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IMPACT ASSESSMENT

Accompanying the document

**Proposal for a Regulation of the European Parliament and of the Council
on electronic freight transport information**

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Glossary

<i>Term or acronym</i>	<i>Meaning or definition</i>
Business register	The database maintained by each Member State to keep record of registration of companies in the given Member State and subsequent changes in the information on companies.
Electronic data vs digital	See https://www.linkedin.com/pulse/electronic-vs-digital-data-bernadette-bosse/
International transport	Pursuant to articles 90 and 91 TFEU, by international transport it is understood in this study the transport of goods from the territory of a Member State or passing across the territory of one or more Member States
Shipment	Determined set of goods that exchanges ownership and needs to be transported from seller shipping point to a final buyer's/consignee reception point
Member States/public authorities	All relevant authorities. For the purposes of the analysis in this study, a distinction has been made between enforcement authorities and judicial authorities.
Enforcement authorities	Relevant public authorities having tasks related to controlling, monitoring and ensuring enforcement of applicable legal provisions concerning the international transport of goods on the territory of the EU, such as police, fiscal police, ministries and their agencies.
Judicial authorities	Administrative, criminal or civil courts.
Member State(s) (MS)	In the context of this Impact assessment, this covers Member States of the EU and of the EEA (i.e. Iceland, Liechtenstein and Norway in addition to the EU).
Data	Information that has been encoded digitally, using a revisable structured format which can be used directly for storage and processing by computers.
Data elements	A unit of data which, in a certain context, is considered indivisible and for which the identification, description and value representation has been specified.
Information	In the context of this Impact assessment, it covers the transport related information included in the transport documents and are necessary for the controls by authorities.
Registered office	The office and the address under which the company is registered in the business register.
SME	Small and Medium Enterprises
DTLF	Digital Transport and Logistics Forum
TFEU	Treaty on the Functioning of the European Union, OJ 2012/C 326/01
RFD	Reporting Formalities Directive – No 2010/65/EU on reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2002/6/EC

eIDAS Regulation	Regulation (EU) No 910/2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC
UCC	Union Customs Code as laid down in the Regulation (EU) No 952/2013
RIS Directive	Directive 2005/44/EC on harmonised river information services (RIS) on inland waterways in the Community
IWT	Inland waterways transport
CMR Convention	Convention on the Contract for the International Carriage of Goods by Road (CMR), Geneva 19 May 1956
CMR	Consignment note as defined in the CMR Convention
eCMR Protocol	Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR) concerning the Electronic Consignment Note, Geneva 27 May 2008
eCMR	Electronic consignment note as defined in the eCMR Protocol
CIM	Uniform Rules Concerning the Contract of International Carriage of Goods by Rail (CIM) - Appendix B to the Convention concerning International Carriage by Rail (COTIF) 9 June 1999
COTIF	Convention concerning International Carriage by Rail (COTIF) 9 June 1999
CIT	International Rail Transport Committee
CIM consignment note	Rail consignment note
TAF TSI	Technical specifications for interoperability relating to Telematics application for freight
TAF TSI Regulation	Regulation (EU) No 1305/2014 on the technical specification for interoperability relating to the telematics applications for freight subsystem of the rail system in the European Union and repealing the Regulation (EC) No 62/2006
CMNI	Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway (CMNI) Budapest 2000
Hamburg Rules	United Nations International Convention on the Carriage of Goods by Sea (Hamburg Rules) Hamburg 31 March 1978
Montreal Convention	Convention for the Unification of Certain Rules for International Carriage by Air, Montreal 28 May 1999
eAWB	e-air waybill
IATA	International Air Transport Association
Rotterdam Rules	United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (Rotterdam Rules) 11 December 2008
B2A	Business to Administration communications
B2B	Business to Business communications

Directive on dangerous goods	Directive 2008/68/EC on the inland transport of dangerous goods
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road, 1 January 2017
RID	Convention concerning International Carriage by Rail (COTIF) – Appendix C - Regulations concerning the International Carriage of Dangerous Goods by Rail, 1 January 2017
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways, 1 January 2017

1 INTRODUCTION: POLITICAL, LEGAL AND MARKET CONTEXT

1.1. Freight transport documents – background and scope limitation of this initiative

The movement of goods from sellers to buyers¹ is accompanied by a large amount of information being exchanged among a variety of parties, in both the private and the public domain. Today, this information is mostly printed on paper, in a variety of standard format documents. Most of these documents are issued by private parties and serve to convey important information related to their own contractual relation for the movement of the goods, and for business administration purposes. Some of these are also used by authorities as source of information to verify regulatory compliance.

These documents are physically exchanged and, in the case of some of them also signed, and at times also modified, by hand, in a number of copies. As a result, the information contained in these documents is recopied in and printed out of the electronic systems of the various parties several consecutive times, for each individual cargo shipment. This is because one or more of the commercial parties involved, or one public authority concerned or another, request to see or sign paper documents.

In a context where virtually all companies, to a very large extent, record, exchange and store data related to their business in electronic format, these paper-based information exchange processes over the movement of the goods are the source of important cost-inefficiencies, mainly related to the physical management of the paper documents, but also to business operations management. Some stakeholders have described them as a “black box”, which prevents the “end-to-end” visibility over the movement of the goods in the supply chain that businesses need to fully reap the benefits of digitalisation.

This impact assessment focuses on goods related documents. The other two main groups of documents used in freight transport, namely documents related to the means of transport and, respectively the personnel manning them, have not been include in the scope². This focus limitation is linked to the distinct nature of the goods related documents and, in particular, their dynamic and commercial character.

These documents are unique to each distinct set of goods being shipped from a seller to a buyer or final user and, therefore need to be issued anew for each shipment. In the case of the main transport documents, the contracts of carriage, in particular, they may also undergo changes during the course of the transport operation itself. They are mostly issued by the businesses, and serve both business-to-business and business-to-authorities information communication purposes.

By contrast, the documents concerning the means of transport or the personnel manning them – such as certificates concerning the registration of a vehicle, its conformity with requirements for the transport of specific good or, in the case of personnel, if they have the qualifications to drive/conduct a certain type of vehicle – is issued either by a public authority or a private entity authorised by a public authority to do so. They are also static documents in the sense that, once issued, do not need to be renewed but only at very long and regular intervals. They are also used mainly in relation to the authorities, and do not need to be

¹ Or, more generally, from senders/consigners to recipients/consignees.

² This is a basic taxonomy, used also in the context of the Digital Transport and Logistics Forum (DTLF), for the organisation of the activity of this Commission expert group.

exchanged between the commercial partners. For this reason, even though the majority of these "other" documents involved in a transport operation are still being issued, kept and presented to the authorities on paper (and to some extent on plastic), the cost inefficiencies related to the issuing and management of these documents is, currently, less significant to the businesses than those related to goods documents³.

1.2. Political context

The Commission has acknowledged the need to foster acceptance and use of electronic transport documents in a number of policy initiatives: the White Paper on Transport, 2011⁴; the Digital Single Market Strategy, 2015⁵; the ICT Standardisation Priorities for the Digital Single Market, 2016⁶; the EU eGovernment Action Plan 2016-2020, 2016⁷. The case for intervention has been recognized also by a wide range of stakeholders.

Since 2015, participants in the Digital Transport and Logistics Forum (DTLF) – a Commission expert group formed by more than one hundred private and public stakeholders⁸ – have repeatedly emphasised the need for EU level intervention to support wider uptake of electronic transport documents. In October 2017, in the Tallinn Declaration on eGovernment, the Member States urged the Commission to step up efforts for provision of efficient, user-centric, electronic procedures in the EU, pointing out the significance of the eGovernment Action Plan 2016-2020⁹ and the vision of the European Interoperability Framework¹⁰.

In November 2017, during the Tallinn Digital Transport Days, several public and private stakeholders from all transport sectors concluded that it is about time to reap the benefits of digitalisation, including paperless data sharing¹¹. Following up, the Council called on the Commission, in its December 2017 Conclusions on the digitalisation of transport, to continue working with the DTLF to develop “*measures to support¹² more systematic use and acceptance of e-documents and the harmonised exchange of information and data in the logistic chain*”¹³. In May 2017, the Parliament had also called on the Commission “to increase harmonisation in passenger transport and transport of goods”, and “to speed up the mandatory use ... of electronic consignment notes (e-CMR)”, in particular¹⁴.

³ This was also reflected in the choice made by the transport and logistics experts gathered in the framework of the DTLF on the prioritisation of their work. Thus, in the context of the one of the two main working groups of the Forum, mandated to focus on "the acceptance of electronic transport documents", they mandated two of the three teams established to focus on goods related documents, and the "waybills" in particular. The third team was mandated to "prepare an inventory of [all] other documents used during transport / other information requirements by authorities (e.g. on vehicles, drivers, etc.) and look into their possible digitalisation." (See Mandate of the subgroup on electronic transport documents of the Digital Transport and Logistics Forum, available at: http://www.dtlf.eu/sites/default/files/public/uploads/fields/page/field_file/mandate_for_sub-group_-_e-transport_docs_-_final.pdf)

⁴ [COM\(2011\)0144](#), pp. 13, 19.

⁵ [COM\(2015\) 192](#), pp. 82-84.

⁶ COM(2016) 176, p. 11.

⁷ [COM\(2016\) 179](#), p. 8.

⁸ The [DTLF](#) was set up by the Commission in April 2015 (Decision C(2015)2259), to provide a platform where Member States and relevant transport and logistics stakeholders can exchange technical knowledge, cooperate and coordinate with a view to support measures aimed at promoting efficient electronic exchange of information in transport and logistics.

⁹ The [Tallinn Declaration on eGovernment](#) was signed at the ministerial meeting during Estonian Presidency of the Council of the EU on 6 October 2017.

¹⁰ https://ec.europa.eu/isa2/eif_en

¹¹ The Digital Transport Days Declaration was signed in Tallinn on 10 November 2017 and is available at https://ec.europa.eu/transport/modes/road/news/2017-11-10-digital-transport-days-declaration_en

¹² P8_TA(2017)0228

¹³ Council Conclusions on the digitalisation of transport, 15050/17, 05/12/2017.

¹⁴ European Parliament resolution [2017/2545\(RSP\)](#) of 18 May 2017 on road transport in the EU.

1.3. Legal context

The eIDAS Regulation¹⁵ provides a horizontal EU legal framework for the acceptance of electronic documents by Member States' authorities, but only as evidence in legal proceedings¹⁶. It does not impose an obligation on Member States' (enforcement) authorities to accept electronic documents as evidence for other regulatory purposes, such as compliance with various legislative provisions, including as concerns the conditions for the transport of goods.

The main information sets concerned also differ. This initiative focuses only on regulatory information concerning the goods and the transport operation itself – on the identity of the consignor, carrier and consignee, places of pick-up and delivery, route and several others. Both the UCC and the RFD concern also cargo information description, but alongside a large host of other information sets. In the case of UCC, this also includes certain information elements related to the transport operation itself; in the case of RFD, additional sets of information elements on the ship, its crew and passengers are concerned.

Both the UCC and the RFD already contain provisions allowing fulfilment of reporting formalities by means of electronic information communication, including as regards the cargo and, respectively, the transport operation¹⁷. This initiative aims to allow electronic communication for fulfilling regulatory information requirements also beyond the points of entry, or before the point of exit, of the EU, on the entire territory of the Union. Geographically therefore, the scope of this initiative begins where that of the UCC and/or the RFD ends (or, conversely, ends there where that of the UCC and/or the RFD begins).

In terms of the transport operations concerned by the information requirements, however, these scopes overlap: this initiative concerns both purely intra-EU international/ cross-border transport (not falling under UCC's or RFD's scope), as well as international transport having its origin, destination or transiting an EU Member State's territory¹⁸. As a result, the combined application of this initiative and that of the UCC and the RFD will further facilitate international freight transport having its origin and destination outside the EU, as well as intra-EU maritime traffic¹⁹, by enabling the use of electronic means for transmission of regulatory information on cargo transport to the authorities not just at the point of entry and exit of the EU, but also on the entire EU territory.

The Commission is currently considering further policy initiative in both policy areas covered by these two instruments, but neither is considering enlarging the information reporting requirements, nor the geographical scope of the application of the related regulatory

¹⁵ Regulation (EU) No 910/2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC,

¹⁶ Article 46 of eIDAS states only that "An electronic document shall not be denied legal effect and admissibility in legal proceedings solely on the grounds that it is an electronic documents". That implies however that they could be rejected on any other grounds, such as related to their authenticity or integrity.

¹⁷ The UCC allows using electronic transport documents or systems for some customs formalities (e.g. simplified transit), under the condition that certain data elements are contained, as specified in Annex B of the UCC Delegated and Implementing Act. The RFD concerns a coordination mechanism for harmonising the B2A electronic information reporting a ship is required to do in connection to a port call (e.g. customs formalities, safety/security related information, border control issues, etc.). It contains specific cargo information reporting requirements, but it does not include in its scope specific transport documents (for example the transport contract, the maritime bill of lading).

¹⁸ Cf. Article 91 of the Treaty on the Function of the European Union (TFEU): "international transport to or from the territory of a Member State or passing across the territory of one or more Member States"

¹⁹ From a regulatory point of view, transport exiting an EU port is taking place outside the EU territory, even if the goods are bound for a destination inside the EU territory, re-entering through another EU port.

conditions. Rather, these initiatives aim at insuring interoperability of the electronic data exchange related to their respective information reporting requirements²⁰. In this respect, this initiative will also aim to ensure the interoperability of the electronic data for the common information elements²¹.

In terms of technical solutions for enabling the electronic communication of the information/documents, this initiative also requires a different approach, due to the specificities of the information reporting under the UCC and the RFD. In the case of the latter, the information must be submitted at a specific point in time – before or at the time of arrival at EU entry/exit point – to all of a pre-defined set of authorities. By contrast, the information concerned by this initiative only needs to be available in case it is required for inspection, by one or another of the competent authorities, at any point in time during (and in certain cases also after) the completion of the transport operation.

Several other EU legal acts and ongoing Commission policy initiatives address digitalisation aspects and affect to some extent transport related issues. None is however addressing the problem as identified in the context of this impact assessment report²².

1.4. Market context

Total freight transport in the EU has increased by almost 25% over the last 20 years²³, and it is projected to further increase by 51% during 2015-2050 under current trends and adopted policies²⁴. Today, this information is mostly printed on paper, in a variety of standard format documents. 99% of cross-border transport operations on the territory of the EU still involve paper-based documents at one stage of the operation or another²⁵. The digitalisation of information exchange has the potential to significantly improve the efficiency of transport and, therefore, to contribute to the smooth functioning of the Single Market.

In the past two decades, there have been a considerable number of private, public and mixed initiatives aiming at developing technical solutions for the digitalisation of transport and logistic processes²⁶. While contributing to efficiency gains in specific transport sectors and Member States, these initiatives were often run independently from each other.

The growing concern, raised by all stakeholders, is the limited interoperability of the various systems and technical solutions being developed²⁷. In the absence of overall coordination and reliable indication as to which would be the dominant standard for data definition, representation, exchange and preservation²⁸, individual businesses face the risk of making the

20 Cf. Inception Impact Assessment on Reporting formalities for ships (European Maritime Single Window environment), available at https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-3807523_en.

21 Concretely, under the preferred policy option proposed, by prescribing, at a minimum the use of the same data vocabulary for this set of common elements.

22 See summary of conclusions of analysis in Table Annex 8.7 in Annex 8.

23 Measured in billion tkm. Source: EU Transport in figures 2017

24 A description of the baseline scenario (i.e. developments under current trends and policies) is available in Annex 4 of the impact assessment.

25 More specifically, they require the use of paper documents at one point or another in the course of the transport operation. In other words, only 1% of these operations is accompanied by a fully digital information and documentation exchange. However, their share varies depending on the transport mode. The estimate draws on the Ecorys et al. (2018) impact assessment support study.

26 See overview provided in Ecorys et al. (2018) impact assessment support study.

27 See the discussions, most recently, in the framework of the Digital Transport Days, Tallinn, 8-10 November 2017. Summary of proceedings and concluding Declaration available at: <http://digitaltransportdays.eu/doc.html>

28 DTLF draft report on 'Paperless Transport'. The report is planned to be adopted at the last plenary meeting of DTLF, foreseen for June 2018.

wrong choice of investment. In addition, specificities of individual transport modes – including their (historically separate) regulation – mean that most digitalisation efforts remain mode-specific²⁹. Yet, even in the rail and air transport sectors, where a de facto dominant international system for information and documentation exchanges has been established, concerns for the lack of interoperability and interconnectivity across mode-specific solutions and systems are high³⁰.

2 PROBLEM DEFINITION

The main identified problem is the low and varying degree of acceptance by authorities of information or documents electronically communicated by the business as evidence of compliance with regulatory conditions for the transport of goods on the different EU Member States' territory.

Two main drivers underpin this problem: a) a fragmented legal framework setting inconsistent obligations for authorities to accept electronic information or documents³¹, and allowing for different administrative practices to implement them; and b) a fragmented IT environment characterised by a multitude of non-interoperable systems/solutions for electronic transport information and documentation exchange, both for business-to-administration and business-to-business communication.

The two drivers are mutually reinforcing. The fragmented legislation and the ensuing lack of acceptance by authorities discourage investment in digital solutions for electronic documents. The fragmented IT environment, specifically the lack of well-established or interoperable solutions, discourages authorities from the use of electronic documents.

Furthermore, both drivers are shaped by the fragmented wider market context, which is however not specifically addressed by this initiative, characterised by, on the one hand, historically-evolved characteristics of the different transport sectors and, on the other hand, competing, non-interoperable and evolving industry standards and technical solutions for electronic data exchange.

As a consequence, the large majority of freight transport operators and other transport business stakeholders in the EU continue to use paper documents. This prevents considerable gains in efficiency for the various market players, in particular in multimodal and cross-border transport, and hinders the better functioning of the EU single market.

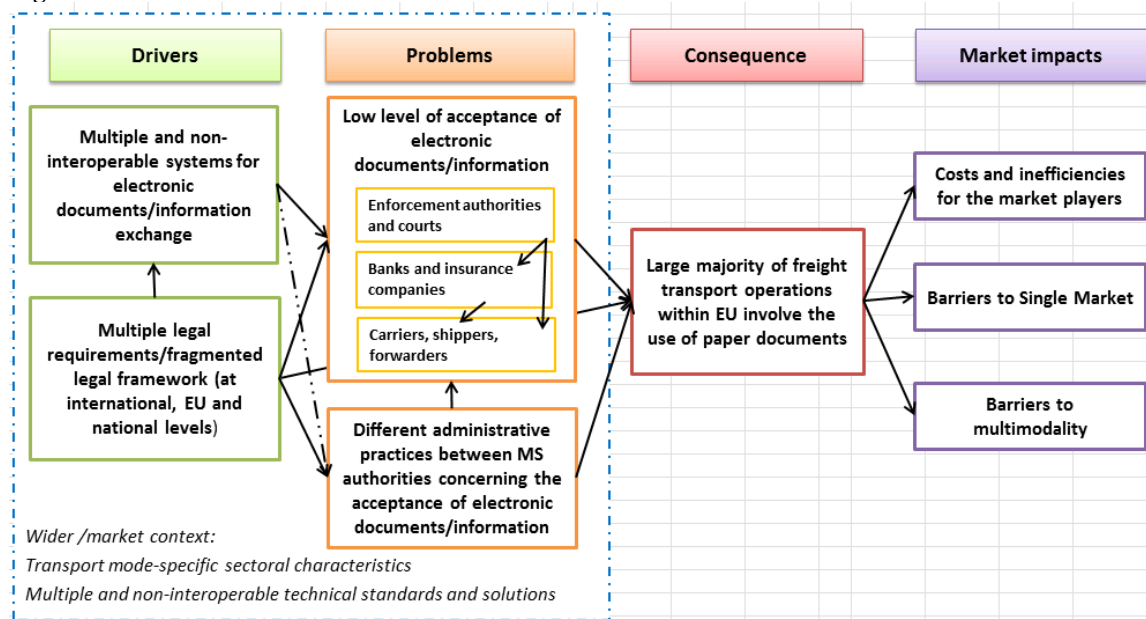
These issues are further discussed in the upcoming sections and are summarized under Figure 2.1 below.

²⁹ Overview provided in section 2 and Annex I of the Ecorys et al. (2018) impact assessment support study.

³⁰ Interventions of IATA, Head of Digital Cargo and, respectively, Raildata Technical Expert, during stakeholder consultation workshops on 05/12/2017 and 16/01/2018. See also, more generally, minutes of DTLF expert group meetings.

³¹ The electronic representation of the information currently contained in the paper documents does not need to amount to a document format, in the sense of a standardised representation of the data. In that sense, the term “documents” might be misleading. An explanation of the merits in moving away from a documents-centred to a data-centred approach is provided in Annex 8

Figure 2.1: Problem tree



2.1 What is/are the problems?

The main conclusion of the stakeholder consultation activities is that there is general uncertainty among the stakeholders as to which authorities, in which Member States, are accepting electronic documents for which types of controls. In particular, stakeholders refer to the uncertainty related to acceptance by enforcement authorities. Acceptance by courts of the contract of carriage is also an issue, but it appears to be less of a concern for a majority of the respondents.

2.1.1 *Low level of acceptance of electronic freight transport documents by the different market players*

Lack of acceptance by Members States' authorities of electronic documents has been indicated by all categories of industry stakeholders as the main obstacle preventing their wider use.

Member States authorities

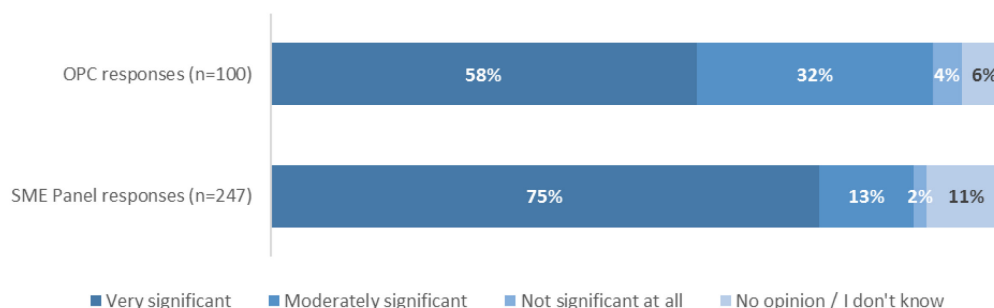
Enforcement authorities

Depending on the Member State and mode of transport concerned, authorities inspect cargo transport documents for some or all the following purposes: verification of legitimate possession; enforcement of rules related to safety, taxation, customs, environmental protection, security, working conditions and health, cabotage, and various transport conditions. Various authorities may be involved in inspections: police, fiscal police, tax authorities, customs; and control officers from the transport, health and veterinary departments. There are important differences in the extent to which those authorities currently accept electronic documents as valid (or admissible) evidence for inspection.

In aviation, inland waterways and rail, documents are more often accepted in electronic form. But only in few Member States, and mainly for aviation, acceptance of full documentation is

reported. At the other end, road transport documents and, in some cases rail, are explicitly reported as being accepted in paper format only³².

Figure 2.2: Significance of the lack of acceptance by Member States enforcement authorities



Stakeholders also indicated significant differences in the inspection procedures, and the information/documents required as proof of compliance. The same transport document is often inspected in the same Member State by different authorities in different ways³³. Some authorities might accept the electronic transport document, while others only accept paper, although the paper document is often a print-out of the electronic one³⁴. Between Member States, differences in inspection practices are equally present, even when the same type of authority is performing a control for the same regulatory purposes in the same transport mode.

Textbox 2.1: Examples of divergent acceptance

An electronic transport document (the electronic air waybill/e-AWB) is accepted for the entry and exit processes of cargo by air in the Netherlands, but when the cargo is being transported by road to reach the final destination, the paper version of the same air waybill is often used, as Dutch road-side inspectors do not accept an e-AWB. In France, while custom authorities accept an e-AWB, a paper AWB still needs to be submitted to airport enforcement authorities³⁵.

In inland transport, the Dutch police requires barge operators to have a paper transport document available at all times (and regularly inspects whether such a document is available on board), while the German police never performs cargo related inspections and therefore does not require a transport document at all³⁶.

In road transport, in the Netherlands or Germany for example, the e-CMR would be accepted, but the operators do not use it because authorities of other Member States, such as neighbouring Belgium, do not. Truck drivers do not wish to take risks and therefore are only willing to perform the transport when receive the transport document in a paper format³⁷.

In rail transport, an electronic document containing cargo information, which complies with the TAF TSI requirements³⁸, is accepted by the Belgian authorities for controls related to dangerous goods regulatory compliance³⁹. In Germany, a paper document is always required for dangerous goods certificates⁴⁰.

³² For a summary overview of the situation in all 28 Member States, see Annex 8. For further detailed information by Member State, including the questions included in the surveys, see Ecorys et al. (2018) impact assessment support study.

³³ In France, to address the issue of different requirements for the inspection of the cargo and transport documents by the (no less than 11) different national authorities, the national industry associations initiated a DTLF mirror-group, with the participation of the authorities concerned. Cf. presentation by TLF (Transport et Logistique France) representative, during stakeholder consultation workshop, Brussels, 17/10/2017.

³⁴ This conclusion is based mainly on the assessment of the acceptance of the contract of carriage transport documents, though the other cargo documents are also concerned, but to a more limited extent. The contracts of carriage transport documents are the main documents most often used (and requested by authorities) for purposes of proving regulatory compliance.

³⁵ Intervention by a representative of the French national association of freight forwarders, TLF France, during stakeholder consultation workshop, Brussels, 17/10/2017.

³⁶ As highlighted during stakeholder consultation workshop, Brussels, 17/10/2017, by a European Barge Union (EBU) representative. The view was confirmed during the targeted interview with CBRB and was also mentioned, in more general terms, in the inland waterways case study conducted by the contractor (see Ecorys et al. impact assessment support study).

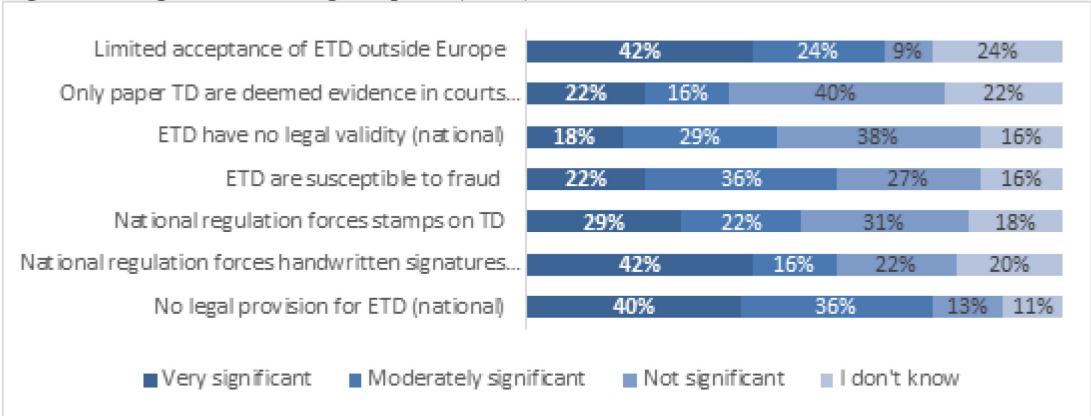
³⁷ As reported by various stakeholders, such as International Road Union (IRU), TLN (Transport & Logistiek Nederland) and Samskip (Dutch multimodal transport and logistics operator). Italian freight forwarders operators have stated, too, that they use paper documents in all countries where they operate. Cf. Ecorys et al. impact assessment support study.

