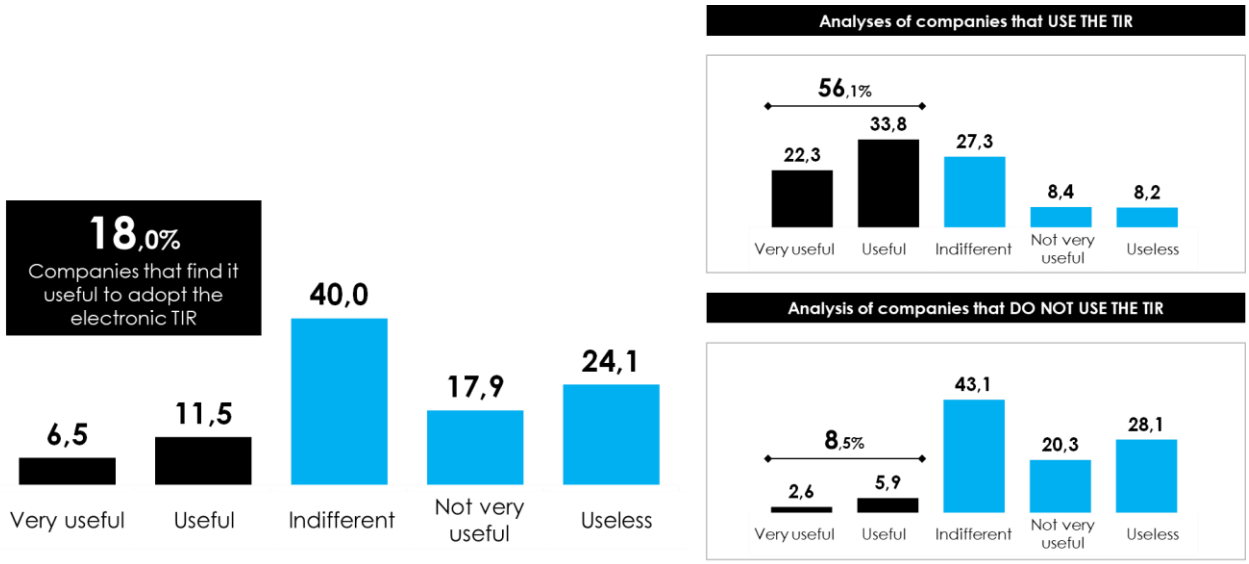

Figure 37 Survey results on the usefulness of the electronic TIR

The greatest difficulty businesses see in adopting eTIR relates to its integration with corporate IT systems, while among the main benefits, businesses cite greater ease of reading due to the absence of handwritten parts, easier retrieval of documents and improved security.

	Slightly/not at all advantageous (0-6)	Very/quite advantageous (7-10)
Easy to read thanks to the absence of handwritten parts	72,1	27,9
Easy retrieval of documents	72,4	27,6
Improved safety and risk management	73,4	26,6
Reduction of fraud	74,2	25,8
Facilitation of inspection and control processes	74,5	25,5
Elimination of paper TIR carnets	75,3	24,7
Real-time information exchange and speeding up of procedures	76,5	23,5

Figure 38 Benefits of using the eTIR

5. Conclusions

The introduction of the CMR consignment note in 1956 made it possible to establish a legal framework to regulate the international carriage of goods by road and the aspects of supporting documents. **Uniform rules governing the content of the consignment note** (which in turn has simplified numerous procedures both on a business-to-business and business-to-authority level) and the **responsibilities of carriers** have been determined. Sixty-six years after its entry into force, the CMR Convention is still an important piece of legislation regulating any international road freight transport that begins or ends in one of the 58 participating countries.

The paper CMR consignment note (the form of which was harmonised in 1976 by the IRU) was the only option for decades. However, with the evolution of information and communications technology (ICT), **the idea of the e-CMR** took shape. Consequently, in 2008, the Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR) on the electronic consignment note was introduced. To date, 30 countries have adopted this Protocol. However, even though the framework allowing the use of the e-CMR consignment note has been in place for several years now, the e-CMR still remains more of a possibility than a widespread tool used on a daily basis.