Overall, the industry stakeholders report general uncertainty as to which enforcement authorities, in which Member States, are accepting which electronic documents for which types of controls. Consequently, to avoid the risk of electronic documents being declared noncompliant by authorities or not accepted by their partners, the transport operators, as well as the other commercial parties involved, prefer to print, carry and exchange paper cargo documents, in spite of all the inconvenience and cost this implies. In the framework of the OPC, 90% of the private companies and associations indicated the non-acceptance of electronic transport documents/ information by Member States authorities as a significant driver. For the smaller companies, according to the SME panel survey, the main reason for not using electronic transport documents is that their clients and business partners do not use transport documents in electronic format, followed closely by non-acceptance by authorities.

Courts

Several stakeholders pointed out in the consultation process the lack or limited acceptance of the electronic transport documents by courts⁴¹. Private parties should be able to enforce their rights in civil law procedures on the basis of the electronic transport document that serves as a contract of carriage. Secondly, operators should be able to challenge a fine imposed by an authority which refused to accept an electronic transport document.

Figure 2.3: Significance of legal aspects (N=45)



Source: *Ecorys et al., 2018, results of targeted survey*

According to the targeted survey undertaken in the context of the IA support study, 38% of the respondents consider the lack of acceptance of electronic transport documents in courts as important (22% as very important, and additional 16% as moderately important). There is certain divergence of views among the stakeholders, as 29% of private companies consider this factor very important, against only 10% of the authorities.

The support study also found limited empirical evidence on the acceptance of electronic transport documents by courts and on the enforceability of the contracts of carriage concluded or evidenced in an electronic form. In France, for example, where acceptance of electronic

³⁸ Commission Regulation EU No 1305/2014 on the technical specification for interoperability relating to the telematics applications for freight subsystem of the rail system in the European Union.

³⁹ Intervention of the representative of the Belgian rail safety authority during stakeholder consultation workshop, Brussels, 17/10/2017.

⁴⁰ Reply to targeted legal survey by German authorities; and confirmed by Raildata representative, intervention during stakeholder consultation workshop, Brussels, 05/12/2017.

⁴¹ Cf. French authorities, International Association for the representation of the mutual interests of the inland shipping and the insurance and for keeping the register of inland vessels in Europe IVR (Netherlands), EBU (Belgium).

documents for road transport has been established already by national law in 1999, there is no case law yet on the enforceability of electronic transport documents⁴². In the framework of the stakeholder consultation, none of the respondents was able to identify case law recognizing the enforceability of electronic transport contracts. The limited use so far of electronic transport documents may explain the lack of such case law, and the lower importance attributed to the ‘courts’ dimension of the ‘limited acceptance’ driver.

Non-acceptance by third countries authorities

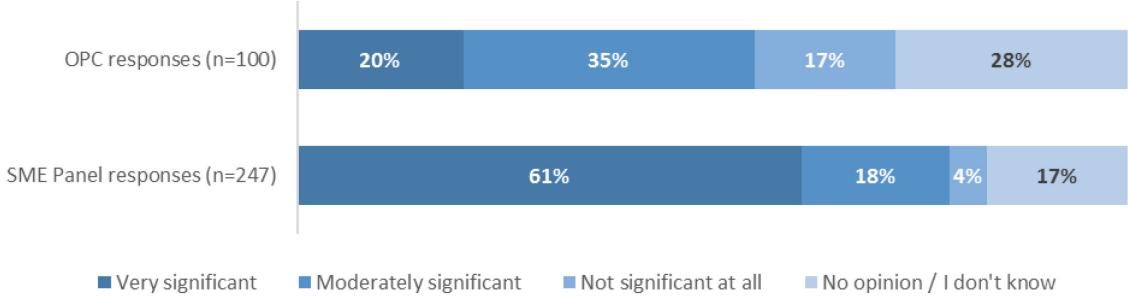
In the OPC and SME Panel several stakeholders added the non-acceptance by third country authorities as an additional barrier hampering the use of electronic documents only. In the OPC, several stakeholders indicated that the non-acceptance is also a bottleneck when trading with neighbouring countries that are not part of the EU. An example frequently mentioned was Russia, as paper documentation is required in all road transport between Russia and the EU.

The respondents to the targeted impact survey and targeted interviews undertaken in the framework of the IA support study confirmed this view. Out of the 45 respondents to the survey, 30 indicated that the non-acceptance of electronic transport documentation in third countries is, at least moderately, contributing to the problem. Authorities and private stakeholders interviewed also raised this issue.

Acceptance by businesses

Another important aspect is linked to the low acceptance of e-documents by the commercial parties themselves. Among these, banks and insurance companies, which are often necessary parties to a transport operation – insuring the cargo or providing bank guarantee as to the payment of the goods shipped – are highly relevant stakeholders in this regard.

Figure 2.4: Significance of problem driver to the overall problem – lack of acceptance by banks



Source: OPC and SME Panel

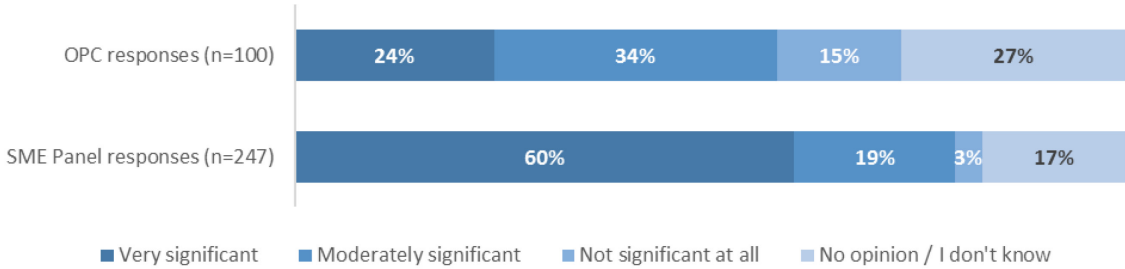
In the industry’s view, the acceptance by banks and insurance companies of electronic transport documents, particularly those that evidence the contract of carriage, is strictly related to the acceptance and enforceability of the electronic contracts of carriage in courts.

More than half of the stakeholders in the OPC indicated that the limited acceptance by both banks and insurance companies contributes, at least moderately, to the overall problem. Private companies (ranging from transport operators and forwarders to different associations)

⁴² Information provided by French Ministry of Transport. Cf. Ecorys et al. (2018) impact assessment support study, section 3.4, Draft Minutes of Interview – Organisation affiliation of interviewee Ministère chargé des transports Mission de la flotte de commerce, Direction des affaires maritimes (French Ministry of Transport), 07/12/2017).

were the main respondents to the OPC. A relatively large share of the respondents (almost 30%) indicated however that they do not have an opinion on the subject.

Figure 2.5: Significance of problem driver to the overall problem – lack of acceptance by insurance companies



Source: OPC and SME Panel

Lack of legal certainty in this regard impacts the decision of banks and insurance companies to accept electronic transport documents⁴³. In case of litigation, banks and insurance companies want to be certain that the responsibilities and liabilities mentioned in a contract of carriage are enforceable by means of court order. It appears however, that insurance companies tend, more than banks, to accept electronic transport documents when requested to insure cargo.

Smaller companies experience higher lack of acceptance by banks and insurance companies than their relatively larger counterparts. As presented in the figure 2.5, more than 60% of the respondents to the SME Panel see the lack of acceptance as a significant contributor, while in the OPC only 20 to 24% of the respondents showed a similar view. The difference might be explained by the fact that for smaller companies it is more difficult to obtain finance or insurance (due to business risks), than it is for larger companies.

2.1.2 Different administrative practices between and within Member States

The analysis of the stakeholder consultation has revealed important differences in the way the different Member States authorities are conducting inspections aimed at establishing compliance with applicable regulatory requirements⁴⁴. Thus, when the same transport document is inspected in the same Member State by different authorities, for different purposes, they may do so in different ways. Across Members States, differences in inspection practices are equally present, even when the same type of authority is performing a control for the same regulatory purposes in the same transport mode⁴⁵.

⁴³ For example in Italy, because the contract of carriage by sea can be evidenced only by submitting a manually signed contract, banks will not provide the consignees with the funding necessary to pay for the cargo if they do not receive the signed paper bills of lading. Only upon receipt of the paper bill of lading and of the so-called letter of credit from the consignee, the bank will transfer to the bank of the consignor the sum corresponding to the price of the goods (i.e. the bank will grant a loan to the consignee in order to buy the cargo). As a result, a paper bill of lading is used by the involved operators despite the fact that there are no regulatory controls on the bill of lading during a carriage of goods.

⁴⁴ This conclusion is based on the responses received to the legal, and the more general, targeted stakeholder surveys conducted in the context of the impact assessment study, on how inspections are being carried out by the Member States authorities, and not on a legal analysis of Member States’ legislation concerning how inspections should be carried out at national level. The questions included in the surveys can be found in the annex to the impact assessment support study.

A summary overview of different inspection practices in different Member States is provided in Annex 8. Table Annex 8.2 compares how the road consignment note (CMR) is inspected in Germany, France, Italy and Bulgaria and which information is checked by authorities, while table Annex 8.3 shows how the CMR, the AWB, the CIM and the bill of lading are

Furthermore, the consultation revealed that the appreciation by the different individual public authorities, including at the level of the enforcement officers, of the extent to which they may trust or not a document presented electronically, also determines whether they may accept in one case such document as evidence, while in other they may require to see the paper documents⁴⁶. Different authorities may impose different requirements for the acceptance of the same information/document inspected also pursuant to their long-established practices.

Several authorities in (at least) some Member States appear to follow different administrative processes, developed in the course of decades. When moving from paper to digitalised inspection processes, these practices tend to be reproduced, resulting in continuing differences in therefore, with consequences for compliance requirements for businesses. This is for example the case in the maritime sector in Italy, where the harmonization of different administrative processes followed by the different maritime authorities has been the main challenge for the implementation of the maritime national single window, in the context of the RFD, at national level⁴⁷.

Textbox 2.3: Other examples of different administrative practices

In the Netherlands, an electronic transport document (the e-AWB) is accepted for the entry and exit processes of cargo by air, but when the cargo is being transported by road in order to reach the final destination, the paper version of the same air waybill is often used, as road side inspectors do not accept an e-AWB. Although the e-AWB is recognised by Dutch law (and is a valid document) road side inspectors still require a paper version. They prefer paper over electronic documents as they fear that the latter might be fraudulent.

Reportedly, in France, while custom authorities accept an electronic air waybill, a paper air waybill still needs to be submitted to airport handlers or airlines⁴⁸.

Another illustrative example for the argument made above is that of the Luxembourg police. Currently, officers may seize all paper documents presented by a driver during a road-side control, if they have reasons to suspect that the information or the documents provided are not genuine. Not surprisingly, during training in preparation of the launch of the Benelux e-CMR pilot, the main questions they raised were: how to trust that what they would be presented on a smart phone/tablet is genuine?; and, in case they had doubts, whether they would be allowed to confiscate the respective tablet/smartphone?⁴⁹.

controlled in several EU countries and which information in the transport document is controlled by the Member States' authorities, including tax and customs authorities..

⁴⁶ In the absence of availability of IT systems developed by the public sector, many authorities do not trust the technical solutions currently proposed by the market. They fear that it is easy to tamper with the information sent via an electronic channel (for example, providing incorrect information on the value of the cargo). Several public authority interviewees indicated that they would like to have several guarantees (e.g. on authenticity, availability and signatory) before trusting the electronic solutions provided to them. (Cf. impact assessment support study.)

⁴⁷ Interview with Italian Coast Guard, impact assessment support study, 2018.

⁴⁸ As referred by a representative of TLF France during stakeholder consultation workshop, Brussels, 17/10/2017.

⁴⁹ Intervention by an external consultant to the Ministry of Transport, Luxembourg, during Stakeholder consultation workshop, Brussels, 17/10/2017.

2.1.3 Why is it a problem?

Businesses are currently facing a complex and uncertain landscape regarding the acceptance of electronic documents, particularly by the public authorities, in the different Member States. Consequently, and to avoid the risk of electronic documents being declared noncompliant, the transport operators as well as the other involved commercial parties prefer to print, carry and exchange paper cargo documents, in spite of all the inconvenience and cost this may imply. Paper is often carried in parallel to electronic information and documents exchange⁵⁰.

Paper-based information and documentation exchange processes, both in business-to-business (B2B) and business-to-administration (B2A) communication, have been identified by numerous companies as an important source of foregone cost savings, untapped potential for administrative burden reduction and, more generally, efficiency losses. The large majority of the stakeholder consulted – i.e. more than 90% of the 265 SME respondents to the SME panel survey⁵¹, and 88 of the 100 respondents to the open public consultation (OPC) survey indicated significant or at least some expected benefits from adopting electronic information exchange.

Businesses have identified different sources of costs related to the paper-based processes. A primary source is the management of the physical documents as means of transfer of information from one party to the other – primarily related time spent by the employees, but also the use of physical resources such as paper and printer toner. Another source of costs are the errors in the manipulation of these documents by the various individuals involved in a transport operation – such as errors in (re-)copying the data, damage, misplacement or loss of documents.

The degree of digitalisation is different across transport modes, impacting differently the time (and equivalent costs) spent in processing freight transport information by the different transport modes. Due to reasons explained under the problem driver section, the highest level of uptake of e-documents/information exchange is in the aviation sector (c.a. 40 %) followed by the rail sector (c.a. 5%) and road (c.a. 1%). The overall levels of uptake in the maritime and inland waterway transport sectors are close to zero. Table 2.1 shows that in 2018 it is estimated that more than 380 million hours would be spent for processing freight transport information needed for national and international trips, equivalent to almost EUR 7.9 billion⁵²:

Table 2.1: Estimated time and equivalent costs spent processing freight transport information by mode of transport in 2018

	Total time spent processing freight transport information (million hours)	Administrative costs - intra-Member State shipments (EUR million)	Administrative costs - shipments between EU Member State (EUR million)	Total administrative costs (EUR million)
Road	297	5,663	299	5,962

⁵⁰ The respondents had to indicate if they print these documents. If they did print these documents, they had to give an indication of the percentage of electronic documents that are printed. For example, 238 respondents to the SME panel answered the question whether, when using electronic transport documents, they also printed them. 77 of these respondents indicated that they printed all transport documents, while 84 answered that they printed some, but not all of them. Only 25 of the respondents indicated that they never printed these documents. The remaining 52 answered that this question was not applicable to them.

⁵¹ The number of respondents who answered the benefits related questions in the SME panel survey varied between 230 and 250, depending on the specific benefits identified in the different questions.

⁵² Cf. estimations in the context of the Ecorys et al. (2018) impact assessment support study.

Rail	29	299	208	507
IWT	24	178	404	582
Maritime	36	147	667	814
Aviation	1	3	22	25
Total	387	6,290	1,600	7,890

Yet other costs are related to inefficiencies in companies' internal decision-making processes, due to lack of real-time information on their actual physical stock (what goods are sold, but still awaiting shipment, which are in transit, which delivered and awaiting payment or, conversely, which have been contracted, but not yet delivered, for what value etc.). In addition, overall supply chain organisation could also be significantly optimised, if real-time data on the goods being moved were available⁵³.

National public administrations believe that there is a potential for more effective use of larger volumes of data, in particular with regards to their capacity to effectively and efficiently enforce applicable regulations, and to devise better targeted and more effective policy measures. Moreover, some public administrations also indicate that there are some efficiency losses in processing non-digitised information. For example, for the Rhine-Danube corridor alone, authorities estimate about 5 million euros losses due to the time needed to process non-digital information for investigations⁵⁴.

In short, paper-based processes of transport information and documentation exchange are an important source of unnecessary costs and inefficiencies for businesses. They also particularly affect the transport of goods changing transport mode or crossing borders, thus potentially hindering multimodality and putting obstacles to the Single Market. In multimodal transport operations involving several modal legs, stakeholders estimate potential savings from the digitalisation of current paper-based processes at about three times higher, per shipment, than in a unimodal operation. The two case studies conducted provide evidence of benefits of around EUR 9-37 and EUR 21-87 per trip due to time savings⁵⁵.

Table 2.2: Samskip case studies on administrative cost reduction from transport e-document

	Member States involved	Modes of transport	Number of transfers	Lost time savings (min)	Lost cost savings (EUR)
Case 1	DE – NL – IE	Road – Maritime - Road	2	29.6	9-37
Case 2	NO – NL – DE - IT	Road – Maritime – IWT – Road – Rail – Road	5	89.6	21-87

2.2 What are the problem drivers?

2.1.4 A fragmented legal framework concerning the acceptance of electronic freight transport documents/information⁵⁶

Today, no single or uniformly applicable legal framework regulates the use of (electronic) cargo and transport documents for international freight transport in the EU. The applicable

⁵³ Various stakeholders interventions during stakeholder consultation workshop, 10/01/2018. See also Ecorys et al. (2018) impact assessment support study.

⁵⁴ RIS COMEX, 2016

⁵⁵ The case studies show a loss in potential time saving of 10 minutes for each transfer, which translates to approx. EUR 1.5-6. See also Ecorys et al. (2018) impact assessment support study.

⁵⁶ The analysis in this section is based primarily on the Ecorys et al. (2018) impact assessment support study. Ecorys used both secondary sources of information as well as conducted an extensive legal survey and a number of interviews with legal experts in both the public and private sector.

rules are determined by the combined application of various legal acts, issued at international, European, and national level. The result is a highly fragmented legal regime, which varies depending on the Member State, the transport mode and, often, the type and use of the documents.

In the context of the present assessment, it is important to pay attention to three aspects that affect the use of electronic transport documents, and information more generally: (a) the general acceptance of the electronic form; (b) the requirements for validity of the electronic form (i.e. the necessary and sufficient conditions for acceptance); and (c) the technical specifications for implementation of these requirements.

➤ *The obligation of acceptance*

The **international conventions** relevant for this analysis are primarily those governing the regime applicable to the international contracts of carriage in the different transport modes. These conventions establish, separately for each transport mode, the legal equivalence of the electronic contract of carriage to that of the paper-based document⁵⁷. These conventions enable the use of the electronic contract of carriage but, except for the protocol to the CMR convention, the application of their provisions on electronic documents is conditional on the existence of specific national rules. In practice, they apply only if the national legislation of the State under which the contract was concluded allows the use of the electronic means for the conclusion or evidence of a transport contract. The e-CMR protocol, regulating the electronic road consignment note, does not include such clause and it is directly applicable if the respective State is a party to the protocol. Participation in the e-CMR protocol is however relatively modest, though growing.

These conventions regulate however only the contractual relation between the commercial parties, if they choose to use the contract of carriage in an electronic form. They do not impose, but rather allow, the *use of the electronic contract of carriage (transport document) by the commercial parties (business to business)*. Furthermore, they do not regulate the use of electronic documents between business and authorities.

Indirectly, however, these conventions impact the acceptance by the authorities, and in particular courts, which may be called upon to enforce the rights and obligations deriving from an electronic transport contract. For enforcement authorities, they become relevant only when their national legislation requires a valid transport contract to evidence compliance with specific regulatory requirements.

At **EU level**, acceptance by the Member States' authorities of electronic documents or, more generally, of evidence communicated by electronic means, is regulated by means of several legal acts⁵⁸. These acts establish specific conditions for the transport of goods within the EU,

⁵⁷ Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR, Geneva 19 May 1956) concerning the Electronic Consignment Note, Geneva 27 May 2008; Uniform Rules Concerning the Contract of International Carriage of Goods by Rail (CIM) - Appendix B to the Convention concerning International Carriage by Rail (COTIF) 9 June 1999; Convention for the Unification of Certain Rules for International Carriage by Air, Montreal 28 May 1999; United Nations International Convention on the Carriage of Goods by Sea (Hamburg Rules) Hamburg 31 March 1978; Budapest Convention on the Contract for the Carriage of Goods by Inland Waterway (CMNI) Budapest 2000; United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (Rotterdam Rules) 11 December 2008. Attempts thus far to establish a legal regime applicable to multimodal international transport operations have so far failed. The United Nations Convention on International Multimodal Transport of Goods, Geneva, 24 May 1980, has not yet gathered sufficient signatures to entry into force, and there are no signs that it will do so on short to medium term.

⁵⁸ Council Regulation No. 11/1960 concerning the abolition of discrimination in transport rates and conditions; Directive 2008/68/EC on the inland transport of dangerous goods; Directive No 2010/65/EU on reporting formalities for ships; Council Directive 92/106/EEC on the establishment of common rules for certain types of combined transport of goods between

either in general or for particular types of goods, for a variety of regulatory purposes – to ensure the safety and security of transport, to facilitate certain types of transport operations, or to ensure the smooth and fair functioning of the transport market. They also specify how, i.e. the required information elements, and by what means the private actors may make proof of compliance with the respective conditions. While the information elements concerned are often overlapping, the means of conveyance of this information, and the degree of specification of what constitutes an admissible electronic evidence, vary significantly between these legal acts.

Only some of the EU legal acts establish the principle of acceptance of the electronic means. Moreover, they do so only for specific regulatory purposes, in specific transport modes – for example for compliance with security requirements in air freight transport, dangerous goods information transmission in inland waterway transport, or fulfil determined customs formalities (such summary transit declaration) for air and maritime. The acceptance of electronic means is generally established as possible alternative to the paper format, with the only exception of maritime formalities at arrival at and departure from ports, where the EU legislation explicitly states that “*Member States shall accept the fulfilment of reporting formalities in electronic format*”.

In three of the five transport modes, there is at least one legal act that foresees only the use of paper and another one (for a different regulatory purpose) that allows the use of electronic means. As a result, an enforcement authority that controls regulatory compliance of the same transport operation, is expected to accept an electronic document pursuant a certain EU legislation, but to require a paper document pursuant another⁵⁹.

At **national level**, Member States’ legislation regulates acceptance by authorities of (electronic) cargo transport information or documentation for a variety of purposes. These include compliance with fiscal rules, environmental rules, or mere legality of transport. Often, compliance with these rules requires presentation of evidence of a valid transport contract⁶⁰. These provisions vary considerably. They differ both between Member States and within Member States, depending on the transport mode concerned or regulatory purpose⁶¹. They

Member States and, respectively, Proposal No 2017/0290 (COD) for a Directive of the European Parliament and the Council amending Directive 92/106/EEC; Regulation EC No. 1072/2009 on common rules for access to the international road haulage market and, respectively, Proposal No 2017/0123 (COD) for a Regulation of the European Parliament and the Council amending Regulation EC No. 1072/2009; Commission Implementing Regulation 2015/1998 laying down detailed measures for the implementation of the common basic standards on aviation security; Directive 2005/44/EC on harmonised river information services (RIS) on inland waterways in the Community and Commission Regulation No. 164/2010 on the technical specifications for electronic ship reporting in inland navigation referred to in Article 5 of Directive 2005/44/EC; Commission Regulation EU No 1305/2014 on the technical specification for interoperability relating to the telematics applications for freight subsystem of the rail system in the European Union.

⁵⁹ For example, in inland waterways, information concerning dangerous goods is accepted when electronically transmitted, pursuant the RIS Directive provisions, whereas a paper document is required pursuant Regulation No. 11/1960. In rail, only paper documents could be currently accepted by authorities pursuant to EU legislation (pursuant Regulation No.11/1960 and Directive 2008/68/EC), but the electronic exchange of the rail consignment note information is mandated as the main form for communication between the commercial parties (pursuant Commission Regulation No. 1305/2014). For road, paper documentation will continue to be required pursuant Regulation No 11/1960, while proposals for the amendment of the Regulation No. 1072/2009 and, respectively, Directive 92/106/EEC would require the acceptance of “evidence.. presented or transmitted electronically”. For a more detailed overview, see Table 8.7 in annex 8.

⁶⁰ Generally referred to as “the transport document”, the transport contract (or contract of carriage) is, arguably, the document most often used by businesses, and accepted by the Member State authorities, as source of proof (or evidence) when controlling compliance with the EU legislation, as well as for a range of other regulatory purposes regulated by national legislation, and by courts as evidence in legal proceedings.

⁶¹ Based on the information gathered in the context of this impact assessment. For a summary but comprehensive overview of national provisions concerning the validity of transport contracts, see Annex 8. For further details see Cf. Ecorys et al. (2018) impact assessment support study.

range from specific provisions establishing the obligation of the authorities to always accept the electronic means for certain regulatory purposes, when certain conditions are met⁶², to legislation under which no such means is accepted⁶³. In other Member States, legislation may take the form of horizontal laws requiring or (implicitly) allowing acceptance by authorities of electronic means in business-to-administration communication⁶⁴. In addition, specific legislation provisions may also require the paper format for certain, clearly identified documents, while remaining silent on others⁶⁵. Where the legislation specifically requires the acceptance of electronic documents, it is most often limited to the transport contract and it does so for specific regulatory purposes only⁶⁶ or in specific transport modes⁶⁷.

Acceptance by national courts of the electronic means for business-to-administration regulatory information conveyance, and of transport contracts in particular, depends on specific provisions in national legislation on the type of evidence admissible in legal proceedings in courts. In most Member States the contract of carriage does not need to be in paper to be enforced by national courts⁶⁸; and while in some States even oral contracts of carriage would be enforceable⁶⁹, in several of them the national legislation establishes specific conditions for the probative value of contracts concluded electronically. At the same time, acceptance of a document as admissible evidence in courts of law is generally not regulated in detail in most Member States. As a result, most Member States' national courts have discretion on whether to accept or not electronic transport documents as evidence of a contract of carriage⁷⁰.

➤ *Requirements for acceptance/admissibility and guidance on technical implementation*

The acceptance of the electronic documents is in practice linked to the criteria and means by which admissibility can be established. When authorities are asked to accept electronically conveyed evidence, they have to apply more general principles of law related to the authenticity and integrity of the information provided. Compared to paper documents⁷¹, current guidance on how to establish the validity of electronically conveyed information/documents remains generally limited and uneven. This creates uncertainty and room for interpretation in implementation as to the necessary and sufficient conditions for validity and, therefore acceptance, of the electronic means.

Two levels of specification can be identified with respect to the guidance provided by the current legislative framework: general requirements for acceptance and specifications for technical implementation.

⁶² For example, in France according to a 1999 decree amended on 06/12/2017, the road consignment notes can be established in electronic version provided that these documents can be transmitted or communicated in if complying to certain specified conditions.

⁶³ For example Latvia, Romania.

⁶⁴ For example in Netherlands or Sweden.

⁶⁵ For example in Greece or Italy, where the national law requires that a bill of lading should bear handwritten signatures in order to be valid, meaning only paper bill of lading can be accepted.

⁶⁶ For example, in Slovenia, where an electronic transport contract is not accepted by other enforcement authorities, but it is accepted by the fiscal authorities, provided it bears an electronic signature

⁶⁷ For example in Malta or Luxembourg, where the legislation specifically identifies only the electronic air waybill (e-AWB) as admissible evidence.

⁶⁸ For example in France, Germany, Denmark, Netherlands, Italy, Spain, and Belgium.

⁶⁹ For example in Germany, Belgium, Denmark, France,

⁷⁰ This conclusion is based both on information gathered through the targeted legal information gathering in the context of the impact assessment support study.

⁷¹ By the mere fact that paper has been used for centuries as the means of conveyance of information, both legal provisions and established practices provide the authorities with guidance as to how the validity of paper documents could be established.

EU legislation limits general requirements for acceptance to the specification of the possibility of use, presentation or transmission of the required information electronically. In addition, the electronic means of information conveyance are referred to, or defined, in different ways. In several acts, a more specific format is implied – “document”, “documentation”⁷² or “message”⁷³ – while in others the wider term – “evidence”⁷⁴ – is used. Furthermore, it provides technical specifications in only three of the seven EU legal acts establishing the requirement of acceptance⁷⁵. However, these specifications differ significantly, requiring specific and largely non-interoperable technical solutions.