Basically, the idea behind the e-CMR consignment note is the preservation of all the specific information of the paper version with the integration of modern functions made possible by the digitisation of documents. The application solutions available on the market provide a digital platform on which the e-CMR is produced, used, reviewed and modified by the parties involved in transport:

- The sender accesses the e-CMR platform typically via a PC and completes the document manually or through integration with internal company systems.
- The driver can access the document via an app available either on the on-board unit as long as it is mobile (laptop or tablet) or on a smartphone, and the CMR itself is stored on an online server. Authorities that perform controls during transport can acquire the relevant data in the consignment note in real time using the devices at their disposal: e.g. by using a unique QR code linked to the specific e-CMR consignment note (the driver presents the QR code on his device, either on-board unit or smartphone) to the authorities who scan it and thereby gain access to the specific e-CMR) or by requesting that the e-CMR be sent to a default address or another address provided at the time.
- The recipient can access the CMR via a mobile device or PC. He can view it and enter comments.
- All this information is recorded and made available to everyone concerned.

According to the Additional Protocol, the e-CMR consignment note is considered to be fully **equivalent to its paper counterpart and contains the same details as the latter** and, at the same time, offers many benefits, among which are:

- Reduction of costs for all parties involved in logistics and transport operations due to the limited need for manual entry of data (the data for compilation of the e-CMR are 'retrieved' from company databases), the elimination of the compilation of paper documents upon scanning, mailing and archiving, as well as the simplicity and speed in retrieving and sending data of the delivery order/customs declaration to the requesting parties;
- Exchange of information and monitoring of shipment status in real time;
- Real-time exchange of additional information on any unforeseen events during transport (e.g. photos of damage to goods);
- Reduction of invoice issuing time after delivery;
- Reduction of human errors in the process of taking over the goods and delivering them to the recipient;
- Elimination of problems due to illegibility of certain parts of the hand-filled consignment note;

- Elimination of complications following the loss/destruction of a paper consignment note;
- Efficiency, accuracy and speed of administrative procedures carried out by tax, customs and other authorities and reduction of risks of fraud;
- Ease of handling the e-CMR (as opposed to the CMR) as proof of delivery of goods to another country for the purposes of correct taxation;
- Authentication of signatures on the e-CMR consignment note: the affixing of a 'trustworthy' electronic signature by any of the electronic authentication methods permitted by the law of the country in which the e-CMR was used.

Although the benefits of the transition from paper-based to electronic CMR are manifold, it is important to identify and highlight four main obstacles that prevent the widespread use of the e-CMR:

1. A significant number of countries that participate in the CMR Convention have not yet adopted the Additional Protocol, namely: Armenia, Austria, Azerbaijan, Bosnia and Herzegovina, Croatia, Cyprus, Georgia, Jordan, Greece, Kazakhstan, Kyrgyzstan, Hungary, Ireland, Italy, Lebanon, North Macedonia, Malta, Morocco, Mongolia, Montenegro, Pakistan, Serbia, Syrian Arab Republic, Tunisia and Turkmenistan. Until these countries ratify the protocol, their authorities will not be obliged to consider the e-CMR consignment note as equivalent to the paper one, and transport companies will tend to use only the paper system for reasons of simplicity. As far as EU Member States are concerned, this will change when Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information is fully implemented (from 21 August 2024).
2. There is a wide margin of discretion for users of the e-CMR consignment note as to how it is issued, delivered, modified and stored. In fact, the parties involved are free to choose one of the application solutions available on the market as long as it meets the security standards of the Protocol. Consequently, there is a problem of compatibility and interoperability between the e-CMR solutions of the various providers (e.g: TransFollow, Pionira, Collect+Go, Dashdoc, Care, Dornach, Transbook, LZP).
3. The current operating processes of road haulage companies are not always immediately replicable in the transition from paper to electronic[7] and therefore require redefinition of the operating methods.
4. The need to provide special training sessions for the various parties involved in international road transport on the e-CMR platform that will manage the transport for which they are responsible. Furthermore, in relation to point 2, a company might have to be able to use different e-CMR solutions depending on the customer's choice. The training sessions also concern the customs staff or more generally the staff of the authorities that will carry out the e-CMR controls who will necessarily have to be able to use the different e-CMR solutions available.

This document has brought to light that the e-CMR electronic consignment note represents a desirable and necessary evolution of the supporting documentation for road transport. However, for it to become established as a new practice for international transport, a number of actions need to be undertaken, including:

1. Increasing the number of countries acceding to the Additional Protocol to the CMR Convention;
2. Definition of guidelines for compatibility and interoperability of e-CMR solutions;
3. Dissemination and raising awareness among international but also national hauliers of the benefits of using electronic documentation (eFTI).

[7] On the other hand, this would not be desirable either, because the inherent potential of digital for a more efficient review of operational processes would be lost.

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