Similarly, all mode-specific **international conventions** link the validity (i.e. legal equivalence to the paper format) of the electronically supported contract of carriage to the fulfilment of certain general requirements. Yet these requirements vary significantly between the different conventions. They range from single reference to the manner in which the necessary signatures are performed – “*stamped, in symbols or made by any other mechanical or electronic means*” (Article 6, CMNI) or just “stamped” (Article 11, Montreal Convention) – to more general reference to the information representation – “*electronic data registration which can be transformed in legible written forms*” (Article 6, CIM) – to a larger set of more specific requirements such as how the consignment note shall be authenticated, its integrity ensured, and how to deal with additional cargo and transport documents supplementing the note (Articles 3 to 6, e-CMR Protocol). However, none of the conventions provide further guidance on specific options for the technical implementation of these requirements. This is left for the interpretation of the parties concerned resulting in a variety of implementation approaches and specific/non-interoperable technical solutions for electronic transport contracts, mostly along sectoral lines, both by the private sector and the authorities.

National provisions on validity requirements also vary significantly. Most often there are no specific requirements, apart from the possibility, or obligation, to accept electronic means. Some countries have however established explicit conditions, with varying degree of detail – some formulated at general level (such as referred to the identification of the parties, integrity and availability of the document⁷⁶), other related to the existence of an electronic signature⁷⁷. These requirements may relate either to certain transport mode documents, (e.g. the transport contract), or to the validity of commercial contracts in general. In most cases, no guidance on technical implementation is provided. Overall, national provisions concerning acceptance leave ample room for interpretation to determine the concrete and specific conditions of their implementation.

34 (i.e. more than 75%) respondents to the IA support study targeted survey confirmed that the diverse and inconsistent legal framework applicable at EU Member State level on the acceptance of electronic transport documents/information is a significant driver to the limited use of electronic transport documents. 26 respondents also stressed the fact that national rules

⁷² Council Regulation No. 11/1960; Council Directive 92/106/EEC; Commission Implementing Regulation 2015/1998.

⁷³ Commission Regulation No. 164/2010.

⁷⁴ Regulation EC No. 1072/2009 and proposal No 2017/0123 (COD). Proposal No 2017/0290 (COD).

⁷⁵ Directive 2005/44/EC (dangerous cargo information transmission in inland waterway transport); Commission Regulation EU No 1305/2014 (for exchange of consignment note information, between the private undertakings only, in rail); Commission Implementing Regulation (EU) 2015/2447 and Commission Delegated Regulation (EU) 2015/2446 (transport data elements for customs formalities).

⁷⁶ For example in France. According to Article 1366 of the Civil Code, in France an electronic document could not be refused by a court only because it is in electronic form. However, the law further specifies, the probative value of the document could be questioned if the identification of the persons referred in the document and / or the integrity of the documents could not be guaranteed.

⁷⁷ For example in Lithuania, Poland, Hungary or France.

requirements for handwritten signatures also hampers the use of electronic documentation. Another 23 respondents mentioned the requirement to use stamps on a transport documents as hampering factor.

Closely related to the question whether national rules are in place that allow authorities to accept electronic transport documents, is the question whether they do accept them once the legal basis is provided. 13 out of the 35 respondents to the targeted IA support study survey indicated that authorities do accept the electronic transport documents when the applicable legislation allows it, although the majority also stressed that the authorities do not accept the electronic form once they have reason to believe the documents are not accurate or are manipulated. 12 respondents indicated that, although a legal basis exists that allow authorities to accept electronic documentation they do not accept it. The remaining ten stakeholders did not provide an answer.

It can be concluded therefore, that the legal framework for acceptance of electronic information in relation to international transport operations applicable across the EU is patchy and incomplete. Different requirements in different applicable pieces of legislation implies that the same authority is required (or allowed) to accept an electronic transport document specific to one transport mode, but not to another, or to accept the electronic contract of carriage, but not an electronic invoice, packing list, or house manifest. Furthermore, the limited and variable specification of the law creates ample room for interpretation in application by the authorities. As a result, acceptance remains limited in scale and appears to be more a consequence of initiatives of individual authorities than the legal implication of a general requirement compelling all national authorities to accept electronic transport documents.

2.1.5 Multiple and non-interoperable data exchange systems

The second problem driver identified relates to the technical means that authorities need in order to be able to accept electronically communicated transport documents or information⁷⁸. Due to limited requirements by the applicable legislation, the number of transport specific IT systems used by Member States' authorities is currently small. Apart from the electronic systems set up by the Member States pursuant to the EU legal framework on customs and, respectively, maritime reporting formalities, there have been few attempts to develop transport specific electronic cargo information and documentation exchange systems and, so far, they remained at the level of pilot projects⁷⁹. Each of these pilot projects tended to create its own technical system for sharing the electronic transport documents or information. This means that in each pilot for each authority, mode and Member State, a new technical solution would be introduced for the sharing of information.

⁷⁸ As opposed to paper, which can be exchanged between and read by any number of parties without particular requirements, apart perhaps agreed templates for the presentation of the information, the exchange of information/documentation in electronic form implies both specific equipment, the hardware, and specific means of writing (data encoding), transmission (coding in electronic "envelopes") and, respectively reading by the other side (decoding) of the information, the software.

⁷⁹ Luxembourg, Belgium and the Netherlands have engaged in a 3 year e-CMR Benelux Pilot, starting December 1, 2017. The legal basis for such project is the BENELUX Decision M (2017) 12, published on 25 September 2017). The scope of the Pilot project is limited to transports within BENELUX. Finland is involved in the Mobicarnet project between Finland and Estonia. The purpose of this project is to develop an international application that enables paperless goods transport and that can be linked to the authorities' data systems. E-CMR in France was officially launched in January 2017 with the first ever border crossing to use electronic consignment notes between Spain and France. The Estonian Single Window Initiative is an ambitious example how various services of different actors and institutions can be integrated in the digital age. Such solutions require a high degree in providing information digitally and it should be remarked that this should go in line (but often conflict) with data privacy. See also Ecorys et al. support study.

As a result, multiple technical systems are used by authorities. In addition, these systems differ from the systems used by business in B2B communication. They contain different information, are based on different technical protocols and might use different devices/solutions. Even within the same Member State, for the same transport mode, systems may differ⁸⁰.

⁸⁰ Cf. Ecorys et al., 2018.

Textbox 2.2: Example of multiple technical systems used within the same Member State⁸¹

In Germany, multiple systems are used, each based on a different legal act. Based on EU Regulation 2015/2447 custom specific information needs to be included in the ATLAS-system (Automatisiertes Tarif- und Lokales Zollabwicklungssystem). Based on EU Regulation 2010/65, the transport document needs to be included in the National Single Window (NSW) for general inspection. Based on national law, transport related information needs to be included in a nationally developed system.

These different data transmissions contain partly the same data, but transfer formats and data channels are different. Each authority regards the requested data for their own system as the most vital information. Furthermore, almost the same data is sometimes sent to comparable authorities in different EU countries in order to comply with laws in single countries. This existing administrative burden today causes reluctance among all interviewed companies to create another system to send the same data once more.

In the Netherlands, Dutch inland transport sector, two systems are currently used for business-to-administration communication. Furthermore, under the current circumstances, the Dutch barge operators cannot share their transport related information with, for example, the German or Belgian authorities, as they have different systems.

This diversity of public administration systems impacts also on the market responses, resulting in a variety of business-to-administration technical solutions⁸². Most solutions are only suitable for one mode (e.g. road, air, or rail) or are created for a specific authority (e.g. customs), while others are primarily used for business-to-business information exchange.⁸³

Rail and air are sectors characterised by rather high concentration of players, and virtually single electronic information exchange solutions with global reach have been established under the umbrella of the respective global industry organisations. These are essentially B2B systems, but are also used for B2A electronic communication⁸⁴. In road, inland waterway and maritime transport, where the market is more fragmented, the number of available solutions is higher, and their use more heterogeneous across the Member States⁸⁵.

⁸¹ Cf. Ecorys et al., 2018.

⁸² The term solution in this context must be understood as more generic term regarding a software-based system which enables parties to exchange data in the form of a defined electronic document dataset. The definition of this dataset is often standardised; hence such an exchanged dataset is based on a standard.

⁸³ As highlighted in the textbox above. For a wider overview, see Ecorys et al. (2018) impact assessment support study.

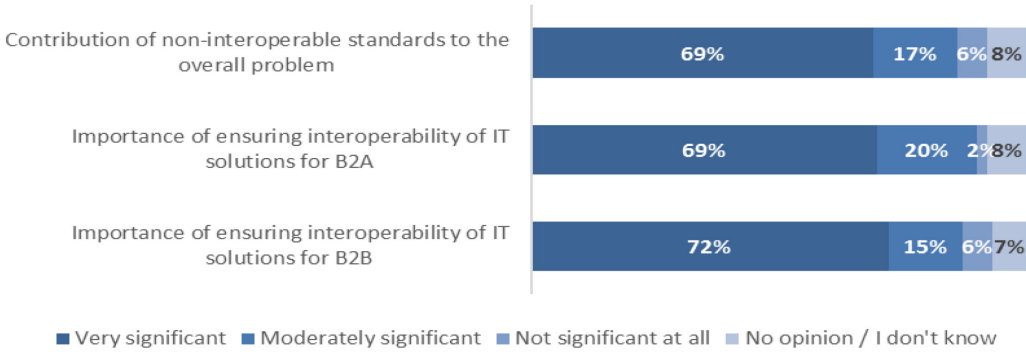
⁸⁴ In the railway sector, 12 of the largest EU railway operators are currently using electronic cargo information exchange, The Raildata was established in October 1995, as a special group of the International Union of Railways (UIC), having as mandate the development and production of central information and data exchange systems for European freight rail transport, which established their ORFEUS system. About 80% of the 12 ORFEUS users use the option of accompanying papers, so – although there is a high degree in digital exchange – the number of used paper is still very high. It is likely that other rail freight operators that are not member of Raildata still use paper only. Hence overall it is estimated that the use of electronic transport documents only for rail in Europe is 5-10%. In the air sector, the International Air Transport Association (IATA) formally launched its programme of digitalisation of air transport goods-related documents in 2005. In 2011, it launched its e-air waybill (eAWB) solution, which is implemented via specific bilateral agreements between the member airlines and IATA. IATA members account for more than 83% of total scheduled traffic. By 2017, about 40% of the total AWB issued by the IATA members were eAWB in Europe. By IATA's own expectations this remains low, as it had to revise downwards its penetration targets several years in a row. Since 2017, it has launched the next phase of its paperless programme, which includes the digitisation of all cargo documents used in air transport and their exchange and management processes.

⁸⁵ At least three main commercial solutions for the e-CMR are currently available in Europe, and major transport and logistics companies are also considering developing their own systems. Their use in B2A relations is however distributed geographically – the Danish e-CMR solution of the national road transport association (ITD) is the primary solution used in Denmark, whereas in France and Netherlands, the Transfollow solution, developed by the commercial arm of IRU, appears to conform to national requirements and promoted by the respective national industry associations (cf. ITD, IRU, TLF – replies to interviews and interventions in the various stakeholder workshops and DTLF meetings and side discussions). In the inland navigation sector, only in the Netherlands, currently five or six business-to-business systems are operable, and two in relations to the administration. In the maritime sector, at least four business-to-administration systems have been identified, providing solutions for businesses to respond to the European national single window requirements, but high visibility pilots like the [Maersk-IBM blockchain](#)-based fully paperless export-import transactions indicate that it will not stop there. For a detailed overview, see Ecorys et al. support study.

However, none of the observed solutions apply at least for B2A electronic information exchange with all authorities in one Member States, let alone apply to all relevant authorities in multiple Member States. As a result, companies need multiple technical solutions to provide the relevant information to authorities and business partners, even if the basic information is the same for all⁸⁶.

The problem therefore, as it emerged from the feed-back received from the stakeholders, is that the low interoperability between the current B2A systems, which also impacts on B2B solutions.

Figure 2.6: Contribution of the problem drivers to the overall problem (n=100)



Source: OPC

The SME panel results for options regarding the question on how interoperability of IT solutions/systems can be ensured reveal that 73% of the respondents consider that standardized technical specifications for sharing data between logistics operators and public administrations should be established.

2.3 How will the problem evolve?

Without any specific EU level intervention, acceptance of electronic documents is likely to remain limited.

International fora generally take a long time to secure agreement between the various parties concerned, and often only recommend, but do not require using certain procedures. At EU level, progress may be equally slow and variable, as it will depend on the various revision processes of the current applicable legislation. At national level, Member States will likely continue to adapt their legislation in order to accommodate the increasing need for development of eGovernment services. However, they are likely to do so at variable pace and with different results, depending on national political priorities.

Businesses will likely try to adapt to this evolving enabling environment, in order to capture most of the expected benefits of digitalisation. Therefore, the current trend of slow and mode-specific uptake of a variety of primarily mode-specific and non-interoperable solutions will continue. Theoretically, a company could acquire as many mode specific and/or national specific solutions as necessary, or use the services of companies that provide connecting software that ensures the interoperability of the data exchanged with the various commercial partners. However, that is neither economically sound nor effectively sustainable in practice, due to the high investment and maintenance costs for this solutions and integrators/translators.

⁸⁶ Both authorities and commercial partners requires, at a minimum, information on the shipper, consignee, the cargo, its value and other cargo-specific characteristics.

Rather, the large majority of businesses will continue to prefer the certainty (including as regards costs) of paper, and not invest in digital solutions, since the currently fragmented IT market, as well as the limited acceptance by authorities, makes digitalisation too costly⁸⁷.

In the baseline scenario, freight transport activity for inland modes is projected to increase by 28% between 2015 and 2030 (51% for 2015-2050). Yet the digitalisation levels of the electronic transport document will remain limited for most of the transport modes. The levels provided in the table below represent the continuation of the current situation with only limited coordinated action in the direction of tackling the existing problem drivers. They account however for a certain increase in the use of electronic transport documents in the more digitally-ready Member States, such as for example the Netherlands, Denmark, or Estonia.

Table 2.3: Baseline scenario – assumed level of uptake for electronic documents

	2018	2025	2030
Road	1%	3%	5%
Rail	5%	10%	15%
IWT	0%	2%	5%
Maritime	0%	2%	5%
Aviation	40%	45%	50%

Source: Ecorys et al. (2018) impact assessment support study

Driven by growing traffic and low acceptance/use of electronic documentation and information exchange, the administrative costs under the baseline scenario are projected to increase despite some further uptake of electronic documents. Table 2.4 shows the evolution of administrative costs by mode of transport between 2018 and 2030 in million euros⁸⁸. The assumed uptake rates in the baseline scenario and the calculation of administrative costs are explained in Annex 4.

Table 2.4 Estimated administrative costs in the baseline scenario

Sector	2018			2025			2030		
	Digital	Paper	Total	Digital	Paper	Total	Digital	Paper	Total
Road	42	5,920	5,962	140	6,474	6,614	250	6,776	7,026
Rail	17	490	507	40	536	576	66	559	625
IWT	0	582	582	7	628	635	18	656	674
Maritime	0	814	814	9	873	882	25	901	926
Aviation	8	17	25	11	20	31	15	21	36
Total	7,890			8,738			9,287		

Source: Ecorys et al. (2018) impact assessment support study

The slow and mode-dependent progress in the acceptance/use of electronic documents and information exchange is expected to hamper developments in the multimodal transport. In the baseline scenario road transport would maintain its dominant role within the EU, road freight activity going up by 27% by 2030 (47% for 2015-2050). These developments would not

⁸⁷ Since, as highlighted earlier, much convergences is not expected to occur spontaneously in the timeframe considered under this impact assessment, neither as regards the requirements in the legal basis, nor in the IT solutions market, these costs are estimated as tending to null under the baseline.

⁸⁸ Ecorys et al., 2018.

support the achievement of the 2011 Transport White Paper goal of shifting 30% of road freight over 300 km to other modes such as rail or waterborne transport by 2030. A description of the baseline scenario and its assumptions is provided in Annex 4.

3 WHY SHOULD THE EU ACT?

3.1 Legal basis

The legal basis is provided by Article 91 and 100(2) of the Treaty on the Functioning of the European Union (TFEU), which must be understood in light of Article 90. Article 90 requires Member States to pursue a common transport policy. Articles 91 and, respectively 100(2) set out the requirement that common rules applicable to international transport to or from the territory of a Member State or passing across the territory of one or more Member States and, respectively, appropriate provisions for sea and air transport, be laid down by the European Parliament and the Council.

3.2 Subsidiarity: Necessity of EU action

Unilateral initiatives by Member States to facilitate the uptake of electronic transport documents and information exchange would have limited effect, if similar action was not taken in other Member States whose territory is also concerned by the transport operations in question.

At the same time, even if most EU Member States were to enact legislation facilitating the use of electronic documents, there is a high risk that, legislating unilaterally, each Member State would adopt different requirements for the acceptance of electronic documents, and regulatory information communication more generally, as valid and authentic. In practice, electronic documents and regulatory information communication which fulfilled the requirements for acceptance in one Member State would not be accepted in the other(s), thus creating barriers in the EU internal market.

3.3 Subsidiarity: Added value of EU action

The most appropriate level to address the problem and its drivers is therefore the EU level, where a uniform approach to acceptance of and common standards for acceptance of electronic documents can be set. In that respect, this initiative takes further and complements measures already established at EU level to ensure uniform conditions for acceptance of electronic freight transport information and documents, including by ensuring trust with regards to the electronic means for their communication⁸⁹.

4 OBJECTIVES: WHAT IS TO BE ACHIEVED?

4.1 General and specific objectives

The general objective of the initiative is to contribute to removing barriers to the smooth functioning of the Internal Market, to the modernisation of the economy and to the greater efficiency of the transport sector, through enabling wider use of digital technologies.

This general objective would be achieved by means of specific measures implementing the following specific objectives:

a) Addressing the problem driver "fragmented legal framework"

⁸⁹ Including the framework for the cross border use of eIDs and electronic signatures as established by eIDAS.

1. Ensure the establishment, in all EU Member States, of the obligation of acceptance of electronic cargo transport documents/information by all relevant public authorities;
2. Ensure the uniform implementation by authorities of the obligation of acceptance;

b) Addressing the problem driver "multiple and non-interoperable systems"

3. Ensure the interoperability of IT systems and solutions for electronic exchange of cargo transport information, in particular for B2A regulatory information communication.

There are clear synergies between the specific objectives of the intervention. For example, acceptance of the electronic transport information/documents by the authorities will significantly impact the level of acceptance by the businesses, and is expected to have a significant impact on reducing related B2A administrative costs and on improving the accuracy and reliability of the information exchanged B2B. However, if the authorities will continue to have large room for interpretation in how to apply their regulatory obligation to accept the information/documents communicated electronically, this will significantly impact the interoperability of the systems developed or adopted by the authorities to that end. If these systems remain not interoperable, this will impact on the interoperability of the solutions developed for the businesses, both for B2A and B2B communication, and therefore their related costs. As a result, the printed versions of the documents will continue to be issued and physically exchanged alongside the goods throughout the entire logistics chain. Therefore, it is important to pursue these objectives in parallel for a more coherent system of digital solutions.

All of the stated specific objectives were supported by the large majority of the stakeholders consulted. 90 of the 100 OPC respondents fully agreed with the first objective, namely to ensure the acceptance by Member States' authorities. The same number of respondents also agreed with the third objective, aimed at ensuring the interoperability for B2A and B2B communications. There was also no subgroup of respondents that disagreed with any of these two objectives.

Likewise, most enterprises responding to the SME panel indicated that 'acceptance by MS authorities' would be the most important policy objective to increase the use of electronic transport documents by SME's (with 198 out 265 indicating it as a very important objective, and additional 35 as moderately important). A great majority also indicated the ability to use a single IT application/system to exchange electronic transport documents with all the other companies as a second most important objective (240 in total, with 172 indicating it as very important and 58 as moderately important).

The second objective has been suggested by stakeholders during the consultation workshops and interviews. It aims to complement the implementation of the first objective, by ensuring also the uniform implementation, across the Member States, of the new uniform legal regime concerning the acceptance of the electronic documents by the authorities. This would tackle, in particular, the different administrative practices aspect of the identified problem.⁹⁰

⁹⁰ This suggestion has been promoted in particular in the context of the consultation workshops, and voiced primarily by Transport and Logistique France (TLF), including in their position paper on this initiative, of 8 January 2018. TLF is also one of the main initiators, alongside FNTR, another French industry association member of DTLF, of a DTLF France mirror group, having as main objective to ensure the coordination between the French authorities as regards their inspection requirements and practices.

The objectives of the present intervention are consistent with the objectives of other ongoing initiatives currently being pursued, such as on the revision of the cabotage and combined transport rules in the EU, which provide for the acceptance by authorities of electronic evidence as proof of compliance with these rules, but do not provide detailed guidance on what could be considered authentic evidence, and how such authenticity could be proved. As highlighted earlier, the initiative is also consistent with the on-going initiative dealing with the RFD revision. By ensuring the uniform acceptance of electronically communicated cargo transport information on the hinterland journey of the goods – either before reaching a port for continuation over a maritime leg, or once the goods left the port after their maritime voyage – this initiative would facilitate the possibility of end-to-end electronic communication and exchange of transport information along the entire logistics chain. Furthermore, in pursuing the objective of ensuring the interoperability of the systems used by authorities to accept the electronic cargo information, synergies will be exploited, notably in terms of data models and interoperability.

5 WHAT ARE THE AVAILABLE POLICY OPTIONS?

5.1 What is the baseline from which options are assessed?

The Baseline scenario reflects developments under current trends and adopted policies as described in section 2.4, without further EU level intervention. In this scenario the acceptance of documents will continue to remain limited, particularly on the side of the public authorities, though improving slowly and at variable speeds depending on the transport mode and on the Member State concerned.

The adoption by authorities of technical implementation orientations and digital tools for inspecting electronic transport information would also remain limited, and largely divergent. Slow progress will be hampering the development of multimodal transport. National based approaches will likely continue to remain the norm, impacting on the digitalisation of cross-border transport information and documentation exchange. As suggested by current pilot initiative, more efforts for coordination among the different Member States and between and with the business can be expected. Yet, as this experience also suggests, these pilots will continue largely independently, with cross-border coordination concentrated rather at regional level⁹¹.

5.2 Policy measures and options

A long list of policy measures addressing the two main problem drivers was considered after extensive consultations with stakeholders, expert meetings, independent research and the Commission's own analysis. This list was subsequently screened based on the following criteria: legal, political and technical feasibility, effectiveness, efficiency and proportionality. Based on this initial screening (see Annex 9 for detailed explanation), a number of policy measures were discarded:

- Separate revision of individual pieces of current EU legislation;
- Obligation for businesses to use electronic documents for regulatory inspection by authorities;

⁹¹ For example, along some of the TEN-T corridors, as sought to be piloted in the context of the TEN-T corridors policy implementation and the DTLF, or among neighbours, such as Finland and Estonian Mobicarnet project, or the e-CMR Benelux project, as highlighted earlier (see footnote 81).

- Establishment of a single EU legal regime concerning the validity of electronic transport contracts as commercial contracts;
- Establishment of a centralised EU transport information exchange system.

The retained policy measures have been grouped in four distinct policy options. Table 5.1 below provides an overview of the retained policy measures, and links the individual policy measures with the problem drivers in the problem definition, the objectives and the policy options.

Table 5.1: Description of policy measures (Key: D1=“multiple legal requirements” driver; D2=“non-interoperable systems” driver; SO = specific objective; S = support measure; R= regulatory measure; ✓ : included)

	Policy measure	Driver / Specific objective	PO1	PO2	PO3	PO4
	Acceptance	D1 / SO1				
1	Member States adherence to international contracts of carriage conventions	D1 / SO1	✓ R	✓ S	✓ S	✓ S
2	Amendment of international conventions to remove the limitation of applicability of the conventions' provisions on the legal equivalence of the electronic transport contracts	D1 / SO1	✓ S	✓ S	✓ S	✓ S
3	Establishment of general obligation for MS authorities to accept electronic means for B2A information/documentation communication ⁹²	D1 / SO1	-	✓ R	✓ R	✓ R
4	Inclusion in relevant EU-third countries bilateral agreements of provisions on mutual acceptance of electronic information/documentation	D1 / SO1 (int'l dimension)	-	✓ R	✓ R	✓ R
5	Awareness raising, training and exchange of experience	D1 / SO1	✓ S	✓ S	✓ S	✓ S
	Requirements for validity/acceptance	D1 / SO1				
6	Amendment of international conventions to align provisions on the validity of electronic contracts of carriage	D1 / SO1	✓ S	✓ S	✓ S	✓ S
7	Establishment of requirements for acceptance by authorities of B2A information made available electronically	D1 / SO1	✓ S	✓ R	✓ R	✓ R
8	Inclusion of provisions on common requirements for acceptance in relevant EU-third countries bilateral agreements	D1 / SO1	-	✓ R	✓ R	✓ R
	Alignment of administrative procedures	D1 / SO2				
9	Review of administrative practices for checks by authorities of regulatory information	D1 / SO2	✓ S	✓ S	✓ R	✓ R
10	Adoption of aligned procedures for regulatory information checks	D1 / SO2	✓ S	✓ S	✓ R	✓ R
	Technical specifications for interoperability	D2 / SO3				
11	Establishment of technical specifications for the	D2 / SO3	✓ S	✓ S	✓ R	✓ R

⁹² This measure is without prejudice to national provisions regarding the legal value of the electronic (or electronically concluded) contract.

	Policy measure	Driver / Specific objective	PO1	PO2	PO3	PO4
	implementation of the requirements for acceptance of B2A information/documentation made available electronically					
12a	Establishment of an EU transport data dictionary/ data model	D2 / SO3	✓S	✓S	✓R	✓R
12b	Mode-specific technical specifications	D2 / SO3	✓S	✓S	✓R	-
12c	Technical specifications common to all transport modes	D2 / SO3	✓S	✓S	-	✓R
13	Establishment of technical specifications for implementation of B2A electronic documentation requirements for validity/acceptance	D2 / SO3	✓S	✓S	✓R	✓R
14	Certification of IT solutions for B2A information communication	D2 / SO3	✓S	✓S	✓R	✓R
15	Inclusion of provisions on common technical specifications in relevant EU-third countries bilateral agreements	D2 / SO3	-	-	✓R	✓R

As indicated in Table 5.1 above, all options contain, for most part, the same set of policy measures. These measures may be implemented either in non-binding form, as support measures promoting voluntary action by the Member States, or regulatory form, such as the adoption of EU legal acts and the signature of bilateral agreements with third countries. The logic of the policy options building has followed a combination of these measures, when varied along two axes: material scope of the policy initiative, on the one hand, and levels of regulatory strength of the intervention, on the other hand.

In scope, the options differ primarily in the range of cargo and transport documents/information covered, namely whether it includes only the main transport documents (i.e. those which serve as contracts of carriage), or any document/evidence containing the information required by applicable legislations. The depth of regulatory intervention is determined by the mix of non-regulatory instruments (support measures) and regulatory instruments under each option. It ranges from limited legislative intervention, relying primarily on ensuring adherence to current international conventions provisions on the legal equivalence of the electronic transport contracts to full regulatory guidance on the implementation of the obligation of acceptance. Table 5.2 below provides a synthetic overview of the four policy options envisaged. A more detailed explanation of the differences between the options is provided further below.

Table 5.2 – Definition of policy options (Key: S = support measure; R= regulatory measure)

Policy Option 1 – Full obligation of adherence by the Member States to the current legal framework as regards acceptance of electronic transport contracts, with voluntary harmonisation of implementation (PO1)
Acceptance
<ul style="list-style-type: none"> ✓ Adherence to relevant international conventions (R) <ul style="list-style-type: none"> ➤ Scope: international conventions to which not all Member States are party, i.e. the e-CMR protocol (road), the CMNI convention (inland waterways), and the Hamburg Rules (maritime) ✓ Amendment of international conventions to remove the limitation of the applicability of conventions' provisions on the legal equivalence of the electronic contracts to the paper concluded/evidenced contracts (S) ✓ Awareness raising, training and exchange of experience (S)
Requirements for validity/acceptance/admissibility

<ul style="list-style-type: none"> ✓ Amendment of international conventions to align current mode-specific provisions on requirements for the legal equivalence of electronic contracts of carriage to paper-based/evidenced contracts (S)
Administrative procedures
<ul style="list-style-type: none"> ✓ Review of administrative practices for controls of electronic transport documents/information (S) ✓ Adoption of aligned procedures for controls of electronic transport contracts presented electronically (S)
Technical specifications
<ul style="list-style-type: none"> ✓ Establishment and alignment by Member States of technical specifications for the implementation of the requirements for validity/admissibility of electronic transport contracts, as specified in the international conventions, in their respective national legislation (S) ✓ Certification of IT solutions for B2A information communication (S)
Policy Option 2 – Full obligation of acceptance for the Member States authorities of the electronic transport contracts, with minimum harmonisation of implementation (PO2)
Acceptance
<ul style="list-style-type: none"> ✓ Establishment of general obligation for MS enforcement authorities to accept electronic contracts of carriage (R) <ul style="list-style-type: none"> ➤ Scope: international transport contracts as governed by the mode-specific international conventions, as well as any other electronically concluded or evidenced transport contract ✓ Inclusion of provisions of mutual acceptance of electronic contracts of carriage in relevant EU-third countries bilateral agreements (S) ✓ Awareness raising, training and exchange of experience (S)
Requirements for validity/acceptance/admissibility
<ul style="list-style-type: none"> ✓ Establishment of single set of requirements for acceptance by authorities of electronic contracts of carriage for all transport modes (R) ✓ Amendment of international conventions to align current mode-specific provisions on electronic contracts of carriage with EU requirements (S) ✓ Inclusion of provisions on common requirements in relevant EU-third countries bilateral agreements (S)
Administrative procedures
<ul style="list-style-type: none"> ✓ Review of administrative practices of inspection of transport documents, including, and in particular, the electronic contracts of carriage (S) ✓ Adoption of aligned procedures for controls of transport contracts presented electronically (S)
Technical specifications
<ul style="list-style-type: none"> ✓ Establishment of technical specifications for the implementation of the requirements for acceptance of electronic contracts of carriage (S) ✓ Establishment of an EU transport data dictionary/data model (S) ✓ Inclusion of provisions on common technical specifications in relevant EU-third countries bilateral agreements (S) ✓ Certification of IT solutions for B2A information communication (S)
Policy Option 3 – Full obligation of acceptance for the Member States authorities of regulatory cargo transport information or documentation, with partially harmonised implementation (PO3)
Acceptance

<ul style="list-style-type: none"> ✓ Establishment of general obligation for MS enforcement authorities to accept B2A regulatory information and documentation made available electronically (R). <ul style="list-style-type: none"> ➤ Scope: All regulatory information/documentation required to be evidenced as proof of compliance as specified by EU legislation regulating the conditions of the transport of goods within the EU (cf. Title VI TFEU), as well as specific national provisions that may bear on international freight transport. This includes information evidenced by, but not limited to, contracts of carriage. ✓ Amendment of international conventions to remove the limitation of applicability of the conventions' provisions (S) ✓ Inclusion in relevant EU-third countries bilateral agreements of provisions on mutual acceptance of electronic means for B2A regulatory information / documentation communication (S) ✓ Awareness raising, training and exchange of experience (S)
Requirements for validity/acceptance/admissibility
<ul style="list-style-type: none"> ✓ Establishment of single set of requirements for acceptance by authorities of B2A regulatory information / documentation made available electronically (R) ✓ Amendment of international conventions to align provisions on electronic contracts of carriage (S) or ✓ Inclusion of provisions on common requirements in relevant EU-third countries bilateral agreements (S)
Administrative procedures
<ul style="list-style-type: none"> ✓ Review of administrative practices for regulatory controls and information requirements (R) ✓ Adoption of aligned procedures for controls, including checks of information requirements (R)
Technical specifications
<ul style="list-style-type: none"> ✓ Establishment of technical specifications for the implementation of the requirements for validity/admissibility of B2A and, respectively, A2B electronic information/documentation communication (R) <ul style="list-style-type: none"> ➤ Mode-specific technical specifications for B2A communication but with ✓ common core EU transport data dictionary/ data ➤ (Possibly) Different technical specifications for requirements implementation for A2B documentation ✓ Certification of IT solutions for B2A information communication (R) ✓ Inclusion of provisions on common technical specifications in relevant EU-third countries bilateral agreements (S)
Policy Option 4 – Full obligation of acceptance for the Member States authorities of regulatory cargo transport information or documentation, with fully harmonised implementation (PO4)
Acceptance
<ul style="list-style-type: none"> ✓ Same as PO3
Requirements for validity/acceptance/admissibility
<ul style="list-style-type: none"> ✓ Same as PO3
Alignment of administrative procedures
<ul style="list-style-type: none"> ✓ Same as PO3
Technical specifications
<ul style="list-style-type: none"> ✓ Establishment of technical specifications for the implementation of the requirements for validity/admissibility of B2A and A2B electronic information/documentation communication (R) <ul style="list-style-type: none"> ➤ Common technical specifications for requirements implementation for all B2A communication in <i>all</i> transport modes ✓ Certification of IT solutions for B2A information communication (R) ✓ Inclusion of provisions on common technical specifications in relevant EU-third countries bilateral agreements (S)

5.3 How do the policy options differ

5.1.1 Material scope: transport contracts vs regulatory information evidence

The scope of policy intervention is limited in PO1 and PO2 to those transport documents which serve as (international) contracts of carriage. In PO3 and PO4, this scope is enlarged to include any document which, due to its information content, may serve as evidence of compliance of a determined transport operation with the applicable regulatory conditions on the EU Member States' territory. The justification of limiting the focus of some policy options to the transport contracts lies, on the one hand, in the nature and functions of the document and, on the other hand, in the urge expressed by a good number of stakeholders that there might be merits in "starting small", as it would allow unlocking some immediate potential⁹³.

The transport contracts are the main documents currently used by businesses, and requested by authorities for inspection, to evidence compliance with transport conditions. They contain an important part of the information required by the authorities, and they also constitute proof of the legitimate possession of the goods. Unlike most other documents used to communicate freight transport information, the contracts of carriage are central and indispensable to a transport operation. In addition, not all business stakeholders come in contact with the other transport documents with the same frequency. Shippers (i.e. sellers of the goods) come relatively less frequently in contact with them than the freight forwarders, which come less frequently with them than the carriers. Yet almost all categories of these stakeholders come in contact with the contract of carriage⁹⁴.

Most stakeholders initially indicated that the acceptance of these transport documents by the authorities was their main concern, and this was also reflected in the various formal takes of position on the issue of digitalisation of transport documents. The acceptance of the electronic road consignment note, currently characterised by the lowest level of use and acceptance relative to the other mode-specific transport contracts, has been particularly highlighted⁹⁵. Consequently, an exclusive focus on the international transport contracts, and particularly as defined by the mode-specific international conventions, was the starting point of this impact assessment. This was clearly indicated in the inception impact assessment (IIA) report. None of the reactions received to the IIA had challenged that focus⁹⁶.

The shift in focus came as a result of the wider and more in-depth stakeholder consultation. This became clear particularly in discussions with rail and aviation stakeholders, where the degree of digitalisation of the transport contracts is most advanced. According to them, the reason why penetration rates had remained rather low (or at least lower than anticipated), was the fact that the digital solutions developed focused only on the transport contracts. For many

⁹³ Point stressed particularly by road transport stakeholders in the context of the different stakeholder workshops, including in the context of the DTLF. Other stakeholder representatives' reactions also indicated that, if the Commission chose to take such a narrower approach, they would not oppose it.

⁹⁴ Cf. replies to the different stakeholder consultation activities. See, in particular, the summary of the stakeholder consultation results, Ecorys et al, 2018, Annex.

⁹⁵ The acceptance of electronic transport documents, and waybills in particular, has been identified as one of the main objectives of DTLF subgroup on "electronic documents" – one of the two main thematic working groups it established. In endorsing the continuation of the work of the DTLF on the digitalisation of transport documents, in the frame of the Transport Council Conclusions of 7 December 2017, the Member States singled out, among the "measures to support the more systematic use and acceptance of the e-documents", the ratification of the e-CMR protocol on the electronic road transport contract. This echoed European Parliaments call in its May 2017 resolution, "to speed up the mandatory use... of electronic consignment notes (e-CMR)", in particular. (See full references in subsection 1.2. Political context of this report.)

⁹⁶ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-2546864_en

companies, that significantly dented the business case for investment in such solutions, if the rest of the documents had to be circulated in paper⁹⁷. This was also confirmed by several other stakeholder groups' representatives, including from the maritime sector and those whose business activities span more than one transport mode. In addition, a large number of stakeholders made a strong call to avoid aiming to simply reproduce current paper documents and business processes in a digital environment. Rather, digitalisation opens up important opportunities to rethink and optimise such processes⁹⁸.

The stakeholder consultation activities also revealed relatively broader support for a wider rather than narrower approach to the scope of the policy intervention. However, the results also highlighted that there would be significant support – about half of the stakeholders consulted – for a more narrowly based intervention. Thus, while 40 of the 100 OPC respondents indicated that electronic means should also be used for the other documents, 54 were undecided. Similarly, 137 of the respondents to the SME panel were not sure whether it was necessary at this stage to pursue also the digitalisation of the other transport documents, against 101 which thought that they should.

5.1.2 The legal equivalence of the electronic transport contracts and the admissibility as proof of regulatory compliance

An important difference between the policy options retained for further impact assessment consideration lies in whether the options concern also the validity of the electronic transport contract, as a commercial contract, in addition to the admissibility of the electronic form this document, alongside any other documents/information electronically presented, as evidence (i.e. valid source of information) of compliance with the regulatory requirements. This distinction is closely related to the difference in the material scope of the different options.

Only PO1 addresses, and only partly, the issue of validity of the contracts by a regulatory measure, by ensuring adherence by all Member States to the road e-CMR protocol. As highlighted earlier in the analysis in section 2.2.1, this protocol is the only one among the mode-specific conventions which does not subject the validity of the electronic transport contract to national rules related to the validity of the commercial contracts. As such, both acceptance by authorities, including courts, and by all commercial partners, would be warranted. In all other cases – i.e. of the other mode specific transport contracts under option 1, and of all the other (modal) transport contracts under PO2, PO3 and PO4 – the validity of the transport contract would remain dependable on national rules concerning the validity of the commercial contracts. While the eIDAS Regulation would in principle cover the aspect of acceptance of the electronically evidenced contracts by courts, if national legislation conditions acceptance of the electronic evidence to other requirements, related to aspects such as the authenticity or integrity of the document/information, those national law-specific

⁹⁷ Cf. IATA for air, and Raildata, CER and CIT representatives for rail.

⁹⁸ This point has been particularly stressed by industry association representatives. Thus, the feedback papers received during the consultation process from CLECAT, the European freight forwarders' association, stressed the need that the concept of a document accompanying the goods should be replaced by the concept of exchanging data. The target for the current initiative, therefore, should be to introduce measures to remove remaining barriers to the acceptance of the legal equivalence of digital data. This point was also stressed by the French international forwarders' association, TLF, in their position paper on the initiative, and generally supported by the other stakeholders when this point was made in the context of both the stakeholder consultation workshops for this initiative and the meetings of the DTLF working group on electronic transport documents. Member States representatives, such as Denmark, Finland, Estonia, the Netherlands and Sweden, have also stressed the need to move away from thinking in terms of documents towards an information/data-centric approach.

conditions would need to be complied with in order for the electronic document to be accepted.

By contrast, all options would ensure, though to various degrees, the acceptance of the electronic transport contracts as evidence of compliance with regulatory conditions for the transport of goods in the different Member States. By providing clear requirements, as well as technical specifications for the implementation of these requirements, as regards the conditions for acceptance (such as authenticity, integrity) of the regulatory information made available electronically, PO3 and PO4 would also provide uniform conditions that MS courts could take into account when considering the admissibility of the electronic documents containing this information, including electronic contracts, as evidence (i.e. valid source of information). These two options would ensure admissibility at least in administrative legal proceedings, namely in case of dispute between the authorities and the commercial party which presented them over the admissibility of the electronic document as evidence of compliance with regulatory transport conditions. In civil legal proceedings, namely disputes between private parties, national rules on the validity of the transport/commercial contracts would still impact the extent to which the parties could enforce their rights deriving from that contract in a court of law.

5.1.3 The role of international conventions and bilateral agreements with third parties as policy intervention instruments

The international conventions concerned by this initiative, and considered in the context of the policy options, are those governing the mode-specific international contracts of carriage. As highlighted in the analysis in section 2.2.1 above, these conventions concern strictly the conditions of – i.e. the rights and obligations of the parties to – an international transport contract, and the requirements these contracts need to fulfil in order to trigger the application of these conditions. These conditions relate to the information content of the contract, and to its form, specifically under what conditions the electronic form of a contract is legally equivalent to a paper-based document.

There is no provision in these conventions obliging the authorities to accept these documents, either electronically or on paper. Furthermore, no European or Member State⁹⁹ law obliges businesses to use these specific contracts (as defined by the conventions) and to carry them along in order to have it available for inspection¹⁰⁰.

In practice however, contracts concluded according with these conventions are those most often used by the businesses, as they contain clearly defined, standard contract conditions. As highlighted earlier, the transport contract is also the document most frequently requested for vision by the authorities. For this reason, measures concerning adherence to or transposition of the provisions of the international conventions, as well as future amendment of these provisions, are part of all retained policy options. But these measures play different roles, with different impacts, including on the timing, of the implementation of the policy options considered.

In the context of PO1, international conventions constitute the main instruments for implementation. This option foresees an EU legal act that would require adherence to the international conventions. PO2 would transpose these conventions provisions, by requiring

⁹⁹ To the extent that a first desk analysis in the context of this impact assessment could reveal.

¹⁰⁰ Any transport contract between the parties could be used, and the larger companies often make use of such contracts, particularly for multimodal transport, for which no international convention exists.

Member States to recognise the legal equivalence of the electronic transport contracts as defined by these conventions but, in addition, would also seek to align and supplement these conventions' requirements related to the electronic form of the document, into a single and common across all modes set of criteria.

Since the timing for the implementation of the related measures would be no different than for ordinary legislation, such options would therefore speed up the process of acceptance by Member States authorities of these transport documents, compared with the baseline scenario. PO2 would also ensure a more uniformly applicable set of rules as regards the acceptance, and the requirements for acceptance of, the electronic form of these documents as legally equivalent to their paper version¹⁰¹.

In the context of PO3 and PO4, the international conventions are no longer the reference point. As the scope of the intervention is enlarged to cover any “documents” (or “evidence”) that contain the regulatory information required by the EU and national laws regulating the conditions of freight carriage on the EU Member States' territory, the acceptance by authorities of electronic documents (or rather of the information contained therein) is achieved by dedicated regulatory measures, in the framework of an EU legal act. International conventions are concerned only by support measures, aimed at ensuring voluntary adherence by all Member States to the international conventions. The goal is to ensure a uniform global framework to further facilitate B2B use of these electronic contracts, and particularly in the international transport originating or ending outside the EU.

Measures aimed at the amendment of these conventions are also relevant to all options, in different ways. The purpose of these measures is to align and better specify the various mode specific requirements related to the legal equivalence (validity) of the electronic form of the international transport contracts. Under PO1, it would be the only measure that would ensure alignment of the (technical) requirements concerning the validity of the different mode-specific electronic contracts. Under PO2, PO3 and PO4, this requirements alignment would be achieved through specific regulatory measures. The amendment of the international conventions would however remain a useful instrument to further facilitate the use of electronic contracts in the international transport originating or ending outside the EU, by ensuring their acceptance also by third countries, under similar conditions as by EU Member States.

Experience suggests that the amendment of international conventions may take several years, and their entry into force remains dependent on the ratification of a certain minimum number of Member States. This would particularly impact on the timing for the implementation of PO1, which relies primarily on these conventions to provide a uniform EU framework concerning the validity of the electronic transport contracts. The timing would also vary depending on the transport mode. In rail and aviation sector, the EU itself is party to the respective international conventions. This should facilitate negotiations, at least as regards the EU Member States positions. This is however not the case for the other mode specific international conventions.

Under PO2, PO3 and PO4, the impact on timing would be more limited since, as explained earlier, the amendment of these conventions is not central to the implementation of this

¹⁰¹ Such options would also be in line with, for instance, maritime legislation transposing IMO rules, or the directive on dangerous goods in land transport (Directive 2008/68/EC), which transposed the requirements of the European Agreement(s) concerning the International Carriage of Dangerous Goods by Road, by Rail and by Inland Waterways.

initiative. In addition, all these options foresee measures related to the inclusion, in relevant bilateral EU – third countries agreements, as alternative, or "bridge" measure until the international conventions are amended. These bilateral agreements provisions would also supplement international conventions provisions by (i) ensuring mutual acceptance by the authorities of the Member States and of the third countries concerned of the electronic transport information (when provided by commercial parties established on the others' territory), in the case of PO2, PO3 and PO4; and (ii) agreeing on more detailed technical requirements for implementation (of the obligation of acceptance by authorities), under PO3 and PO4.

5.1.4 Technical specifications for implementation

All options contain measures aimed at providing further technical specifications for the implementation of the requirements for the validity/admissibility of the information or documents made available to the authorities by electronic means. The aim of these measures is to ensure the interoperability of these electronic means, in particular with the Member States' systems for reception and control of the electronic information/documentation, both as currently developed as a result of obligations stemming from other EU legal acts (the UCC and RFD in particular), and as they will be developed in the framework of the implementation of this initiative.

In the case of PO1 and PO2, these measures would take the form of support measures for voluntary cooperation and coordination among the Member States, including in the implementation of proposed non-binding implementation guidelines by the Commission. In the case of PO3 and PO4, these would take the form of regulatory provisions, in the framework of the proposed EU legal act. More specifically, these are proposed to be adopted by means of implementing or delegated regulations, which would be based on a dedicated impact assessment.

The main difference between PO3 and PO4 in this regard is the extent to which these technical specifications will be harmonised across the different transport modes, to ensure interoperability. PO4 proposes that these specifications are fully common, whereas PO3 proposes a middle-ground solution, where only a minimum set of specifications would be fully common, while other specifications would take into account mode-specificities. The aim is to ensure a minimum level of interoperability across the mode-specific technical solutions and which, according to stakeholder feed-back requires, at a minimum, interoperability at data level, while trying to avoid excessive costs for adaptation of current mode-specific solutions to "one-size-fits-all" specifications, particularly for those modes where well-established solutions are already in place, such as in the rail and aviation sector and, to a lesser extent, maritime (i.e. as related to the maritime single window). Any proposal in this regard would, nonetheless, be based on a specifically dedicated impact assessment.

Under all options, the technical specifications related measures are envisaged to comply with the principle of technological neutrality, i.e. to accommodate any technological solution, currently available or that would be developed in the future, which would comply with the technical specifications which would be established. Under no option, including PO3 and PO4, a preferred technological solution, however promising to address the various requirements, particularly as regards authenticity and integrity of the electronic information/documents, like for example block-chain, would be indicated by the legal provisions. Furthermore, in the case PO3 and PO4, a governance mechanism would also be established, that would allow the regular review of these technical specifications to ensure

that they do not exclude possible technological solutions developed by the market following the adoption of these specifications, but which would allow the implementation of the (technical) requirements established by the main legal act.

6 WHAT ARE THE IMPACTS OF THE POLICY OPTIONS¹⁰²?

This section summarizes the main expected economic, social and environmental impacts of each policy option. The analysis includes specific assessment of impacts on SMEs. An important assumption for the assessment of administrative costs savings for businesses is that under all policy options we treat the introduction of electronic information and documentation exchange as fully substituting paper-documents (and not complementing it). In practice, the magnitude of relevant effects on costs for businesses might be smaller, given that under no option the use of paper documents is banned. On the other hand, businesses will be given the choice to continue with paper formalities if they consider it more cost-efficient.

An important limitation to the analysis is the scarcity and incompleteness of relevant data, in particular on the distribution of costs between various market players (e.g. operators against shippers/forwarders). Wherever possible, assumptions were made to capture the differences quantitatively. In other instances, to partially compensate for a lack of quantifiable data, multiple sources of qualitative evidence have been used, including stakeholders' assessments. Nonetheless, the assessment included in this report should provide all key stakeholders, including Member States' authorities, with information on the main expected impacts. The results of the quantitative assessment of impacts therefore should be seen **as orders of magnitudes rather than precise values**. The detailed assumptions, results and modelling used in the analysis of impacts are described in Annex 4.

The policy options impact unevenly the different transport modes due to the important differences in the current digitalisation levels and their expected development over time in the baseline scenario (see section 6.1) In particular, the current level of uptake for electronic documents in aviation is much higher than the levels observed for other transport modes, which results in different scales of impacts compared to baseline projections.

6.1 Economic impacts

A number of distinct impacts have been identified under this category. Each option is expected to influence to varying degree the extent of uptake of electronic means for transport information and documentation exchange (direct effect), which in turn would affect the main stakeholders by bringing benefits (e.g. reduced administrative costs for the industry) and costs (e.g. costs for public authorities to adjust to the requirements induced by legislation). The uptake level of electronic documents does not only affect the relevant economic impacts (e.g. costs or modal shift), but it is also key for understanding all other related impacts.

Other economic impacts are also linked to the implementation and application of the policy options – compliance, administrative and enforcement costs – which are born primarily by the main parties to a transport operations – shippers, freight forwarders and transport and logistics operators on the business side, and relevant public sector authorities in the Member States

¹⁰² The analysis in this section is based on the Ecorys et al (2018) Impact Assessment Support Study, on modelling performed by the ICCS-E3MLab with the PRIMES-TREMOVE transport model and on the analysis of stakeholders' feedback. References to the sources of specific information and explanations of assumptions underlying various cost and benefits results are further presented in Annex 4.

such as ministries or departments responsible for policy, specific authorities responsible for enforcement, and courts.

Finally, there are indirect impacts on modal shift, on costs for transport operators, and on the economic performance of the IT solutions providers. More generally, potential impacts on the internal market and the quality of freight transport services have also been identified and are highlighted in this section.

Use of electronic means for transport information and documentation exchange

The level of uptake of electronic means for transport information and documentation exchange varies between PO1, PO2 and PO3/PO4. Table 6.1 below shows that the lowest digitalisation level is projected in PO1, followed by PO2, and PO3 and PO4 with similar levels of digitalisation¹⁰³.

In **PO1**, changes in the digitalisation levels would take place from 2026 onwards. The measures in this policy option, by ensuring the possibility of using the e-CMR across the entire EU, would have a more significant impact on road transport. Somewhat lower impact in terms of level of digitalisation is expected for inland waterways and maritime transport. This is because the two international conventions concerned leave the issue of the legal equivalence of the respective contracts of carriage, and therefore their acceptance by authorities, to the Member States in PO1.

PO2 would result in higher level of digitalisation than PO1 for all modes of transport starting with 2021, due to the establishment of general obligations for Member State authorities to accept electronic contracts of carriage, including as evidence in administrative legal proceedings. However, PO2 would not allow fully exploiting the benefit of digitalisation because of the restricted scope of application of the obligation of acceptance (i.e. to the electronic contracts of carriage) and lower level of regulatory specification of the requirements for acceptance.

The highest level of digitalisation is projected in **PO3 and PO4** for all transport modes starting with 2021, due to the clear obligation of acceptance by authorities and harmonised requirements for admissibility. Moreover, compared to PO1 and PO2, PO3 and PO4 cover all relevant documents/evidence containing the regulatory required information, and not only the contracts of carriage.

The uptake of systems/solutions for electronic transport information exchange is not linear over time under the various policy options. Since the use of paper documents is not ruled out, the uptake of electronic information exchange by businesses depends on their overall acceptance by the Member States authorities, and on the availability of interoperable technical solutions, which are highest under PO3 and PO4. In practice, two factors are expected to affect the uptake of electronic documents. These factors work in opposite directions: a) the availability of multimodal solutions (i.e. interoperable/usable solutions across all modes) has positive effects on the willingness to invest in common systems by businesses (which would be fully ensured under PO4, while under PO3 interoperability might create additional costs) and b) the implementation of a common system by businesses would be difficult, in particular for those that have already invested in mode specific solutions, such as in rail and aviation (which would be also higher in PO4). The overall effect of these factors is difficult to estimate

¹⁰³ Using a conservative approach, the uptake of electronic documents is kept constant post-2030 to the levels of 2030.

before the common specifications are designed; therefore, the digitalisation rates are projected to be similar in PO3 and PO4.

Table 6.1 Levels of uptake of electronic transport information exchange systems/solutions

Uptake rates (%)	Baseline		PO1		PO2		PO3 / PO4	
	2025	2030	2025	2030	2025	2030	2025	2030
<u>Road</u>								
Intra MS	3%	5%	3%	10%	25%	40%	40%	60%
Cross-border			3%	20%	35%	50%	60%	80%
<u>Rail</u>								
Intra MS	10%	15%	10%	25%	50%	75%	70%	85%
Cross-border			10%	25%	60%	85%	80%	95%
<u>IWT</u>								
Intra MS	2%	5%	2%	10%	30%	40%	50%	60%
Cross-border			2%	10%	40%	50%	70%	80%
<u>Maritime</u>								
Intra MS	2%	5%	2%	15%	50%	70%	75%	95%
Cross-border			2%	15%	50%	70%	75%	95%
<u>Aviation</u>								
Intra MS	45%	50%	45%	50%	60%	75%	80%	95%
Cross-border			45%	50%	60%	75%	80%	95%

Source: Ecorys et al. (2018) Impact Assessment support study

Administrative costs for businesses¹⁰⁴

Due to the scale effect of the direct impact on the uptake of electronic documents, the magnitude of the reduction of administrative costs (i.e. costs savings) for businesses is significantly different between policy options. Tables 6.2 and 6.3 provide the cost savings relative to the baseline in million euros and in percentage terms for 2025 and 2030¹⁰⁵.

Table 6.2 Administrative costs savings for businesses in 2025 and 2030 relative to the Baseline (in EUR million), by transport mode

in EUR million	PO1		PO2		PO3 / PO4	
	2025	2030	2025	2030	2025	2030
<u>Road</u>						
Intra MS	0	102-124	418-511	711-869	703-860	1117-1366
Cross-border	0	16-20	32-40	49-60	58-71	81-99
<u>Rail</u>						
Intra MS	0	13-25	46-93	76-153	70-139	89-178
Cross-border	0	9-18	41-82	64-128	58-115	73-147
<u>IWT</u>						

¹⁰⁴ Under administrative costs, both costs directly related to B2A regulatory information communication and to B2B information exchange have been included. The respondents to the consultation could not distinguish between these costs since, from their perspective, and in their own administration, these costs are fully interrelated.

¹⁰⁵ They have been derived based on the time saved per shipment for using electronic means, and monetized drawing on the standard cost model. To account for uncertainty, a range is used for the time saved per shipment in the calculations, drawing on desk research and the consultation with the stakeholders in the course of the impact assessment support study.

in EUR million	PO1		PO2		PO3 / PO4	
Intra MS	0	5-7	26-36	34-49	44-62	54-77
Cross-border	0	11-16	79-113	101-144	141-202	168-240
<u>Maritime</u>						
Intra MS	0	8-11	36-51	51-73	54-78	71-102
Cross-border	0	36-52	164-234	236-338	249-356	327-467
<u>Aviation</u>						
Intra MS	0	0-0	0-0	0-1	0-1	1-1
Cross-border	0	0-0	1-3	3-6	3-8	5-12
<u>All modes</u>						
Intra MS	0	127-168	526-692	874-1145	871-1140	1332-1724
Cross-border	0	73-106	318-472	453-676	509-751	655-965

Source: Ecorys et al. (2018) Impact Assessment support study

PO3 and PO4 show the highest administrative cost savings relative to the baseline (EUR 1.3-1.7 billion for intra Member State shipments, equivalent to 18-23% reduction in 2030; EUR 0.7-1 billion for cross-border shipments, equivalent to 35-52% reduction in 2030), followed by PO2 (EUR 0.9-1.1 billion for intra Member State shipments, equivalent to 12-16% reduction in 2030; EUR 0.5-0.7 billion for cross-border shipments, equivalent to 24-37% reduction in 2030) and PO1 (EUR 0.1-0.2 billion for intra Member State shipments, equivalent to around 2% reduction in 2030; EUR 0.07-0.1 billion for cross-border shipments, equivalent to 4-6% reduction in 2030). Overall, the impacts on cost savings relative to the baseline are higher in percentage terms for cross-border shipments, despite their lower impact in absolute terms. This is because of the larger share of intra Member State shipments in road and rail transport. On the contrary, inland waterways, maritime and aviation show higher cost savings for cross-border shipments in absolute terms (see Table 6.2 and Table 6.3).

Table 6.3 Percentage reduction in administrative costs for businesses in 2025 and 2030 relative to the Baseline, by transport mode

% reduction relative to the Baseline	PO1		PO2		PO3 / PO4	
	2025	2030	2025	2030	2025	2030
<u>Road</u>						
Intra MS	0%	2-2%	7-8%	11-13%	11-14%	17-21%
Cross-border	0%	5-6%	10-12%	14-17%	17-21%	23-28%
<u>Rail</u>						
Intra MS	0%	4-7%	14-29%	21-44%	21-43%	25-52%
Cross-border	0%	4-7%	17-36%	25-52%	24-50%	28-59%
<u>IWT</u>						
Intra MS	0%	2-3%	13-19%	17-24%	23-32%	26-38%
Cross-border	0%	2-3%	18-26%	22-31%	32-46%	36-52%
<u>Maritime</u>						
Intra MS	0%	5-7%	23-32%	31-45%	34-49%	43-62%
Cross-border	0%	5-7%	23-32%	31-45%	34-49%	43-62%
<u>Aviation</u>						
Intra MS	0%	0-0%	5-14%	9-25%	12-33%	16-45%
Cross-border	0%	0-0%	5-14%	9-25%	12-33%	16-45%
<u>All modes</u>						
Intra MS	0%	2-2%	8-10%	12-16%	13-16%	18-23%
Cross-border	0%	4-6%	18-27%	24-37%	29-43%	35-52%

Source: Ecorys et al. (2018) Impact Assessment support study

Over the full deployment horizon of electronic transport documents, expressed as present value over 2018-2040, PO3 and PO4 show total administrative cost savings of EUR 19.7-26.8 billion (or 14.3-19.5% of the baseline values). The lower reduction levels are projected in PO1 (EUR 1.5-2 billion or 1.1-1.5% reduction compared to the baseline), followed by PO2 (EUR 12.9-17.7 billion or 9.3-12.9% reduction compared to the baseline), expressed as present value over 2018-2040 (see Table 6.4).

Table 6.4 Administrative costs savings for businesses relative to the baseline over 2018-2040 (present value)

in EUR billion (present value)	Baseline	PO1		PO2		PO3/PO4	
		difference to the Baseline in EUR billion and % difference to the Baseline					
Total	137.4-138.2	1.5-2	1.1-1.5%	12.9-17.7	9.3-12.9%	19.7-26.8	14.3-19.5%
Intra-MS	109.6-110.1	0.9-1.2	0.8-1.1%	8.3-10.9	7.6-10%	13-16.8	11.8-15.4%
Cross border	27.7-28.1	0.5-0.8	1.9-2.8%	4.5-6.8	16.1-24.4%	6.7-9.9	24-35.8%

Source: Ecorys et al. (2018) Impact Assessment support study

Compliance costs for businesses

All policy options would bring additional costs for businesses to adjust their working practices to the new digitalised business environment. These one-off costs would cover both hardware and software systems. Cost levels will depend however on the company size. According to stakeholders' feedback, small market players will face lower cost levels as they handle limited numbers of transport operations, and therefore related information exchanges. Thus, the adjustment of their working practices (including through deployment of IT solutions and hardware) would not be as demanding as for bigger market players. The assumptions regarding the compliance costs per company are provided in Table 6.5, differentiated by company size.

Table 6.5: Compliance costs for electronic transport document per size of company

Company size	Number of trucks / Mobiles	Total mobile costs per company in EUR*	Total software costs per company in EUR	Total costs per company in EUR
Micro (0-9 employees)	-	-	-	-
Small (10-49 employees)	10	3,000	5,000	8,000
Medium (50-249 employees)	50	15,000	€10,000	25,000
Large (above 250 employees)	300	90,000	€60,000	150,000

Source: Ecorys et al. (2018) Impact Assessment support study; Note: *Total mobile costs per company are calculated assuming a price of EUR 300/ smartphone

Some investments into digital solutions are likely to already occur under the baseline scenario. They are linked to the uptake of electronic documents in the baseline, provided in section 2.3. They are estimated at EUR 213 million for small companies over the full deployment horizon of electronic transport documents, expressed as present value over 2018-2040. For medium size companies they are estimated at EUR 103 million and for large size companies at EUR 80 million over the same time horizon. In total, the compliance costs in the baseline would amount to EUR 396 million (see Table 6.6).

Total compliance costs for businesses (see Table 6.6) are estimated at EUR 4.4 billion in PO3 and PO4 (EUR 4 billion higher relative to the baseline over 2018-2040), followed by PO2

with EUR 2.7 billion (EUR 2.3 billion higher relative to the baseline over 2018-2040) and PO1 with EUR 0.5 billion (almost EUR 0.1 billion higher relative to the baseline over 2018-2040). The compliance costs are estimated to be higher in PO3 and PO4 as businesses are likely to invest more when the overall regulatory framework is clearer. Because of this reason, it could also be expected that investments would be anticipated in time in PO3 and PO4 compared to PO2 and PO1.

Table 6.6: Total compliance costs per size of company over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value

Compliance costs (EUR million for EU28) by company size	Baseline	PO1	PO2	PO3/PO4
Micro (0-9 employees)	-	-	-	-
Small (10-49 employees)	213	274	1,517	2,501
Medium (50-249 employees)	103	125	707	1,157
Large (above 250 employees)	80	75	452	718
Total	396	473	2,676	4,375

Source: Ecorys et al. (2018) Impact Assessment support study

These compliance costs should be regarded as maximum levels that are likely to be reached when the digitalisation potential is exploited and no paper transport documents are in use anymore. These investments are likely to occur over time, as none of the options foresees banning the paper transport documents. Businesses will be able to adjust their practices and decide on investments according to needs and overall acceptance level in the sector. Additional details on the estimated compliance costs by transport mode are provided in Table 6.7.

Table 6.7: Total compliance costs by transport mode over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value

Compliance costs (EUR million for EU28) by mode	Baseline	PO1	PO2	PO3/PO4
Road	339	451	2,462	4,077
Rail	20	8	72	89
Inland waterways	2	1	14	24
Maritime	8	13	118	168
Aviation	27	0	9	17
Total	396	473	2,676	4,375

Source: Ecorys et al. (2018) Impact Assessment support study

The assessment above is also conditional on a) the scope of the initiative in terms of documents covered, which is restricted to the contracts of carriage in PO1 and PO2 and b) on the additional costs to the industry (in particular in the rail and aviation sector) under PO4 linked to the need of a full readjustment of the IT solutions already in place. However, these elements could not be covered in the analysis.

Overall effects on SMEs

For SMEs, just like for the other businesses, the total economic impact can be divided into two main components: the reduction of the administrative costs and the compliance costs.

About 80% of the SME Panel respondents expect significant or at least some benefits due to lower administrative costs as a result of reduced operational time and simplified business processes. The level of administrative cost savings stemming from digitalisation will vary,

depending on the modal composition of the transport operations performed and the overall level of savings per mode. Higher benefits are expected in particular in the road sector, where 90% of enterprises have fewer than 10 employees and account for close to 30% of turnover (including self-employed).

Stakeholders' feedback indicates that compliance costs will depend on the company's size – bigger companies are expected to invest more than small or micro enterprises. At the same time, these one-off outlays are expected to bring net benefits, already in the first year, as demonstrated in the example below. The example relates to a bigger company, but the logic applies to any SME.

Textbox 6.1: Example of business compliance costs

Brewel Logistiek is operating over 200 trucks employing 360 employees. The company estimates that the overall cost of equipping their fleet (e.g. with smartphones) would amount to about 70-75,000 euro. To put this number into context, the same company issues 200,000 CMRs annually. The expected net benefit of the e-CMR for would be 150,000 euro per year.

Providing a clear blueprint for the development of electronic documents (in PO3 and PO4) is also likely to have positive impact on the SMEs in the sector of the IT system providers.

Modal shift and congestion costs

All policy options would lead to shift of traffic from road to rail and waterborne transport¹⁰⁶. PO2 would result in 0.2 percentage points decrease in road modal share in 2030 relative to the baseline (around 1,200 million tonnes-kilometres shifted away from road), while PO3 and PO4 would have slightly higher impact (0.3 percentage points difference, about 1,300 million tonnes-kilometres shifted). Overall, the total freight transport activity is expected to increase by around 0.3% in 2030 relative to the baseline in PO2 and by 0.4% in PO3 and PO4. This is due to the reduction in the administrative costs of all modes that leads to rebound effects. PO1 would not have significant impacts on modal shares and overall freight transport activity.

Table 6.8: Changes in freight transport activity and modal shares in 2030 relative to the baseline

	Baseline	PO1	PO2	PO3/PO4
Changes in freight transport activity (in millions tkm and % change to the baseline)				
Total freight transport	3,473,674	1,130	8,877	12,654
Road freight	2,433,615	-505	-1,244	-1,299
Rail	593,485	679	3,914	4,742
Waterborne transport*	446,575	956	6,207	9,211
Modal shares in 2030 (in % and p.p. difference to the baseline)				
Road freight	70.1%	0.0%	-0.2%	-0.3%
Rail	17.1%	0.0%	0.1%	0.1%
Waterborne transport*	12.9%	0.0%	0.1%	0.2%

Note: * Waterborne transport covers inland waterways and national maritime.

Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab)

External costs of congestion would slightly go down in PO1 (EUR 88 million), PO2 (EUR 261 million) and in PO3 and PO4 (EUR 299 million) relative to the baseline, driven by the shift in traffic away from road, despite the higher overall transport activity (see Table 6.9).

¹⁰⁶ The impacts have been assessed with the PRIMES-TREMOVE model by ICCS-E3MLab. More explanations about the modelling framework is provided in Annex 4.

Table 6.9: Impacts on external costs of congestion relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value

	Baseline	PO1	PO2	PO3/PO4
External costs of congestion (present value in EUR million) in the Baseline and difference to the Baseline				
Freight transport	994,230	-88	-261	-299

Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab)

Impacts on modal shift and congestion have been quantified with the PRIMES-TREMOVE model by ICCS-E3MLab. This is the same model that has been used for developing the baseline scenario. The main driver for modal shift and reduced costs of congestion in this context relates to changes in the relative costs between transport modes, and thus between their relative competitiveness. The changes in costs are induced by the lower administrative costs for businesses due to the uptake of electronic documents.

Compliance costs for authorities

The public authorities will also face some adjustment costs to comply with the measures included in the policy options. These costs cover: a) investments into IT systems to deal with electronic information and documentation exchanges, and b) costs related to the certification of solution providers.

In terms of investments into IT systems, PO1 will bring limited costs, as it does not affect the A2B or A2A operations. PO2, PO3 and PO4 will involve higher levels of investments into IT systems to deal with electronic information and documentation exchanges. PO3 and PO4 will cover higher range of information and documentation, which will inevitably involve relatively higher level of investments for the Member States. However, in PO4, where interoperability requirements would be common, the costs for authorities are expected to be lower than in PO3, as they would need a single system to electronically communicate with all relevant actors, both in the public and the private sector.

These costs are likely to vary per Member States, depending on current levels of digitalisation of their eGovernment administrative processes. The Commission eGovernment benchmark for 2016, while not covering the transport sector specifically, provides nonetheless an overview of the divergences among the Member States in offering e-government solutions, such as prefilled forms or possibility to communicate with the authorities online. Five EU countries are very close to having a fully developed digital channel for public services with scores above 95%: MT, Austria, Estonia, Portugal and Denmark. Investments into IT systems in these countries to cover transport operations are expected to be lower. Countries at the bottom of the range are (mostly) catching up, but seven of them still have one out of four services not available online (Romania, Croatia, Hungary, Greece, Slovakia, Bulgaria, Cyprus)¹⁰⁷. Investments into IT systems in these countries to cover transport operations are expected to be higher. A more specific example of Hungary introducing Electronic Public Road Trade Control System (EKAER) reveals that such systems may require calibration and run-up time. While the system produced visible results and reduced substantially the VAT gap, its introduction also created administrative burden as regards intra-EU trade. This highlights the trade-off between tax collection efficiency and compliance costs¹⁰⁸ and points to the need of close coordination at the EU level.

¹⁰⁷ European Commission, Europe's Digital Progress Report 2017

¹⁰⁸ European Commission, 2017 Hungary country report, SWD(2017) 82 final/2

The costs related to the certification of solution providers will depend on the requirements that will be actually set. Indicatively, drawing on the experience of the Belgian e-CMR pilot, setting-up such system may imply about 1,050 hours for the relevant authority for the initial set-up plus recurrent costs estimated at 20-40 hours per week¹⁰⁹. Drawing on this example, the set-up of the system would imply one-off certification costs of about EUR 30,000 per Member State and recurrent costs of about EUR 45,000 per year per Member State. Certification costs of solution providers would be limited in PO1 and PO2. In PO3 and PO4, certification costs of solution providers are estimated at EUR 17 million over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value.

Table 6.10: Certification costs of solution providers over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value

Certification costs of solution providers (in EUR million for EU28)	PO1	PO2	PO3/PO4
Certification costs	0	0	17

Source: *Ecorys et al. (2018) Impact Assessment support study*

Enforcement costs for authorities

Regarding the time spent on inspections, the availability of all relevant cargo information before inspections will facilitate the processes and allow more and better targeted (risk-based) controls. This does not only increase the efficiency and effectiveness of enforcement but could also reward businesses with a tracking record of compliance. Interviews with national authorities show that they do not expect the increased information availability to change the number of inspections they are performing, but rather to allow better targeting.

The total level of enforcement costs would be highly dependent on the actual system architecture, which will depend on the choice of a Member State or specific authority. Nevertheless, the experience of EUCARIS¹¹⁰, where the basic subscription is set at EUR 16,000 and additional functionalities add to this cost between EUR 20,000-40,000 yearly, sets the scene to understand the potential order of magnitude of potential additional costs for authorities. In total, the EUCARIS system costs slightly less than EUR 1 million annually and handles 75 million transactions annually. Considering a proportional cost approach, a system that would need to handle more than 1.5 billion documents a year could cost in the range of EUR 20 million annually. If divided proportionally between the authorities of all 28 EU MS this is slightly more than EUR 700,000 per Member State yearly.

There is no expectation of a significant impact on the enforcement costs in PO1. For PO2, PO3 and PO4 the enforcement costs, drawing on the experience of EUCARIS, are estimated at EUR 251 million over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value.

Table 6.11: Enforcement costs over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value

Enforcement costs for authorities (in EUR million for EU28)	PO1	PO2	PO3/PO4
Enforcement costs	0	251	251

Source: *Ecorys et al. (2018) Impact Assessment support study*

¹⁰⁹ Presentation by the Federal Ministry of Transport and Mobility during the stakeholder workshop on 10 January 2018.

¹¹⁰ A network of networks of A2A electronic information exchange for road transport related vehicle certificates <https://joinup.ec.europa.eu/document/eucaris-european-car-and-driving-licence-information-system-eucaris-0>

Transport costs for transport operators

The increased uptake of electronic transmission of the information currently contained in paper transport documents is expected to lead to significant operational cost savings for transport operators. In PO1 these are estimated at almost EUR 1 billion over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value. They are higher in PO2 (EUR 8.4 billion) and significantly higher in PO3/PO4 (EUR 11.9 billion), due to the higher uptake of electronic documents in all modes. They stem from a reduction in operation costs due to elements such as fewer errors and corrections, faster invoicing and a range of other elements (e.g. higher efficiency in the transport operations management), as highlighted by the majority of the industry representatives consulted¹¹¹.

Table 6.12: Impacts on transport operators costs relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040)

	Baseline	PO1	PO2	PO3/PO4
Total transport operators costs (present value in EUR million)				
Freight transport	8,307,648	-953	-8,411	-11,945
		0.0%	-0.1%	-0.1%

Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab)

Internal market impacts

The wide use of electronic-only transport information and documentation exchange, and the obligation for the relevant authorities to accept them, are expected to make shipment of freight across the borders and modes much easier and cheaper. In some cases, this may translate into faster delivery times and lower prices for consumers. These effects will occur in all policy options.

However, replacing paper documents with electronic exchange without ensuring interoperability across the modes (i.e. in PO1 and PO2) is unlikely to bring significant benefits for the IT providers. Providing a clear blueprint (in PO3 and PO4) for the development of the IT solutions is expected to increase the number of IT providers. Over time, this is expected to increase the competition and lead to a decrease of IT system costs for the transport operators, and possibly to the authorities.

Innovation impacts

Electronic information exchanges offer a large potential to improve the efficiency and reliability of both B2A and B2B communication processes, but also requires close attention to concerns and risks related to the security and confidentiality of the data registration and communication systems. Cybersecurity and privacy technologies should become complementary enablers of the EU digital economy, ensuring a trusted IT network environment for governments, businesses and individuals. The EU ambition is to become a world leader in a secure digital economy. The prevention of and protection against cyberattacks, as well as ensuring continued operation, remain difficult tasks. This concern applies to all considered options. Ensuring cybersecurity and privacy of commercially sensitive data is one of the main underlying principles for the establishment of requirements under PO2, PO3 and PO4.

¹¹¹ There is a certain degree of overlap between the administrative costs savings and the reduction in the transport costs for transport operators. However, the degree of overlap is limited. While the administrative costs savings mainly relate to the time saved in the physical management of the paper documents and the equivalent labour costs associate to it, the reduction in the transport costs for transport operators is associated to higher efficiency in the transport operations management.

Measures under all options leave room for adjustment and, in PO3 and PO4, also foresee mechanisms for adaptation to the continued evolution of innovative solutions in the implementation of the technical requirements. The guiding principle for the design of the policy options has been technology neutrality, i.e. to avoid lock-in to one particular technology solution or technique that may change in the future.

6.2 Social impacts – impacts on employment

The main expected social impacts are linked to changes in the employment structure and possible impacts on the level of employment. Full implementation of the electronic documentation is expected to make redundant over time a large number of jobs that today are linked to processing of paper documents. However, according to stakeholders' feedback, these employees will be more efficiently redeployed in higher-value tasks. Nevertheless, the exact mechanism for this remains unclear and it will largely differ depending on the organisational structure and internal processes of each company.

Should the expected operational cost savings (mostly estimated as time savings) materialise, a combination of less overtime work and reduction of workload is expected. The magnitude of the changes in employment could be roughly assessed based on the expected costs savings considered above.

This negative impact is expected to be offset to a large extent by the overall sector growth that is expected under all policy options for all transport modes. Greater demand for IT solutions and systems is likely to bring more opportunities for the IT providers, leading to an increase in high-skilled employment. The employment in public administrations is unlikely to change significantly since, as highlighted earlier, authorities do not expect to significantly reduce the absolute number of inspections, but rather improve their effectiveness. The overall employment effect is therefore expected not to be different from the baseline, under any option.

One can note the reduction in workload expected will lead to improvements in working conditions via the reduction of workload equal to around 75-102 million hours yearly (equivalent to around 36-49 thousand full time equivalents per year) on average in PO3 and PO4 over the full deployment horizon of electronic transport documents (2018-2040) across the whole sector. The impact would be lower in PO2, estimated at 49-68 million hours saved per year (equivalent to around 24-33 thousand full time equivalents per year) and PO1 (6-9 million hours saved per year; equivalent to around 3-4 thousand full time equivalents per year). Also, it is expected that there will be the possibility to focus on more creative and added-value tasks and reduce the overtime work.

Table 6.13: Average million hours saved relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040)

in million hours	Baseline	PO1		PO2		PO3/PO4	
		difference to the Baseline in million hours and % difference to the Baseline					
Total	467-470	6-9	1-2%	49-68	10-15%	75-102	16-22%
Intra-MS	373-375	4-5	1-1%	32-43	9-11%	50-65	13-17%
Cross border	94-95	2-3	2-4%	17-25	18-27%	25-37	26-39%

Source: Ecorys et al. (2018) Impact Assessment support study

6.3 Environmental impacts

Emissions

CO₂ emissions savings related to overall changes in volumes and patterns in traffic, as a result of the uptake of electronic transport information and documentation exchange, would be relatively similar for all options over the full deployment horizon (2018-2040), estimated at around 1,091-1,588 thousand tonnes cumulatively relative to the baseline. The associated external cost savings would amount to EUR 56-89 million over the same time horizon, expressed as present value. The limited positive impacts are explained by the slight increase in the overall traffic relative to the baseline (i.e. rebound effects), despite shifts taking place towards rail and waterborne transport. The rebound effects are driven by the lower costs for transport operators.

Table 6.14: Impacts on CO₂ emissions and costs relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040)

	Baseline	PO1	PO2	PO3/PO4
CO₂ emissions (thousand tonnes CO₂) in the Baseline and difference to the Baseline				
Freight transport	5,447,764	-1,091	-1,588	-1,332
Costs (net present value in EUR million) in the Baseline and difference to the Baseline				
Freight transport	384,324	-56	-88	-74

Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab)

The external costs of air pollution are projected to decrease in PO1 and PO2 relative to the baseline (EUR 12-41 million) and slightly increase in PO3 and PO4 (EUR 41 million). The slight increase in PO3/PO4 relative to the baseline is driven by the significant increase in the waterborne transport activity, whereas the emissions factors per tonne-kilometre for air pollutants like NO_x and particulate matter for waterborne transport are higher than for road and rail transport¹¹².

Table 6.15: Impacts on external costs of air pollution relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040)

	Baseline	PO1	PO2	PO3/PO4
External costs of air pollution (present value in EUR million) in the Baseline and difference to the Baseline				
Freight transport	119,592	-41	-12	41

Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab)

Use of natural resources and energy use efficiency

The single most important efficiency gain in the use of natural resources is expected to derive from the more efficient transport value chain, as a result of digitalisation of transport-related information exchanges. Nevertheless, the extent to which this will happen is very difficult to estimate. The small modal shift identified earlier would only result in a limited reduction in energy consumption (316-425 thousands of tonnes of oil equivalent) relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040) in all policy options¹¹³.

Another source of savings of natural resources relates to the reduction in the amount of paper used. More than 70% of the stakeholders consulted expect more than 10% reduction of annual paper consumption. The experience of Rheneus Logistics shows that a single company going digital can save 8-9 trees annually. Assuming that over 1.5 billion transport shipments have

¹¹² EEA, National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention).

¹¹³ According to the results of the PRIMES-TREMOVE Transport Model (ICCS-E3MLab).

the potential to become paperless, with an average of 1-5 copies of each document per shipment not printed anymore - would result in about 2-8 billion sheets of paper saved. This corresponds to 180-900 thousand trees saved annually¹¹⁴. This assessment concerns only the printing of the main transport document – the contract of carriage – and thus corresponds to PO1 and PO2. Assuming the digitalisation of all other accompanying documents, as enabled by PO3 and PO4, such savings would be even higher.

7 HOW DO THE OPTIONS COMPARE?

Effectiveness

The effectiveness of the options is examined against the policy objectives identified in section 4.1. The criteria presented below are used to help assess the effectiveness.

Table 7.1: Objectives and assessment criteria related to the effectiveness of policy options

General objectives	Specific objectives	Assessment criteria
Contribute to removing barriers to the smooth functioning of the Internal Market, to the modernisation of the economy and to the greater efficiency of the transport sector, through enabling wider use of digital technologies.	Ensure a legal framework uniformly established in all EU Member States, the obligation of acceptance by all relevant public authorities of cargo transport information and documentation made available by electronic means	<ul style="list-style-type: none"> Expected improvement in acceptance level by public authorities (including courts) and commercial parties
	Ensure uniform implementation by authorities of the obligation of acceptance	<ul style="list-style-type: none"> Changes to administrative costs for businesses
	Ensure the interoperability of the IT systems and solutions used for the electronic exchange of cargo transport information, and for B2A regulatory information and documentation in particular	<ul style="list-style-type: none"> Changes to compliance costs for businesses Changes in costs for authorities for implementation and enforcement Expected improvement in the uptake level of electronic transport information and exchange solutions

All policy options are also assessed against the criterion of balance between social protection of workers and freedom to provide cross-border services, due to the cross-cutting goal of the legal framework. The results of the analysis of impacts are summarised in Table 7.2.

Table 7.2: Comparison of impacts of policy option in terms of objectives (relative to the baseline)

Key: (+) = positive effects¹¹⁵; (-) = negative effects; 0 = no effects; V = variant

Strongly negative	Weakly negative	No or limited impact	Weakly positive	Strongly positive	
PO1		PO2		PO3	PO4
Effectiveness					
Ensure a legal framework uniformly established in all EU Member States, the obligation of acceptance					

¹¹⁴ Calculation based on <http://www.conservatree.org/>

¹¹⁵ For the assessment of the costs levels positive impact correspond to the reduction in costs

<p>Expected improvement in acceptance level by public authorities (including courts) and commercial parties</p>	<p>(0) Positive impact on B2A use, primarily in road transport, due to possibility of using the e-CMR across all the EU</p> <p>(0/+) Limited positive impact in the MS that are not yet party to the other mode-specific conventions (i.e. CMNI for IWW; Hamburg rules for maritime)</p> <p>(0) No significant impact on multimodal transport</p>	<p>(+) Positive impact in all transport modes, due to clear establishment of the obligation of acceptance by authorities & harmonised requirements for admissibility</p> <p>(0) Limited scope of the evidence admissible in electronic form & limited specification of requirements</p> <p>(+) Positive impact on the <i>admissibility</i> of the transport contracts</p> <p>(0) Limited positive impact on the <i>validity</i> of the transport contracts</p>	<p>(+) Positive impact in all modes, as well as multimodal transport due to clear establishment of the obligation of acceptance by authorities & harmonised requirements for admissibility</p> <p>(+) Technical specifications also eliminate uncertainty/discretion in establishing compliance with admissibility requirements</p> <p>(+) Positive impact on the <i>admissibility</i> of the transport contracts</p> <p>(0) Limited positive impact on the validity of the transport contracts</p>	<p>(+) Positive impact in all modes, as well as multimodal transport due to clear establishment of the obligation of acceptance by authorities & harmonised requirements for admissibility</p> <p>(+) Fully harmonised requirements (including technical specifications) for admissibility</p> <p>(+) Positive impact on the <i>admissibility</i> of the transport contracts</p> <p>(0) Limited positive impact on the validity of the transport contracts</p>
<p>Ensure uniform implementation by authorities of the obligation of acceptance</p>				
<p>Changes to administrative costs for businesses</p>	<p>(+) Slight positive effects, particularly for road transport operators due to possibility of using the e-CMR as evidence</p> <p>(0) Limited business case, as other transport documents could still be required on paper</p> <p>(0) No significant impact on multimodal transport</p>	<p>(+) Slowly occurring and patchy positive effects as a result of voluntary coordination measures by MS authorities</p>	<p>(+) Positive impact in all modes, due to mandatory measures requiring review and alignment of control procedures/processes by the different MS authorities</p>	<p>(+) Positive impact in all modes, due to mandatory measures requiring review and alignment of control procedures/processes by the different MS authorities</p>
<p>Ensure the interoperability of the IT systems and solutions used for the electronic exchange of cargo transport information</p>				
<p>Changes to compliance costs for businesses</p>	<p>(0) Very little increase in compliance costs compared to a baseline</p> <p>(-) Risk of differences in interpretation by the different MS/authorities in defining the technical requirements for admissibility</p>	<p>(-) Businesses might still need to invest in a variety of IT solutions, due to the risk of significant differences in interpretation by the different MS/authorities in defining the technical requirements for admissibility</p>	<p>(+) Investments costs in IT solutions expected to be offset in short to medium term by cost savings due to digitalisation of processes and improved operational flows</p> <p>(-) Some risk of higher costs for multimodal solutions/integrators, but significantly lower than in PO1&PO2</p> <p>(+) Cost decrease expected due to greater number of providers and increased competition</p>	<p>(+) Costs expected to be offset in short to medium term by cost savings due to digitalisation of processes and improved operational flows</p> <p>(-) High upfront compliance costs for those actors that have already invested in IT solutions/systems, particularly businesses in the air, rail and inland waterway sector</p> <p>(+) Cost decrease expected due to greater number of providers and increased competition</p>

<p>Changes in costs for authorities for implementation and enforcement</p>	<p>(-) Investment costs in IT solutions/systems related to the verification of compliance with the admissibility requirements</p> <p>(-) Risk of multiplication of such costs, as different authorities would continue the current trend of development of individual systems/solutions, based on the different legislative requirements</p>	<p>(-) Investment costs in IT solutions/systems related to the verification of compliance with the admissibility requirements</p> <p>(-) Risk of multiplication of such costs, as different authorities would continue the current trend of development of individual systems/solutions, based on the different legislative requirements</p>	<p>(-) Investment costs in IT solutions/systems related to the verification of compliance with the admissibility requirements</p> <p>(-) Some risk of multiplication of these costs for mode-specific solutions, but significantly lower than in PO1&PO2</p> <p>(+) Costs expected to be offset in the longer run by better targeted/ risk-based controls & better statistical data</p> <p>(+) Cost decrease expected due to greater number of providers and increased competition</p>	<p>(-) Investment costs in IT solutions/systems related to the verification of compliance with the admissibility requirements</p> <p>(-/0) Limited risk of multiplication of these costs, due to fully harmonised technical specifications</p> <p>(+) Costs expected to be offset in the longer run by better targeted/ risk-based controls & better statistical data</p> <p>(+) Cost decrease expected due to greater number of providers and increased competition</p>
<p>Expected uptake levels of electronic information exchange by 2030</p>	<p>Road: Intra MS (10%); Cross-border (20%)</p> <p>Rail: Intra MS (25%); Cross-border (25%)</p> <p>IWT: Intra MS (10%); Cross-border (10%)</p> <p>Maritime: Intra MS (15%); Cross-border (15%)</p> <p>Aviation: Intra MS (50%); Cross-border (50%)</p>	<p>Road: Intra MS (40%); Cross-border (50%)</p> <p>Rail: Intra MS (75%); Cross-border (85%)</p> <p>IWT: Intra MS (40%); Cross-border (50%)</p> <p>Maritime: Intra MS (70%); Cross-border (70%)</p> <p>Aviation: Intra MS (75%); Cross-border (75%)</p>	<p>Road: Intra MS (60%); Cross-border (80%)</p> <p>Rail: Intra MS (85%); Cross-border (95%)</p> <p>IWT: Intra MS (60%); Cross-border (80%)</p> <p>Maritime: Intra MS (95%); Cross-border (95%)</p> <p>Aviation: Intra MS (95%); Cross-border (95%)</p>	<p>Road: Intra MS (60%); Cross-border (80%)</p> <p>Rail: Intra MS (85%); Cross-border (95%)</p> <p>IWT: Intra MS (60%); Cross-border (80%)</p> <p>Maritime: Intra MS (95%); Cross-border (95%)</p> <p>Aviation: Intra MS (95%); Cross-border (95%)</p>

Efficiency

The combined measures under the four policy options have economic, social and environmental impacts. The net cost benefits ratio for all three options is positive, with the highest net benefits shown by PO3 and PO4 (over EUR 27 billion). The table below does not account for the additional costs for the public authorities for investments into IT systems to deal with electronic information and documentation exchanges, which will be highest under PO3 and PO4 due to the need to invest into IT systems/solutions to ensure the implementation of the obligation of acceptance of electronic transport information and documentation, and the wider scope of application of the obligation of acceptance. However, it accounts for the costs related to the certification of solution providers and the enforcement costs for public authorities.

Table 7.3: Costs and benefits of the policy options relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value

Net benefits (in EUR million, constant prices 2013)	PO1	PO2	PO3/PO4
Social benefits			
Transport operators savings	953	8,411	11,945
External costs savings	185	361	332

Net benefits (in EUR million, constant prices 2013)	PO1	PO2	PO3/PO4
Air pollution	41	12	-41
Congestion	88	261	299
Climate change	56	88	74
Total social benefits	1,137	8,772	12,277
Costs			
Reduction in administrative costs for businesses*	1,456	12,865	19,709
Compliance costs for businesses	-473	-2,676	-4,375
Compliance costs for authorities	0	-251	-268
Certification costs	0	0	-17
Enforcement costs	0	-251	-251
Net benefits (present value)	2,120	18,710	27,343

* the lower bound value

Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab) and Ecorys et al. (2018) Impact Assessment support study

Coherence

In general, there are no specific issues regarding **internal coherence**, inconsistencies or gaps among the policy options, which were designed in a way to ensure that all drivers are addressed. **PO2**, **PO3** and **PO4** include mandatory measures that are expected to work in complementarity, strengthening the obligation of acceptance by the authorities and increasing legal clarity and consistency across modes. **PO3** and **PO4** include additional mandatory measures, aimed at limiting the room for interpretation in the application of the requirements for admissibility, thus further strengthening effectiveness. The corresponding measures in **PO1** and **PO2** are only voluntary, which may not be adopted by all Member States and thus, in practice, only partly address the problem identified. Coherence of **PO1** with the other options is more limited, insofar as the mandatory measure included is limited in the scope of the modes covered, relying primarily on voluntary measures for ensuring implementation by authorities of the obligation of acceptance.

As regards **coherence with key EU policy objectives**, the main aspects considered contribute to the following overall EU policy objectives: reducing barriers to the internal market (including for SMEs), reducing barriers to multimodality in transport, and enabling the development of e-Government services and, therefore, of the Digital Single Market. Due to their low degree of effectiveness in achieving the specific objectives of the initiative, **PO1** and **PO2** will have a corresponding lower coherence with the key EU objectives identified. Conversely, **PO3** and **PO4** are expected to improve coherence with other EU policies. Furthermore, as highlighted earlier, **PO3** and **PO4** are also likely to have stronger positive impact on the SMEs, including in the IT sector, as these options provide a clear blueprint for the development of the electronic documentation.

As regards **coherence with other relevant EU legislation**, all policy options (though particularly **PO3** and **PO4**, and to a lesser extent **PO1** and **PO2**) provide synergies in terms of facilitating international transport and trade, including with third countries, reducing administrative and other operational costs for business, and overall improving administrative cooperation and consistency and effectiveness of cross-border enforcement of EU transport legislation with better use of digital tools for electronic data exchange. A detailed analysis of the coherence of the initiative with EU legislation in force, as well as with ongoing proposals and initiatives currently under consideration is provided in Annex 7.

PO3 and **PO4** envisage adoption of technical specifications for implementation of requirements related to acceptance of the electronic information and documentation, which

are concurrent to similar measures considered under the impact assessment, undertaken in parallel to the present one, for the revision of the maritime Reporting Formalities Directive. Insofar as the scope of the two initiatives is expected to overlap – namely on the identification of a (maximal) data set to be concerned by some of those specifications – mitigation measures in the sense of ensuring coordination and alignment in the adoption of those specifications, are envisaged.

Proportionality and subsidiarity

None of the options goes beyond what is necessary to achieve the objectives.

The set of measures designed to address the first specific policy objective in all policy options establish the obligation of authorities to accept the electronic information/documents, but do not impose the obligation to use the electronic form on the businesses, neither in B2A nor in B2B (business-to-business) relations. Imposing such obligation on the latter would ensure full digitalisation of freight transport information and document exchanges, but it is not necessary in order to ensure acceptance on the part of the authorities. Furthermore, most industry associations argued during the stakeholder consultation that the business is ready and will move towards full digitalisation when the authorities will eventually allow it.

At the same time, the authorities are not required to accept any electronic source of information provided by the businesses. Rather, the measures take into account the need of authorities for authenticity and integrity assurance of the information /documents presented, and condition the obligation of the authorities to accept the latter if the electronic means used for their presentation comply with a determined set of requirements. In the case of PO1, these are the requirements set by the international conventions, whereas in PO1, PO2 and PO3, these measures are provided in the framework of the proposed EU legal act.

The set of measures aimed at achieving the second specific objective require Member States to cooperate in order to align their (future) digitalised processes of control of information/documents communicated electronically, including as regards the set of data elements their authorities require as necessary for fulfilling the information requirements as established in the relevant EU and national legal acts. These measures will ensure uniform rules for electronic information/documents verification, and will contribute to reducing administrative compliance costs (and therefore burden) for the business. But they do not require uniformization of the information requirements themselves as established in the respective EU and Member State legislation. In PO1 and PO2, these take the form of support measures, for voluntary coordination among the Member States. In PO3 and PO4, such cooperation is mandated through regulatory provisions in the framework of the proposed legal act.

The set of measures aimed at achieving the third specific objective establish the requirements the electronic means used by the business to provide to the authorities the requested regulatory information should comply with, and provide for the development of technical specifications for their implementation. These requirements and the related technical specifications will ensure the interoperability of the IT systems used by the different Member States authorities, among them and with the solutions used by the business, as well as facilitate this interoperability across the (currently highly transport mode-specific) B2A and B2B solutions. In PO1 and PO2, the developments of the technical specifications are promoted by means of non-binding measures supporting voluntary cooperation and implementation by the Member States. In PO3 and PO4, the development and implementation

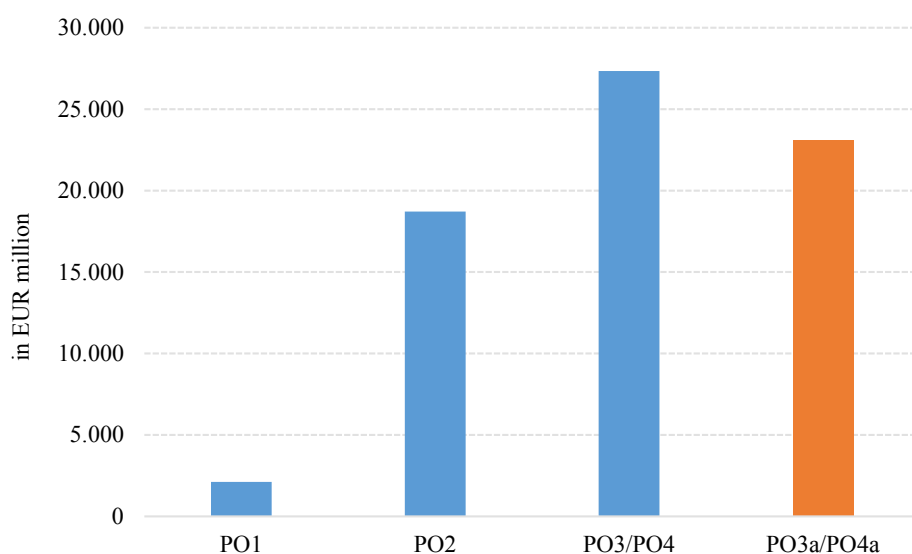
of the technical specifications will be mandated through regulatory provisions in the framework of the proposed legal act.

Sensitivity analysis

Sensitivity analysis has been performed with respect to the uptake levels of the electronic transport documents. More specifically, lower uptake rates (10 percentage points lower) for the levels of the electronic transport documents have been assumed for all transport modes relative to PO3/PO4.

The results of the sensitivity analysis (so-called PO3a/PO4a below) indicate that lower uptake of electronic transport documents would have an impact on the net benefits. PO3a/PO4a would however still result in EUR 23 billion net benefits over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value. In addition, the ranking of the policy options would not change (see Figure 7.1).

Figure 7.1: Net benefits of policy options and PO3a/PO4a (sensitivity analysis) relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value



Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab) and Ecorys et al. (2018) Impact Assessment support study

The detailed costs and benefits of PO3a/PO4a relative to PO3/PO4 are presented in the Table 7.4. In addition, the assessment with the PRIMES-TREMOVE model by ICCS-E3MLab indicates that PO3a/PO4a would result in 0.3 percentage points decrease in road modal share in 2030 relative to the baseline (around 1,360 million tonnes-kilometres shifted away from road), similarly to PO3/PO4. However, the total freight transport activity is expected to increase by around 0.3% in 2030 relative to the baseline in PO3a/PO4a (compared to 0.4% in PO3/PO4). This is linked to the somewhat lower reduction in the administrative costs for businesses in PO3a/PO4a relative to PO3/PO4. The lower increase in total freight transport activity in PO3a/PO4a is the reason for the higher external costs savings relative to PO3/PO4.

Table 7.4: Costs and benefits of PO3/PO4 and PO3a/PO4a (sensitivity analysis) relative to the baseline over the full deployment horizon of electronic transport documents (2018-2040), expressed as present value

Net benefits (in EUR million, constant prices 2013)	PO3/PO4	PO3a/PO4a
Social benefits		
Transport operators savings	11,945	10,266

Net benefits (in EUR million, constant prices 2013)	PO3/PO4	PO3a/PO4a
External costs savings	332	465
Air pollution	-41	13
Congestion	299	333
Climate change	74	119
Total social benefits	12,277	10,730
Costs		
Reduction in administrative costs for businesses*	19,709	16,316
Compliance costs for businesses	-4,375	-3,640
Compliance costs for authorities	-268	-268
Certification costs	-17	-17
Enforcement costs	-251	-251
Net benefits (present value)	27,343	23,138

* the lower bound value

Source: PRIMES-TREMOVE Transport Model (ICCS-E3MLab) and Ecorys et al. (2018) Impact Assessment support study

8 PREFERRED OPTION

Both PO3 and PO4 render very similar costs and benefits and, as highlighted earlier, both would significantly contribute to solving the identified problems, with significantly higher effectiveness in achieving the specific and overall policy goals than PO1 or PO2. The high effectiveness of PO3, as well as that of PO4 results, on the one hand, from the wide scope of information coverage in the obligation of acceptance and, on the other hand, from the higher degree of specification of the binding requirements for acceptance of the electronic means.

The obligation of acceptance under PO3 and PO4 is not defined in terms of specific documents, as is the case of PO1 and PO2, but in terms of “information” that is required by EU and national legislation regulating the conditions of international freight transport on the territory of the EU Member States. As such, not only the electronic contracts of carriage are covered, but any electronic information rendition formats, provided the information content requirements of the applicable legislation and, respectively, the requirements for acceptance of the electronic means that would be provided by the new legal act proposed, were complied with.

The preferred policy option is PO3. The choice between PO3 and PO4 took account of the views of stakeholders, as well as proportionality considerations. Industry stakeholders in the maritime, aviation and rail sectors clearly indicated that, while a multimodal approach is necessary, the Commission should avoid proposing a "one-size-fits-all" solution¹¹⁶. The main considerations are related to the investments made already in these sectors in related solutions. These solutions have been developed on the basis of current provisions in international conventions and EU law which, as the legal analysis in this report has also highlighted, are mode specific and differ significantly.

The requirement of fully common technical specifications for interoperability, for all solutions used for B2A regulatory information communication, in all transport modes, as proposed in PO4, would require higher upfront investments on the part of the businesses in these sectors, in order to adapt to the new requirements. In PO3, the extent to which such cross-modal common technical specifications will be established would be determined on the

¹¹⁶ See for e.g. ECSA and WSC (maritime), as well as CER (rail) position papers sent in reaction to the IIA. IATA has been actively participating in almost all stakeholder consultation seminars organised, where they have also clearly stated such position.

basis of a specific impact assessment. The purpose of this impact assessment would be to more accurately establish the minimum necessary common cross-sectoral technical specifications that would ensure interoperability between all related authorities systems and with the solutions used by businesses, with best cost-benefit ratio as regards compliance costs by businesses and future benefits.

The assumption, based on industry stakeholders' arguments, is that sufficient level of interoperability can be ensured without requiring full harmonisation of requirements across all transport modes. More specifically, according to most industry stakeholders, interoperability would require, at a minimum, a common multimodal data dictionary.¹¹⁷ Technical specifications implementing other requirements, such as related to authenticity or integrity, may be developed specifically for the different transport modes, should a separate, dedicated impact assessment analysis conclude that such an approach would be most cost-efficient for some of the (common) requirements.

Annex 3 contains a more detailed description of the regulatory measures envisaged, as well as an indication of how implementation could take place in practice, based on insights from current industry solutions developed in the various transport modes, as well as several pilot projects undertaken by Member States administrations.

9 HOW WILL ACTUAL IMPACTS BE MONITORED AND EVALUATED?

The evaluation arrangements of the impacts of this initiative, as well as the identification of the operational objectives and monitoring plan for the preferred options are presented in detail in Annex 5. These have been developed on the basis that **PO3**, which covers all relevant e-transport documents, sets up the conditions for their acceptance/validity and relevant technical standards. A set of operational objectives were derived from the respective generic and specific objectives of the initiative, which reflect the nature and type of measures adopted. The monitoring framework covers three important areas, i.e. application (i.e. main intended results and impacts), implementation (i.e. outputs and related costs for the players) and context information (i.e. main important context drivers which affect the development of the issues). The latter section was included to ensure in particular that upcoming monitoring will capture the relevant developments in the overall technological levels and level of the freight activities which would be the key factors to assess under the relevance part of the upcoming evaluation.

The monitoring of these two issues will be done through a combination of specialised study(ies) to be contracted by the Commission and national data gathering stemming from the monitoring provision put in place in the legislation. The monitoring should start immediately after the entry into force of the Regulation. Annex 5 discusses possible monitoring arrangements. However, some of those will be established more in detail only after thorough discussion with key stakeholders leading to the preparation of the implementing acts.

¹¹⁷ 73% of the respondents in an interactive feedback session during the workshop on e-docs in Tallinn required the establishment of standardised technical specifications for sharing data between logistics operators and public administrations. Likewise, the TLF Union proposes the establishment of a single data set at EU level. According to the targeted interviews (source Ecorys et al.) the group of freight forwarders stressed the importance of a common data set enforced through EU legislation. The need for a common data set was also specifically indicated in the position paper of Finland's government on this initiative.

Annex 1: Procedural information

1. LEAD DG, DECIDE PLANNING/CWP REFERENCES

The lead DG is DG MOVE, Unit D1: Maritime Transport and Logistics

The Agenda Planning Reference is MOVE/2018/001.

2. ORGANISATION AND TIMING

DG MOVE put forward a proposal for the launch of a policy initiative on electronic transport documents in July 2016. The First Vice President Cabinet's agreement was received on 20 March 2017.

The impact assessment process was launched in May 2017, with the first meeting of the Inter-Service Steering Group on 12 May 2017 and an inception impact assessment subsequently published on 18 May 2017¹¹⁸.

The Commission launched a call for tenders for a support study on "State of play and barriers to use of electronic transport documents for freight transport. Options for EU level policy interventions". A contract was signed with a consortium of Ecorys/Grimaldi/ISL under contract reference No MOVE/D1/2017 – 498 implementing Framework contract No MOVE/A3/119-2013/LOT 5.

The Inter-Service Steering Group (ISG), chaired by DG MOVE with close involvement by the Secretariat-General, was established in April 2017 in view of the preparation of this initiative. The following Commission Services were consulted: Secretariat-General (SG), Legal Service (JS), DG Taxation and Customs Union (TAXUD), DG Budget (BUDG), DG Climate Action (CLIMA), DG Communications Networks, Content and Technology (CNECT), DG Competition (COMP), DG Research and Innovation (RTD), DG Employment, Social Affairs and Inclusion (EMPL), DG Justice and Consumers (JUST), DG Internal Market Industry, Entrepreneurship and SMEs (GROW), DG Eurostat – European Statistics (ESTAT), DG Informatics (DIGIT), DG Environment (ENV). The feedback received from services has been taken into account in the impact assessment.

The ISG met three times in preparation of this impact assessment: on 12 May 2017, 16 October 2017 and on 9 February 2018, discussing the inception impact assessment, the outcome of the support studies and the draft impact assessment.

3. CONSULTATION OF THE RSB

The Impact Assessment Report was submitted to the Regulatory Scrutiny Board on 14 February and was discussed by the Board 7 March 2018. The Board issued a positive opinion with reservations. The Board made recommendations. Those were addressed in the revised IA report as follows:

Main considerations	Modification of the IA report
(1) The report does not sufficiently discuss the interplay between the initiative and international conventions and bilateral	A new subsection 5.3 "How do the policy options differ" has been added

¹¹⁸ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-2546864_en

<p>agreements.</p>	<p>under section 5 "What are the policy options". It provides a more detailed description of the measures and their different role in the context of the different policy options, including the interplay between this initiative and international conventions and bilateral agreements.</p>
<p>(2) The policy options lack important details about implementation and necessary steps to achieve the policy objectives.</p>	<p>A new subsection 5.3 "How do the policy options differ" has been added under section 5 "What are the policy options". It provides a more detailed description of the measures and their different role in the context of the different policy options. Table 5.1 providing the overview of the retained policy measures and the corresponding policy options have been revised, to highlight how each measure relates to the identified problem drivers and to policy objectives.</p>
<p>(3) The report is not clear about how it arrived at its cost estimates. It is not clear either whether the estimates reflect all the costs of the proposal. This makes it difficult to justify why the report strongly recommends one policy option over another that appears to have very similar costs and benefits.</p>	<p>The argumentation related to the choice of the preferred policy option (PO3) has been revised. It is now not only based on costs considerations, but also on stakeholder preferences. This has been highlighted in Section 8 "Preferred policy option".</p>
<p>Further considerations and adjustment requirements</p>	
<p>(1) The report should better explain the interplay between the initiative and the relevant international sectoral conventions and bilateral agreements. The report should further elaborate on how the initiative intends to build on those international conventions, such as by encouraging Member States to ratify them or by working to amend them. The report should clarify the policy flexibilities they allow and any relevant constraints they may present for the various policy options. The report should also better explain how realistic it is and what time frame is foreseen to amend international conventions and bilateral agreements (preferred option), in particular as regards the nature of electronic documents, the requirements for their validity and acceptance by national authorities and the technical specifications for B2A and A2B electronic documents.</p>	<p>A new subsection 5.3 "How do the policy options differ" has been added under section 5 "What are the policy options". It provides a more detailed description of the measures and their different role in the context of the different policy options, addressing all these comments and recommendations.</p>
<p>(2) The report should explain how this initiative relates to parallel initiatives such as revising the maritime Reporting Formalities Directive. It should clarify whether and how they overlap or are</p>	<p>More detailed explanation in this regard has been provided in subsection 1.3</p>

mutually reinforcing.	"Legal context".
(3) The report should explain why the scope of the initiative is limited to cargo transport documents, excluding documents concerning the means of transport and the personnel manning the means of transport.	The explanation has been added in a new subsection 1.1 "Freight transport documents – background and scope limitation of this initiative".
(4) The report should further clarify how the policy options would be implemented in practice. It should describe what concrete steps to take in the context of this initiative to achieve the goal of paperless documentation in transport. It should clarify whether the legal proposal based on this impact assessment will contain all practical elements or whether it will provide a principles-based framework for necessary further steps. The report should also discuss the extent to which the policy options are future proof, i.e. can flexibly integrate future technological developments.	A new subsection 5.3 "How do the policy options differ" has been added under section 5 "What are the policy options". It provides a more detailed description of the measures and their different role in the context of the different policy options, addressing all these comments and recommendations.
(5) It is not clear how robust the impact estimates are. The report should better present the methodologies it applied in estimating the impacts of the policy options. It should explain the underlying assumptions and main logical steps that resulted in the presented outcomes. For example, it should explain how the estimates on a possible modal shift were obtained and how credible they are. It should explain why shifting goods transport from road to rail leads to external benefits while the shift to waterborne transport leads to (higher) external costs. Moreover, the report should discuss how robust the choice of the preferred policy option is, given that the estimated benefits of options 3 and 4 appear to be about the same. The impact analysis should assess how sensitive the estimates are to plausible variations of the underlying assumptions.	Further explanations regarding the methodology for deriving the administrative costs has been added in Annex 4. In addition, a section on the uptake rates of electronic documents has been added in Annex 4. An explanation on how the modal shift has been assessed has been added in section 6.1 (modal shift and congestion costs). Clarification regarding the external costs of air pollutants has been added in section 6.3 (emissions). Considerations regarding the choice of the preferred policy option have been added in section 8. Sensitivity analysis for the uptake rates of electronic documents has been added in section 7.
(6) The impact analysis should provide more information about the costs that the policy options imply for public authorities. Currently it mainly concentrates on costs for private operators and refers to future impact assessments (see table below). However, reaching the objective will eventually imply costs related to these implementing measures. As these are also relevant for the current political decision, the report should indicate their magnitude.	More information regarding the costs related to the certification of solution providers and the enforcement costs for public authorities has been added in section 6.1 (Compliance costs for authorities and enforcement costs for authorities).

4. EVIDENCE, SOURCES AND QUALITY

The impact assessment is based on research/analyses done by the Commission:

- Ecorys et al., study on "State of play and barriers to the use of electronic transport documents for freight transport: Options for EU level policy interventions", 2018.
- Digital Transport Logistics Forum (DTLF) expert group.
- DTLF, report on "Paperless transport" (draft report).
- Modelling performed by the ICCS-E3MLab with the PRIMES-TREMOVE transport model.

Annex 2: Stakeholder consultation

1. INTRODUCTION

The Commission actively engaged with stakeholders and conducted comprehensive consultations throughout the impact assessment process. The consultation strategy¹¹⁹ set out a number of actions for the Commission to organise as part of the consultation process. In addition, the Commission made use of the consultation carried out in the context of DTLF.

This annex provides a summary of the outcomes of the stakeholder consultation activities which were carried out as part of the study to support the impact assessment.

It provides a basic analysis of the range of stakeholder groups that were engaged in those activities and a summary of the main issues which they raised.

The objectives of the consultation activities were to:

- Provide to the wide public and stakeholders an opportunity to express their views on the importance and severity of the problems and issues related to the current legal framework, in order to help formulate the problem definition;
- Gather specialised input (data and factual information, expert views) from private and public stakeholders' perspective; and
- Gather input (data and/or estimates, expert views) on the expected impact and level of support of a set of measures intended to address issues and problems identified in the current situation.

The consultation activities included:

- an open public consultation (OPC) organised by the Commission, running from 25 October 2017 to 18 January 2018;
- an SME panel survey organised by the Commission, running from 24 November 2017 to 22 January 2018;
- a legal survey of private and public stakeholders organised by the consultant responsible for the impact assessment support study, running from 23 October 2017 to 1 January 2018;
- a targeted survey of private and public stakeholders organised by the consultant responsible for the impact assessment support study, running from 27 October 2017 to 7 January 2018;
- 50 interviews with stakeholders, including industry representatives and national authorities, conducted by the consultant responsible for the impact assessment support study and its partners between 20 October 2017 and 15 January 2018;
- stakeholder meetings and workshops at several different events;

¹¹⁹ https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-2546864_en

- five case studies examined by the consultant responsible for the impact assessment support study between 6 November 2017 and 15 January 2018.

2. FEEDBACK

2.1. Feedback received on the Inception Impact Assessment

The Commission received eight reactions to the Inception Impact Assessment by the World Shipping Council (WSC), the European Community Shipowners Associations (ECSA), the International Road Transport Union (IRU), the Association of European Vehicle Logistics (ECG), the BLG Automobile Logistics GmbH & Co. KG Bremen (BLG), the rail sector including CER, CIT and UIC Raildata, the Norwegian Coastal Administration, the German transport insurers (GDV), the UK Road Haulage Association, the French leading professional organization for the transport sector (FNTR), BusinessEurope and a Polish Non-governmental organisation (NGO). In general, the reactions were positive regarding the EU's policy move towards a more digital transport environment. All but one welcomed and encouraged the new Commission's initiative on electronic transport documents. BLG Automobile Logistics GmbH & Co. KG, Bremen mentioned that due to the situation in Germany, the use of electronic transport documents was still not advisable, however they would recommend the ratification of the e-CMR Protocol.

Problem definition:

- The WSC and ECSA urged the Commission to focus only on B2A and avoid B2B communications.
- The Polish NGO focused on the complexity of the issues to be addressed, referring to the amount of documents used across different modes, the legal and regulatory barriers regarding the transport documents, including international conventions, and concerns that establishing a single legal framework for EU should not isolate international transport.

Policy options:

- WSC and ECSA advised the Commission to recognise the complex operational and legal realities that distinguish each transport mode and to avoid pursuing 'one size fits all' multimodal solutions.
- IRU encouraged the Commission to further increase its legislative and non-legislative actions and to subsequently enable and align the implementation of electronic documents for road freight transport and logistics.
- The Norwegian Coastal Administration suggested focusing on economic benefits and non-regulative measures when addressing the industry. They found the outlined objectives and policy options vital for the impact assessment and proposed to create a forum where the various modes of transport could discuss and assess the challenges and opportunities at hand.
- ECG called for all European countries to ratify the 2008 e-CMR Protocol.
- GDV proposed the fulfilment of requirements similar to those of e-CMR. Furthermore, they supported almost all Commission's proposals on the measures.
- The UK Road Haulage Association suggested that the paper documents should also be available and that the electronic documents should be accessible at any time.

- The FNTR highlighted that it would be important that the solutions be easy and not time consuming. They insisted on the interoperability and the integrity of the solutions, while they proposed that signing on glass process is not an option but digital signature tools are.
- The rail sector recommended that potential legislative measures should take into account the already existing international legal framework and ongoing railway initiatives, respecting the entrepreneurial freedom of companies.
- BusinessEurope mentioned that actions in each mode are essential, as well as the improvement of the interoperability between the modes.

2.2. Feedback received during the consultation process

The Commission received three more reactions from private and public stakeholders during the consultation process, all welcoming the initiative – CLECAT, Transport et Logistique France (TLF) Union and the Finish administration.

CLECAT proposed that the concept of a document accompanying the goods should be abandoned entirely and be replaced by the concept of exchanging data. It also underscored that DG MOVE should not aim to replace existing systems, but rather render existing B2A solutions more interoperable. For CLECAT it is important to introduce measures in order to remove the remaining barriers of legal acceptance of digital data.

Similarly, the TLF underlined that the aim of the initiative should be the digital exchange of data. Therefore, TLF recommended that a single EU-wide legal framework should be defined by DG MOVE, enabling the digital exchange of data between businesses and authorities in transport and logistics.

In its position paper, Finland emphasized the need for an EU legislation that obliged all the European public authorities to accept electronic documents, as well as the fact that Commission should speed up the harmonisation of data elements.

3. METHODOLOGY

3.1. Open public consultation (OPC)

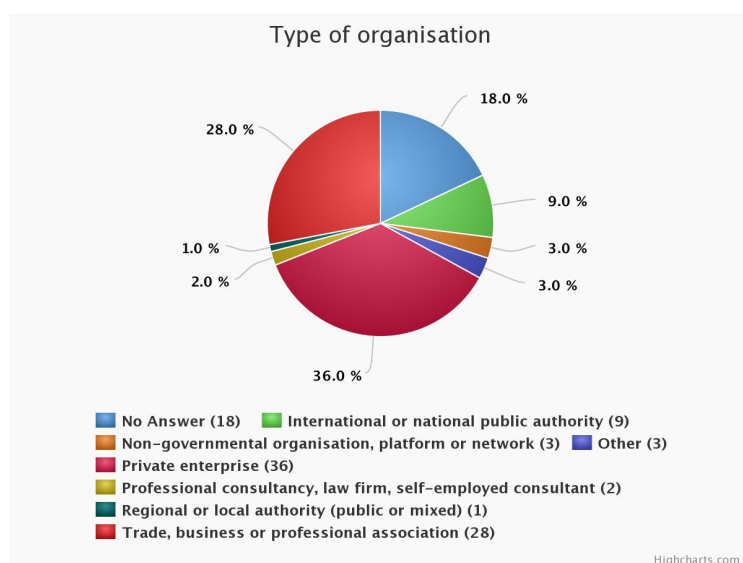
The objectives of the OPC were to gather the views and concerns of all interested private and public stakeholders on the use of electronic freight transport documents and help verify the problems faced by the sector, validate the objectives of the possible policy intervention and obtain the opinion of stakeholders on the appropriateness and expected impacts of the possible policy measures to address those problems.

A total of 100 responses were received, covering a variety of stakeholder groups, as shown in the Graph 2-1 below. 82 respondents responded in their professional capacity or on behalf of their organization, whereas the remaining 18 (no answer) indicated that they replied as an individual in their personal capacity.

Responses were received from respondents residing or based in 20 EU Member States (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Netherlands, Portugal, Poland, Romania, Spain, Sweden and the United Kingdom), as well as from Switzerland and Norway. Most

responses were received by stakeholders from Hungary 18, followed by Germany (12), Austria (10) and Belgium (8).

Graph Annex 2-1 OPC respondents grouped by organisation type



3.2. SME panel

The Commission SME panel survey focussed on whether and to what extent the SMEs are using electronic transport documents, the potential benefits from their use, reasons for not using them, and the way the Commission could facilitate the use of electronic transport documents by the SMEs.

A total of 267 responses were received from organisations based in 22 EU Member States (Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and the United Kingdom). 75% of the respondents came however from just 5 countries –France, Italy, Lithuania, Poland and Portugal.

3.3. Stakeholder workshops

During the consultation process the Commission held several workshops with stakeholders and Member States representatives. The Commission presented to the experts its intentions and ideas, asking their opinion on the drivers and the policy options and measures.

On 10 July 2017, 25 stakeholders, including industry representatives from all modes, apart from air, and representatives from some Member States (DE, FI, LU, SE), participated in a first workshop aimed at pre-identifying the range of possible measures that would be included in the stakeholder OPC. The participants confirmed that the Commission had indeed identified the main issues in its problem assessment described in the inception IA, and discussed possible measures to address the first problem driver – limited acceptance by Member States authorities.

The aim of the second workshop, which took place on 30 August 2017, was to have a more in-depth discussion on options for measures to address the second problem driver identified – co-existence of multiple, non-interoperable standards. The workshop gathered more than 30 external stakeholders, with a very good representation of all

transport modes as well as multimodal logistics companies and associations, standardisation organisations (UNECE, WCO, CENCELEC) and MS representative (DE, FI, EE). Through the discussion it was emphasised that it is not about "electronic documents" but rather "electronic data sets" which constitute/represent a "document", as the authorities do not require the transport document (CMR, consignment note, waybill, bill of lading) per se, but rather accept them as (valid) source of information/data for verifying compliance with certain regulations.

On 17 October 2017 a workshop dedicated to Member States was organised with representatives from 14 Member States (BE, BG, CY, DE, DK, EL, ES, FI, LU, NL, PL, PT, RO, SE). The purpose was to involve them early on in the policy making process and engage them in cooperating and providing information. During the conversation the Commission gathered information regarding current practices and on-going digitalisation initiatives. The participants recommended the examination of the existing EU legal regime and, with regard to policy measures, they supported the need for harmonisation of data sets and decentralised systems.

A last workshop with wider participation, gathering more than 40 industry and Member States representatives was organised on 10 January 2018. The objective was the independent contractors to present and discuss some of consultation outcomes with the stakeholders and request for further information. Main outcome was the request from the participants for a legislative act.

Two additional meetings, with a more restrained expert participation were organised on 5 December 2017 and 16 January 2018. Gathering experts from all transport modes, as well as Member States representatives, the objective was to identify how the ideal digital environment for transport documentation/information exchange in Europe could look like. The workshops focused on exchanging views on identifying the scope of a future proposal, including technical definitions and terms to be used in relation to the various elements. The experts underscored once more the need for an EU legislative act, with high level of binding specifications.

Conferences

A range of public and private partners from all transport sectors met in Tallinn to discuss the digitalisation of transport in November 2017. A workshop dedicated to the initiative was organised in the framework of the Conference, giving the Commission the opportunity to discuss the various aspects of problem definition and possible measures with a variety of stakeholders.

The Digital Transport Days Conference concluded with a [declaration](#) by the stakeholders, which underscored that it was about time to reap the benefits of digitalisation, including paperless data sharing, and thereby reduce administrative burdens, increase efficiency and safety, and help create new mobility services.

3.4. Conclusions and limitations

The objectives of the consultation activities have been largely achieved. All relevant stakeholder groups representing all EU Member States have been consulted and most provided their views on current hindering aspects and the policy measures under consideration. Where available, respondents also provided (some) quantitative information.

The information collected corresponded in general to the objectives and expectations of the consultation activities defined for each stakeholder group, although in a number of cases stakeholders were unable to quantify the expected costs or savings of the proposed measures.

4. SUMMARY OF INPUT

Stakeholders provided significant input that helped validate and elaborate the definition of the problem and the missed potential benefits. Input in this area came primarily from the OPC and the SME panel survey, and validated through the other stakeholder engagement tools used¹²⁰.

The sections below summarise the inputs provided that covered the problem definition, what are considered to be the underlying causes and drivers of the problem, possible measures and expected impacts to those measures.

4.1. Familiarity with transport documents in electronic format

Half of the 100 **respondents to the OPC** come in contact daily with transport documents. However, the majority of the respondents (62) are aware of the use of electronic documents but they do not work directly with them. Only 25 of the respondents replied that they are familiar and work with electronic documents.

According to **the SME panel** the average number of paper documents that the respondents process on a daily basis is 350, while the average for electronic documents is equal to 200. On a weekly basis the average number of paper documents that process the respondents is 1074, whereas the average for electronic documents is equal to 351. In addition to the above, the respondents had to indicate whether they also print the electronic transport documents that they process. From the 238 respondents who replied to this question, only 11% never print the electronic documents, while 32% print them all. 35% replied that they print them but it depends, and the average of the documents that they print is around 55% of the documents they issue.

4.2. Problems at stake

The majority of the **respondents of the OPC** – more specifically 31 of the 36 private enterprises, 24 of the 28 trade and business associations and 9 of the 10 public authorities believe that there are significant unexploited benefits that could be derived from using transport documents in electronic rather than paper format.

The limited acceptance of electronic transport documents by MS authorities and the lack of interoperable standards have been indicated by **the OPC respondents** as the most

¹²⁰ The summary below is based on the responses received to the OPC and SME panel surveys. For a more detailed description of the consultation results, including input received in the context of the interviews and case studies developed by the external consultant, see Ecorys et al., Annex VIII - XI.

significant drivers of the overall problem. The limited acceptance of electronic transport documents by banks and insurance companies seems to be less significant according to the respondents. 40 out of the 100 respondents indicate that some significant drivers are missing. In general, the majority of these 40 respondents feel that in order to fully exploit the benefits of electronic transport document, all required documentation should be digitalised. According to these respondents, the full benefits can never be exploited as long as there is still a need for paper.

44% of **the respondents to the SME panel survey** replied that main reasons for not using electronic transport documents is that their clients/ business partners do not use transport documents in electronic format, followed closely (xx%) by non-acceptance by authorities.

4.3. Objectives and policy options

Correlating to the significance of the drivers of the problem, around 90% of the **OPC respondents** consider ensuring the acceptance by MS authorities and the interoperability for B2A and B2B communications as important or very important. All respondents from private companies considered important to ensure the acceptance by MS authorities and 90% of them the interoperability for B2A and B2B communications. The proportions regarding the acceptance by banks and insurance companies are lower, around 67,5%. 27 of the 100 respondents indicate that important policy objectives are missing, referring to topics relating to cyber security and privacy.

Regarding the level of policy intervention, 53% of all **OPC respondents** preferred EU level to achieve all the objectives, higher though than the international and national intervention. Around 58% of the private companies preferred EU level intervention in order to ensure the acceptance by MS authorities and Interoperability between B2A and B2B communications. 70% of the trade and business associations find most appropriate the EU level in order to ensure acceptance by insurance companies.

Furthermore, with regard to measures for acceptance by MS authorities, a legally binding approach is found more effective by 88% of **the OPC respondents**. A legally binding approach to achieve acceptance by MS authorities is supported by 31 of the 36 private companies. Regarding the interoperability for B2A communications 88% replied as more effective the legally binding approach. In comparison for B2B communication only 67% find effective the legally binding approach and 84% preferred the voluntary measures. However, 86% (i.e. 31 out 36) of the private companies consider the legally binding approach effective even for B2B communications.

The SME panel survey respondents indicate that ‘acceptance by MS authorities’ would be the most important policy objective to increase the use of electronic transport documents by SME’s. Second most important objective for SMEs is the acceptance of electronic documents by courts when enforcing their rights, and third is the ability to use one IT application/ system to exchange electronic transport documents with all the other companies.

4. 4. Benefits and costs/risks

77% of the **OPC respondents** consider as significant benefit the lower costs for handling of documents, 90% the faster and simplified administration, 80% the data accuracy, 76% the faster document/information exchange between the commercial partners and 87% the

faster/easier presentation to the authorities of documents /information for regulatory compliance checks. Percentages are lower regarding the lower carbon footprint (51%), the improved working conditions (67%), the time savings (66%) and the new business opportunities for IT companies (58%).

34 of the 36 private companies consider significant the faster document/information exchange between the commercial partners, and 27 of the 28 associations the faster and simplified administration. 21 of the 100 respondents indicate that there are additional benefits.

Multiple respondents mentioned that electronic transport documents can reduce fraud/corrupt practices. Additional benefits suggested are the improved customer engagement and experience (real time data), improved logistics, supply-chain and financing by higher quality of data.

Moreover, in relation to costs and risks, the 71 of the 100 **OPC respondents** consider cybersecurity as significant risk and 64 the investment in IT applications/ systems by private sector stakeholders. 21 of the 28 trade and business associations find significant cost the investment in IT applications/ systems by private sector stakeholders. On the other hand only 25% of the total OPC respondents find significant the job losses both in private and public sector. Overall, main risk is the cybersecurity according to all stakeholders.

Around 60% **SME respondents** consider as significant benefits the reduced environmental impact and the simplified business process. Conversely, the benefits of easier settlement of insurance companies and payment considered to be the least significant.

4.5. Other freight documents

Stakeholders provided input with regard to other freight documents used in transport and whether the initiative should include those documents. 60% of the respondents in **the OPC** believe that most types of cargo need to be accompanied by other documents such dangerous goods or phytosanitary certificates. The documents that were identified through the OPC are the dangerous goods certificates, phytosanitary certificates, documents regarding traceability of goods, documents regarding traceability of food, VAT returns, certificates of origin, delivery notes, commercial invoices, waste recovery notes, documents concerning mail carriage, documents related to the vehicle and the personnel, packing list, log books, voyage reports, shipping manifests, NOTOC (Notice to Captain), end use certificates, weighing certificates, veterinary certificates, etc.

The replies received from **the SMEs** focused more on the dangerous goods certificates, phytosanitary certificates and veterinary certificates.

Annex 3: Who is affected and how?

This policy initiative aims at creating an enabling environment for wider use of electronic documents for freight transport. It will not forbid businesses from using the paper documentation, if they wish to continue to do so. At the same time, introducing horizontal requirements for validity of the electronic documents may require some of the businesses to adjust their existing IT environments. It will, however, oblige Member States' relevant authorities to accept documents and information provided by electronic means – as long as these meet certain criteria. At the same time, creating a common legal framework with clear technical specifications for the means of electronic transport information and documentation exchange should bring in more IT companies to the market, rendering the IT solutions market more competitive and thus lowering the overall costs for the transport sector.

1. AN OUTLOOK OF THE PREFERRED OPTION IMPLEMENTATION

The obligation of acceptance for the authorities will not be defined in terms of specific documents to be accepted in electronic format, but in terms of “information” that is specified in EU and national legislation regulating the conditions of international freight transport in the territory of the EU Member States. A list of the relevant EU and national legal acts¹²¹ and the respective regulatory information requirements falling under the scope of the new legislative act would be drawn up and annexed to the latter. A governance mechanism for review and update would also be established.

Conditions for admissibility will be imposed on the electronic systems by which this information is made available to the authorities. A set of functional requirements will be included in the legal act, drawing on those included in the international conventions and in pertinent EU and national legislation. Fulfilment of these requirements should guarantee compliance with a number of general principles that reflect clearly identified needs by public and private stakeholders to ensuring that these requirements, on the one hand, build trust in the electronic means¹²² and, on the other hand, that they will not become barriers to interoperability¹²³ and to further technological developments.

Technical specifications providing guidance on interoperability aspects may be provided later. It is proposed that further assessment be undertaken to establish whether, beyond

¹²¹ More specifically, EU transport legislation according to Chapter VI TFEU, as listed in footnote x in the Report.

¹²² More specifically, the authorities have expressed, in particular, concerns related to how to establish whether the information provided electronically is authentic (i.e. it originates from the parties indicated) and that its integrity has been preserved (i.e. it has not been modified by unauthorised parties) and, respectively, that they could have recourse to further (electronically enabled) checks if they have reasons to doubt authenticity or integrity. The private stakeholders, too, have highlighted issues related primarily to protection of commercially sensitive data – from unauthorised use for commercial purposes by other private parties, such as the IT solution providers and, respectively, from indiscriminate access by the authorities, to collect data which goes beyond the specific regulatory information needs. See analysis of stakeholder feed-back in Ecorys et al Annex VIII-XI.

¹²³ As highlighted earlier in this report, interoperability is the main major concern expressed by all stakeholders, particularly on the industry side. The experience with current efforts to digitalise B2A electronic information exchanges, particularly in the context of the maritime single window (RFD) but also the customs electronic reporting environment (particularly in the case of rail, where the industry's standard, the RailData system for electronic rail data exchange, is currently not accepted, even though the UCC regulation provides the possibility of using an electronic document, or electronic transport system for certain reporting requirements), has rendered the industry to review cautiously new initiatives to digitalise B2A information exchanges. However, many stakeholders also pointed out that imposing too high security requirements for authentication, for example, may backfire, by rendering the solutions/systems too costly, and therefore limiting their uptake.

the need for a common data vocabulary – identified by the large majority of stakeholders as a minimum requirement – other technical specifications should be established, commonly or separately for the different transport modes. Based on the findings of such assessment, technical specifications would be developed and adopted by means of implementing legislation. To enable updates and upgrades in line with advances in technology, a governance mechanism for review of these specifications will also be established.

Commission expert groups such as the Digital Transport and Logistics Forum are expected to continue to assist the Commission with technical advice and recommendations in establishing these technical specifications.

2. PRACTICAL IMPLICATIONS OF THE INITIATIVE

Businesses, ranging from transport operators to freight forwarders will have a choice how fast to move to the electronic documents and how fast to adapt their existing IT infrastructure. The exact costs will vary, depending on the size of the business. A company operating over 200 trucks employing 360 employees is expected to spend about 70-75,000 euro, assuming it equips all trucks with smartphones. If the same company issues 200,000 CMRs annually, the expected net benefit of the e-CMR would be 150,000 euro per year. It is expected that businesses will also need to redeploy or lay off personnel currently dealing with processing paper documents. Most stakeholders argue that these employees will be more efficiently redeployed in higher-value tasks. Nevertheless, the exact mechanism for this is not obvious and will differ depending on the organisational structure and internal processes of each company.

At the same time the businesses will get certainty that the electronic documents and information exchange can be accepted in case of inspection or administrative court case. This will be important in particular for the road transport, where the inspections are irregular. Moving to electronic information and documentation exchange is expected to bring time savings when dealing with administrative requirements and help business to improve their overall efficiency.

The Member States authorities will need to invest in new IT systems or adjust the existing ones. The exact specifications will be worked out together with the authorities' representatives and other stakeholders, and may be subject, if needed, of a dedicated study.

In principle, IT solutions would be developed by the market and Member States would be required to set-up a certification scheme. IT solutions providers would have the possibility of certifying their solutions and sell it to transport and logistics operators or offer them the possibility to subscribe to services offered on the basis of these solutions. Upon authorities' request, operators could present the information on screen together with a reference code that, in case of doubts, would allow authorities to access directly the certified system. The latter would guarantee the authenticity and integrity of the information.

IT solutions certified in a Member State would be automatically recognised in other Member States. They would include a system of access rights that determine what information can be accessed by which authority. Detailed rules for access and information verification procedures will be commonly established by means of an

implementing legislation, once the technical requirements are adopted. No choice of technology will be imposed, but rather the functional specifications or service requirements, plus the minimum technical specifications required for interoperability.

Member States may also decide to establish public IT systems to provide the service, but there would be no obligation to set up a centralised system. Solutions already developed by both private and public actors indicate that an environment based on distributed systems and solutions would be more cost-effective than centralised systems. Private IT service providers are expected to charge logistic operators for the use of their services, but since the use of paper is not banned, they will need to offer value for money. Transport operators will retain the choice of whether to avail themselves of these services or continue with present practices.

An implementation example

The implementation assumed under this option would be a distributed B2A information exchange environment comprised of IT systems and solutions hosted by different actors, which are inter-linked by means of interfaces (software plug-ins) and where the B2A data-exchange is mediated by publicly-governed base registries¹²⁴. Businesses would simply register the data in their own systems, which would be automatically collected by a specific information exchange application, which would be either in-house developed software – the preferred solution currently by larger companies – or an external IT solutions provider – likely the most cost-efficient solution for the smaller companies. The respective application would be used primarily for B2B exchange of information, but would also enable communication with authorities, by establishing dedicated connections to the different Member States national authorities’ base registry.

In practice, if requested by authorities for inspection, the information should be made available in: (a) a human-readable rendition (such as pdf) of the required information available on-screen (of the inspection officer or the private party); or (b) unique identifier of the respective transport operation, together with a web address from where the information could be downloaded (for e.g. in the form of a QR code, or simple registration number) and via which the inspection officer could have access (if having the necessary authorisation, respectively login and password) to the source data-base where the information is stored, in order to conduct further verification in case it has reasons to believe the information presented on-screen is not authentic or has been tempered with.

The access by the inspection officers to the source database (i.e. of the respective company's transport information exchange solution/system) could be done only on the basis of specific authorisation, which would be regulated in terms of type of access (what information, and what operations – such as read only, download in non-editable format, or copy in editable format) via a specific base registry of public authorities. This registry will act as a gate-keeper and, in practice, would be a simple database of national authorities and attributed access rights, with an interface for logging for authorities and a plug-in software which would retrieve the data from the private operators' transport information exchange solution, based on the specific information request and access rights of the respective inspection officer.

3. SUMMARY OF COSTS AND BENEFITS

<i>I. Overview of Benefits (total for all provisions) – Preferred Option</i>		
<i>Description</i>	<i>Amount</i>	<i>Comments</i>
<i>Direct benefits</i>		
Reduction in the administrative costs for	EUR 19.7 billion	The main beneficiary group will be transport operators operating in road

¹²⁴ "Base Public Administration Registries are one of the fundamental pillars of modern eGovernment and public administration, i.e. of the process of digitising public administration. The chief justification for the existence of Base Registries is to provide public servants, institutions of public and municipal administrations, and commercial and other entities with controlled access to information about citizens and relations between citizens and the various entities". Cf. Semantic Interoperability Community (SEMIC) <https://joinup.ec.europa.eu/document/base-registries-universal-database-information>

the industry (i.e. present value over 2018-2040 relative to the baseline)		transport sector (c.a.60% of all costs savings).
Indirect benefits		
Reduced CO2 emissions (i.e. external costs savings over 2018-2040 relative to the baseline)	EUR 74 million	Small positive impact due to decrease in the road modal share in 2030 relative to the baseline.
Reduction in external costs of congestion (i.e. present value over 2018-2040 relative to the baseline)	EUR 299 million	Small positive impact due to decrease in the road modal share in 2030 relative to the baseline.
Transport operators savings (i.e. present value over 2018-2040 relative to the baseline)	EUR 11.9 billion	Reduction in operation costs due to elements such as fewer errors and correction, faster invoicing and a range of other elements (e.g. higher efficiency in the transport operations management)

II. Overview of costs – Preferred option						
	Citizens/Consumers		Businesses		Administrations	
	One-off	Recurrent	One-off	Recurrent	One-off	Recurrent
Direct compliance costs for businesses (present value over 2018-2040)	n/a	n/a	EUR 4.4 billion	n/a	n/a	n/a
Direct compliance costs for authorities (system to check the validity of the electronic transport document) ¹²⁵	n/a	n/a	n/a	n/a	Costs of certification of IT solutions (EUR 0.84 million) ¹²⁶	Costs of certification of IT solutions (EUR 1.26 million annually) Enforcement costs (EUR 20 million annually) ¹²⁷

¹²⁵ Depending on the implementation of the technical solutions, the IT costs of this policy option may significantly vary. The total level of IT costs will be assessed in a separate impact assessment on the implementing act.

¹²⁶ Total costs of certification of IT solutions, including one-off and recurrent costs, amount to EUR 17 million, expressed as present value over 2018-2040.

¹²⁷ Enforcement costs amount to EUR 251 million, expressed as present value over 2018-2040.

<i>Indirect costs for the society</i>		
External costs of air pollution (present value over 2018-2040 relative to the baseline)	EUR 41 million	Negative impact due to the increase in the waterborne transport activity

4. STAKEHOLDERS TABLE

Stakeholder	Description	Key interests
Shippers	Manufacturers, retailers and wholesalers that ship goods that they manufacture or trade.	Faster/easier presentation to the authorities of documents/ information for regulatory compliance checks. Faster document/information exchange between the commercial partners. Faster and simplified administration
Freight forwarders	Companies specialized in the arrangement of shipping for individuals and/or corporations. Act as a “travel agent” for cargo and are often non-asset based.	Legal acceptance by authorities of data provided digitally and encouraging or even enforcing by legal measures the interoperability between authorities. Aim is to exchange data in a future-proof manner.
Transport and logistics operators - General	Operators providing domestic, EU and international transport and logistics services (e.g. warehousing, packaging etc).	Acceptance by Member States authorities. Faster and simplified administration. Faster document/information exchange between the commercial partners.
Transport and logistics operators - Road	Road operators - by means of truck	Both operational and administrative benefits. A common framework needs to be created to allow for interoperability of the independently evolving systems. The EC should focus on making interoperability between different MS feasible.
Transport and logistics operators - Rail	Rail operators - by means of railways	Take into account the need to fit into existing systems. Less mandatory, more flexible and less burden to business. A change from hardcopies to e-data with an international standard is suggested (e.g. Orfeus).
Transport and logistics operators - IWT	IWT operators - by means of barge	Reduction of administrative burden. Better integration in multimodal chain. Acceptance of e-transport data /documents by authorities mainly in field of container transport Only-once reporting and sharing of information within the entire multimodal transport chain Data protection: access to data by authorised parties only very crucial and critical
Transport and logistics operators - Aviation	Air operators - by means of aircraft	Countries and their authorities need to accept electronic (transport) documents, Companies need to agree separately that they will use electronic documentation (e-AWB) for their freight contracts. Technical capacity needs to be available for both the airline and the forwarder. The new initiative should create the necessary conditions, but should also leave room to include current initiatives.
Transport and logistics operators - Maritime	Maritime operators - by means of vessel	Point at the role of blockchain technology to overcome the issue of trust and information protection. Point at the international character of maritime transport and require that this is taken into account when developing / demanding standards.
Transport and logistics	Operators providing transport services with a combination of different modes of transport (road	Competition from road transport. Harmonisation between modes.

operators - Multimodal	+rail, road +IWT etc), including terminals at transfer points between modes	
Solution providers		Development of interoperable solutions so that authorities and local governments can access them in a single environment.
Member States - Policy ministries	Ministries of Transport, Justice	All MS governments and authorities accept the documents in a digital format. Take into account national diversities. Rules on authenticity (Signature eIDAS) and on accessibility by control officers on the spot, and certification of IT solutions.
Member States - Authorities		Need for certification of IT providers, a need for a platform to which enforcement authorities have to have access and a need for common tools.
SMEs	Small and medium enterprise companies, actives as a shipper, freight forwarder or transport operator.	Acceptance of electronic transport documents by EU MS. Usage of one IT application/ system to transmit the electronic transport documents to any EU Member State authority and with other companies.

Annex 4: Analytical methods

The analytical work for this impact assessment is based on the PRIMES-TREMOVE transport model, and the Ecorys model for the regulatory costs for business and the compliance and enforcement costs for public administrations.

PRIMES-TREMOVE transport model covers the entire transport system (e.g. transport activity, technologies and fuels, air pollution emissions and CO₂ emissions at Member State level):

- **Geographical coverage:** EU level, all Member States separately.
- **Time horizon:** 2005 to 2050 (5-year time steps).
- **Transport modes covered for freight transport:** road freight (heavy goods vehicles, light commercial vehicles), freight rail, freight inland navigation, international shipping. Numerous classes of vehicles and transport means with tracking of technology vintages.
- **Regions/road types:** traffic represented at country.

The *PRIMES-TREMOVE transport model*, described in section 1 below, is a building block of the modelling framework used for developing the EU Reference scenario 2016, and has a successful record of use in the Commission's transport, climate and energy policy analytical work – it is the same model as used for the 2011 White Paper on Transport and the 2016 European strategy on low-emission mobility. In this impact assessment, it has been used to define the Baseline scenario (see section 1 below), having as a starting point the EU Reference scenario 2016 but additionally including few policy measures that have been adopted after its cut-off date (end of 2014). In addition, it has been used to derive the impacts of policy options on modal shares together with their impacts on external costs of congestion, CO₂ and air pollutant emissions. The main driver for modal shift and reduced costs of congestion in this context relates to changes in the relative costs between transport modes, and thus between their relative competitiveness. The changes in costs are induced by the lower administrative costs for businesses due to the uptake of electronic means for transport information and documentation exchange.

In addition, an excel based tool has been developed by Ecorys for calculating the regulatory costs for business and the compliance and enforcement costs for public administrations. This is described in section 2 followed by a description of the assumptions used for modelling the policy options in section 3 and of the uptake rates of electronic documents in section 4.

1. DESCRIPTION OF ANALYTICAL MODELS USED: PRIMES-TREMOVE MODEL

The PRIMES-TREMOVE transport model projects the evolution of transport demand by transport mode and transport mean. It is essentially a dynamic system of multi-agent choices under several constraints, which are not necessarily binding simultaneously. The projections include details for a large number of transport means, technologies and fuels, including conventional and alternative types, and their penetration in various transport market segments for each EU Member State. They also include details about greenhouse gas and air pollution emissions (e.g. NO_x, PM, SO_x, CO), as well as impacts on external costs of congestion, noise and accidents.

In the transport field, PRIMES-TREMOVE is suitable for modelling *soft measures* (e.g. eco-driving, deployment of Intelligent Transport Systems, labelling), *economic measures* (e.g. subsidies and taxes on fuels, vehicles, emissions; ETS for transport when linked with PRIMES; pricing of congestion and other externalities such as air pollution, accidents and noise; measures supporting R&D), *regulatory measures* (e.g. CO₂ emission performance standards for new passenger cars and new light commercial vehicles; EURO standards on road transport vehicles; technology standards for non-road transport technologies), *infrastructure policies for alternative fuels* (e.g. deployment of refuelling/recharging infrastructure for electricity, hydrogen, LNG, CNG). Used as a module which contributes to a broader PRIMES scenario, it can show how policies and trends in the field of transport contribute to economy wide trends in energy use and emissions. Using data disaggregated per Member State, it can show differentiated trends across Member States.

PRIMES-TREMOVE transport model has been used for the 2011 White Paper on Transport, Low Carbon Economy and Energy 2050 Roadmaps, the 2030 policy framework for climate and energy and more recently for the Effort Sharing Regulation, the review of the Energy Efficiency Directive, the recast of the Renewables Energy Directive, the 2016 European strategy on low-emission mobility, the revision of the Eurovignette Directive and the recast of the Regulations on CO₂ standards for light duty vehicles.

The PRIMES-TREMOVE is a private model that has been developed and is maintained by E3MLab/ICCS of National Technical University of Athens¹²⁸, based on, but extending features of the open source TREMOVE model developed by the TREMOVE¹²⁹ modelling community. Part of the model (e.g. the utility nested tree) was built following the TREMOVE model¹³⁰. Other parts, like the component on fuel consumption and emissions, follow the COPERT model.

As module of the PRIMES energy system model, PRIMES-TREMOVE¹³¹ has been successfully peer reviewed¹³², most recently in 2011¹³³.

BASELINE SCENARIO

The Baseline scenario used in this impact assessment builds on the EU Reference scenario 2016 but additionally includes few policy measures adopted after its cut-off date (end of 2014). Building an EU Reference scenario is a regular exercise by the

¹²⁸ Source: <http://www.e3mlab.ntua.gr/e3mlab/>

¹²⁹ Source: <http://www.tmlleuven.be/methode/tremove/home.htm>

¹³⁰ Several model enhancements were made compared to the standard TREMOVE model, as for example: for the number of vintages (allowing representation of the choice of second-hand cars); for the technology categories which include vehicle types using electricity from the grid and fuel cells. The model also incorporates additional fuel types, such as biofuels (when they differ from standard fossil fuel technologies), LPG and LNG. In addition, representation of infrastructure for refuelling and recharging are among the model refinements, influencing fuel choices. A major model enhancement concerns the inclusion of heterogeneity in the distance of stylised trips; the model considers that the trip distances follow a distribution function with different distances and frequencies. The inclusion of heterogeneity was found to be of significant influence in the choice of vehicle-fuels especially for vehicles-fuels with range limitations.

¹³¹ The model can be run either as a stand-alone tool (e.g. for the 2011 White Paper on Transport and for the 2016 Strategy on low-emission mobility) or fully integrated in the rest of the PRIMES energy systems model (e.g. for the Low Carbon Economy and Energy 2050 Roadmaps, for the 2030 policy framework for climate and energy, for the Effort Sharing Regulation, for the review of the Energy Efficiency Directive and for the recast of the Renewables Energy Directive). When coupled with PRIMES, interaction with the energy sector is taken into account in an iterative way.

¹³² Source: http://ec.europa.eu/clima/policies/strategies/analysis/models/docs/primes_model_2013-2014_en.pdf.

¹³³ https://ec.europa.eu/energy/sites/ener/files/documents/sec_2011_1569_2.pdf

Commission. It is coordinated by DGs ENER, CLIMA and MOVE in association with the JRC, and the involvement of other services via a specific inter-service group.

For the EU Reference scenario 2016, Member States were consulted throughout the development process through a specific Reference scenario expert group which met three times during its development. Member States provided information about adopted national policies via a specific questionnaire, key assumptions have been discussed and in each modelling step, draft Member State specific results were sent for consultation. Comments of Member States were addressed to the extent possible, keeping in mind the need for overall comparability and consistency of the results. Quality of modelling results was assured by using state of the art modelling tools, detailed checks of assumptions and results by the coordinating Commission services as well as by the country specific comments by Member States.

The EU Reference scenario 2016 projects EU and Member States energy, transport and GHG emission-related developments up to 2050, given current global and EU market trends and adopted EU and Member States' energy, transport, climate and related relevant policies. "Adopted policies" refer to those that have been cast in legislation in the EU or in MS (with a cut-off date end of 2014¹³⁴). Therefore, the binding 2020 targets are assumed to be reached in the projection. This concerns greenhouse gas emission reduction targets as well as renewables targets, including renewables energy in transport. The EU Reference scenario 2016 provides projections, not forecasts. Unlike forecasts, projections do not make predictions about what the future will be. They rather indicate what would happen if the assumptions which underpin the projection actually occur. Still, the scenario allows for a consistent approach in the assessment of energy and climate trends across the EU and its Member States.

The report "EU Reference Scenario 2016: Energy, transport and GHG emissions-Trends to 2050"¹³⁵ describe the inputs and results in detail. In addition, its main messages are summarised in the impact assessments accompanying the Effort Sharing Regulation¹³⁶ and the revision of the Energy Efficiency Directive¹³⁷, and the analytical work accompanying the European strategy on low-emission mobility¹³⁸.

PRIMES-TREMOVE is one of the core models of the modelling framework used for developing the EU Reference scenario 2016 and has also been used for developing the Baseline scenario of this impact assessment. The model was calibrated on transport and energy data up to year 2013 from Eurostat and other sources.

Main assumptions of the Baseline scenario

The projections are based on a set of assumptions, including on population growth, macroeconomic and oil price developments, technology improvements, and policies.

¹³⁴ In addition, amendments to two Directives only adopted in the beginning of 2015 were also considered. This concerns notably the ILUC amendment to the Renewables Directive and the Market Stability Reserve Decision amending the ETS Directive

¹³⁵ ICCS-E3MLab et al. (2016), EU Reference Scenario 2016: Energy, transport and GHG emissions - Trends to 2050

¹³⁶ SWD(2016) 247

¹³⁷ SWD(2016) 405

¹³⁸ SWD(2016) 244

Macroeconomic assumptions

The Baseline scenario uses the same macroeconomic assumptions as the EU Reference scenario 2016. The population projections draw on the European Population Projections (EUROPOP 2013) by Eurostat. The key drivers for demographic change are: higher life expectancy, convergence in the fertility rates across Member States in the long term, and inward migration. The EU28 population is expected to grow by 0.2% per year during 2010-2030 (0.1% for 2010-2050), to 516 million in 2030 (522 million by 2050). Elderly people, aged 65 or more, would account for 24% of the total population by 2030 (28% by 2050) as opposed to 18% today.

GDP projections mirror the joint work of DG ECFIN and the Economic Policy Committee, presented in the 2015 Ageing Report¹³⁹. The average EU GDP growth rate is projected to remain relatively low at 1.2% per year for 2010-2020, down from 1.9% per year during 1995-2010. In the medium to long term, higher expected growth rates (1.4% per year for 2020-2030 and 1.5% per year for 2030-2050) are taking account of the catching up potential of countries with relatively low GDP per capita, assuming convergence to a total factor productivity growth rate of 1% in the long run.

Fossil fuel price assumptions

Oil prices used in the Baseline scenario are the same with those of the EU Reference scenario 2016. Following a gradual adjustment process with reduced investments in upstream productive capacities by non-OPEC¹⁴⁰ countries, the quota discipline is assumed to gradually improve among OPEC members and thus the oil price is projected to reach 87 \$/barrel in 2020 (in year 2013-prices). Beyond 2020, as a result of persistent demand growth in non-OECD countries driven by economic growth and the increasing number of passenger cars, oil price would rise to 113 \$/barrel by 2030 and 130 \$/barrel by 2050.

No specific sensitivities were prepared with respect to oil price developments. Still, it can be recalled that lower oil price assumptions tend to increase energy consumption and CO₂ emissions not covered by the ETS. The magnitude of the change would depend on the price elasticities and on the share of taxation, like excise duties, in consumer prices. For transport, the high share of excise duties in the consumer prices act as a limiting factor for the increase in energy consumption and CO₂ emissions.

Techno-economic assumptions

For most transport means, the Baseline scenario uses the same technology costs assumptions as the EU Reference scenario 2016.

For light duty vehicles, the data for technology costs and emissions savings has been updated based on a recent study commissioned by DG CLIMA¹⁴¹. Battery costs for electric vehicles are assumed to go down to 205 euro/kWh by 2030 and 160 euro/kWh by 2050; further reductions in the cost of both spark ignition gasoline and compression ignition diesel are assumed to take place. Technology cost assumptions are based on extensive literature review, modelling and simulation, consultation with relevant stakeholders, and further assessment by the Joint Research Centre (JRC) of the European Commission.

¹³⁹ European Commission/DG ECFIN (2014), The 2015 Ageing Report: Underlying Assumptions and Projection Methodologies, European Economy 8/2014.

¹⁴⁰ OPEC stands for Organization of Petroleum Exporting Countries.

¹⁴¹ Source: https://ec.europa.eu/clima/sites/clima/files/transport/vehicles/docs/technology_results_web.xlsx

Specific policy assumptions

The key policies included in the Baseline scenario, similarly to the EU Reference scenario 2016, are¹⁴²:

- CO₂ standards for cars and vans regulations (Regulation (EC) No 443/2009, amended by Regulation (EU) No 333/2014 and Regulation (EU) No 510/2011, amended by Regulation (EU) No 253/2014); CO₂ standards for cars are assumed to be 95gCO₂/km as of 2021 and for vans 147gCO₂/km as of 2020, based on the NEDC test cycle, in line with current legislation. No policy action to strengthen the stringency of the target is assumed after 2020/2021.
- The Renewable Energy Directive (Directive 2009/28/EC) and Fuel Quality Directive (Directive 2009/30/EC) including ILUC amendment (Directive 2015/1513/EU): achievement of the legally binding RES target for 2020 (10% RES in transport target) for each Member State, taking into account the use of flexibility mechanisms when relevant as well as of the cap on the amount of food or feed based biofuels (7%). Member States' specific renewable energy policies for the heating and cooling sector are also reflected where relevant.
- Directive on the deployment of alternative fuels infrastructure (Directive 2014/94/EU).
- Directive on the charging of heavy goods vehicles for the use of certain infrastructures (Directive 2011/76/EU amending Directive 1999/62/EC).
- Relevant national policies, for instance on the promotion of renewable energy, on fuel and vehicle taxation, are taken into account.

In addition, a few policy measures adopted after the cut-off date of the EU Reference scenario 2016 at both EU and Member State level, have been included in the Baseline scenario:

- Directive on weights & dimensions (Directive 2015/719/EU).
- Directive as regards the opening of the market for domestic passenger transport services by rail and the governance of the railway infrastructure (Directive 2016/2370/EU).
- Directive on technical requirements for inland waterway vessels (Directive 2016/1629/EU), part of the Naiades II package.
- Regulation establishing a framework on market access to port services and financial transparency of ports¹⁴³.
- The replacement of the New European Driving Cycle (NEDC) test cycle by the new Worldwide harmonized Light-vehicles Test Procedure (WLTP) has been implemented in the Baseline scenario, drawing on work by JRC. Estimates by JRC show a WLTP to NEDC CO₂ emissions ratio of approximately 1.21 when comparing the sales-weighted fleet-wide average CO₂ emissions. WLTP to NEDC conversion factors are

¹⁴² For a comprehensive discussion see the Reference scenario report: "EU Reference Scenario 2016: Energy, transport and GHG emissions - Trends to 2050"

¹⁴³ Awaiting signature of act (Source :

[http://www.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2013/0157\(COD\)&l=en](http://www.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2013/0157(COD)&l=en))

considered by individual vehicle segments, representing different vehicle and technology categories¹⁴⁴.

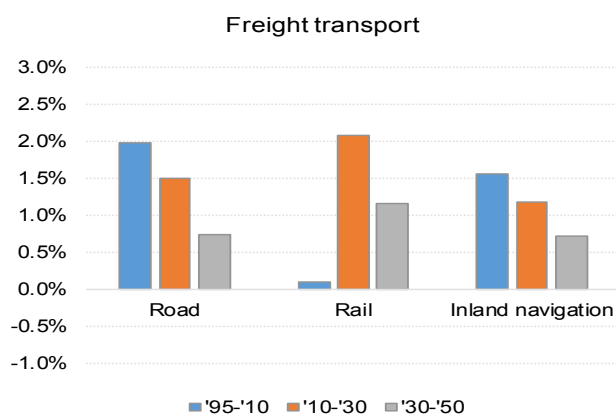
- Changes in road charges in Germany, Austria, Belgium and Latvia.
- Reflecting the plateauing in the number of fatalities and injuries in the recent years, in the Baseline scenario it has been assumed that post-2016 vehicle technologies would be the main source of reduction in fatalities, serious and slight injuries while measures addressing infrastructure safety (such as the existing RISM and Tunnel Directives), and driver behaviour (such as legislation improving enforcement across borders, namely Directive 2015/413/EU facilitating cross-border exchange of information on road safety related traffic offences) would compensate for the increase in traffic over time.

Summary of main results of the Baseline scenario

EU transport activity is expected to continue growing under current trends and adopted policies beyond 2015, albeit at a slower pace than in the past. Freight transport activity for inland modes is projected to increase by 36% between 2010 and 2030 (1.5% per year) and 60% for 2010-2050 (1.2% per year). The annual growth rates by mode, for freight transport, are provided in Figure Annex 4-1¹⁴⁵.

Road transport would maintain its dominant role within the EU. The share of road transport in inland freight is expected to slightly decrease at 70% by 2030 and 69% by 2050. The activity of heavy goods vehicles expressed in tonnes kilometres is projected to grow by 35% between 2010 and 2030 (56% for 2010-2050) in the Baseline scenario, while light goods vehicles activity would go up by 27% during 2010-2030 (50% for 2010-2050).

Figure Annex 4-1: Freight transport projections (average growth rate per year)



Source: Baseline scenario, PRIMES-TREMOVE transport model (ICCS-E3MLab)

Rail freight transport activity is projected to grow significantly faster than for road, driven in particular by the effective implementation of the TEN-T guidelines, supported by the CEF funding, leading to the completion of the TEN-T core network by 2030 and of the comprehensive network by 2050. Rail freight activity grows by 51% by 2030 and

¹⁴⁴ Simulation at individual vehicle level is combined with fleet composition data, retrieved from the official European CO₂ emissions monitoring database, and publicly available data regarding individual vehicle characteristics, in order to calculate vehicle CO₂ emissions and fuel consumption over different conditions. Vehicle CO₂ emissions are initially simulated over the present test protocol (NEDC) for the 2015 passenger car fleet; the accuracy of the method is validated against officially monitored CO₂ values and experimental data.

¹⁴⁵ Projections for international maritime are presented separately and not included in the total freight transport activity to preserve comparability with statistics for the historical period.

90% during 2010-2050, resulting in 2 percentage points increase in modal share by 2030 and an additional percentage point by 2050.

Transport activity of freight inland navigation¹⁴⁶ also benefits from the completion of the TEN-T core and comprehensive network, the promotion of inland waterway transport and the recovery in the economic activity and would grow by 26% by 2030 (1.2% per year) and by 46% during 2010-2050 (0.9% per year).

International maritime transport activity is projected to continue growing strongly with rising demand for oil, coal, steel and other primary resources – which would be more distantly sourced – increasing by 37% by 2030 and by 71% during 2010-2050.

Transport accounts today for about one third of final energy consumption. In the context of growing activity, energy use in transport is projected to decrease by 5% between 2010 and 2030 and to stabilise post-2030. These developments are mainly driven by the implementation of the Regulations setting emission performance standards for new light duty vehicles. At the same time, heavy goods vehicles are projected to increase their share in final energy demand from 2010 onwards, continuing the historic trend from 1995. Energy demand by heavy goods vehicles would grow by 14% between 2010 and 2030 (23% for 2010-2050).

Bunker fuels for maritime transport are projected to increase significantly: by 24% by 2030 (42% for 2010-2050).

LNG becomes a candidate energy carrier for road freight and waterborne transport, especially in the medium to long term, driven by the implementation of the Directive on the deployment of alternative fuels infrastructure and the revised TEN-T guidelines which represent important drivers for the higher penetration of alternative fuels in the transport mix. In the Baseline scenario, the share of LNG is projected to go up to 3% by 2030 (8% by 2050) for road freight and 4% by 2030 (7% by 2050) for inland navigation. LNG would provide about 4% of maritime bunker fuels by 2030 and 10% by 2050 – especially in the segment of short sea shipping.

Biofuels uptake is driven by the legally binding target of 10% renewable energy in transport (Renewables Directive), as amended by the ILUC Directive, and by the requirement for fuel suppliers to reduce the GHG intensity of road transport fuel by 6% (Fuel Quality Directive). Beyond 2020, biofuel levels would remain relatively stable at around 6% in the Baseline scenario. The Baseline scenario does not take into account the recent proposal by the Commission for a recast of the Renewables Energy Directive.

In the Baseline scenario, **oil products would still represent about 90% of the EU transport sector needs in 2030** and 85% in 2050, despite the renewables policies and the deployment of alternative fuels infrastructure which support some substitution effects towards biofuels, electricity, hydrogen and natural gas.

The **declining trend in transport emissions is expected to continue**, leading to 13% lower emissions by 2030 compared to 2005, and 15% by 2050.¹⁴⁷ However, relative to 1990 levels, emissions would still be 13% higher by 2030 and 10% by 2050, owing to the fast rise in the transport emissions during the 1990s. The share of transport in total GHG emissions would continue increasing, going up from 23% currently (excluding international maritime) to 25% in 2030 and 31% in 2050, following a relatively lower decline of emissions from transport compared to power generation and other sectors.

¹⁴⁶ Inland navigation covers inland waterways and national maritime.

¹⁴⁷ Including international aviation but excluding international maritime and other transportation.

Maritime bunker fuel emissions are also projected to grow strongly, increasing by 22% during 2010-2030 (38% for 2010-2050).

CO₂ emissions from road freight transport (heavy goods and light goods vehicles) are projected to increase by 6% between 2010 and 2030 (11% for 2010-2050) in the Baseline scenario. For heavy goods vehicles, the increase would be somewhat higher (10% for 2010-2030 and 17% for 2010-2050), in lack of specific measures in place. At the same time, emissions from passenger cars and passenger vans are projected to decrease by 22% between 2010 and 2030 (32% for 2010-2050) thanks to the CO₂ standards in place and the uptake of electromobility.

NO_x emissions would drop by about 56% by 2030 (64% by 2050) with respect to 2010 levels. The decline in **particulate matter (PM_{2.5})** would be less pronounced by 2030 at 51% (65% by 2050). Overall, external costs related to air pollutants would decrease by about 56% by 2030 (65% by 2050).¹⁴⁸

High congestion levels are expected to seriously affect road transport in several Member States by 2030 in the absence of effective countervailing measures such as road pricing. While urban congestion will mainly depend on car ownership levels, urban sprawl and the availability of public transport alternatives, congestion on the inter-urban network would be the result of growing freight transport activity along specific corridors, in particular where these corridors cross urban areas with heavy local traffic. Estimating the costs of congestion is not straightforward, because it occurs mostly during certain times of the day, often caused by specific bottlenecks in the network. In the Baseline scenario, total **congestion costs for urban and inter-urban network are projected to increase** by about 24% by 2030 and 43% by 2050, relative to 2010. **Noise related external costs** of transport would continue to increase, by about 17% during 2010-2030 (24% for 2010-2050), driven by the rise in traffic.

Further details on the Baseline scenario are available in the Impact Assessment accompanying the review of the Eurovignette Directive.¹⁴⁹

2. DESCRIPTION OF ANALYTICAL MODELS USED: ECORYS MODEL FOR THE REGULATORY COSTS FOR BUSINESSES AND PUBLIC ADMINISTRATIONS

The model for the regulatory costs for businesses and public administrations was developed by Ecorys. It is essentially an excel-based tool that covers the baseline developments, the compliance costs and the reduction in the administrative costs for business as well as the compliance and enforcement costs for public administrations in all policy options. The model estimates these costs at Member State and EU level.

Administrative costs for businesses

In order to estimate the administrative costs for businesses, assumptions on **the uptake levels of electronic documents** were made for the baseline and for the four policy options, on the basis of the desk research and consultations with the stakeholders. The baseline levels for the uptake of electronic transport information exchange systems/solutions, as reported by the stakeholders, are provided in section 4 below. More detailed explanations are presented in the Impact Assessment support study.

Several steps have been followed to calculate the administrative costs for businesses in the baseline and in the policy options:

¹⁴⁸ External costs are expressed in 2013 prices. They cover NO_x, PM_{2.5} and SO_x emissions.

¹⁴⁹ Source: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52017SC0180>

- The number of transport electronic documents per Member State has been derived for the base year, linked to the number of shipments. Eurostat data for 2015 has been used for this purpose. The evolution over time of the numbers of transport electronic documents was linked to the transport activity projections from the Baseline scenario (i.e. updated EU Reference scenario 2016), developed by ICCS-E3MLab with the TREMOVE-PRIMES and presented in the previous section.
- Drawing on a study of SIRA Consulting (2012), it has been assumed that 15 minutes are allocated for paper documents for each shipment, independent of the transport mode. The time saved per shipment by using electronic documents is provided in the table below, drawing on desk research and consultations with the stakeholders in the course of the impact assessment support study. A range has been used (minimum and maximum values) to account for the uncertainty.
- The total time spent for paper documents and for electronic documents in the baseline and in each policy option has been estimated based on the total number of shipments and the assumptions on the digitalization level.
- The administrative costs savings have been monetized drawing on the standard cost model.

Table Annex 4-1: Time saved per shipment for digital solutions

Time saved – Digital (minutes)	Minimum	Maximum
Road	4.5	5.5
Rail	5	10
IWW	7	10
Maritime	7	10
Aviation	4.5	10

Source: *Ecorys et al. (2018) Impact Assessment support study*

The main impact assessment report presents the administrative costs savings in ranges, considering the various sources of information used and the associated uncertainty. For the final table on efficiency of the policy options, it was decided to present conservative values of potential cost saving (i.e. minimum values), to account for the fact that due to a voluntary implementation of the measures some of the benefits might not be realized.

Compliance costs for businesses

The one-off costs for businesses to adjust their working practices to the new digitalised business environment would cover both hardware and software systems. The costs have been assessed depending on the company size and the uptake rates of electronic documents. According to stakeholders' feedback, small market players will face lower cost levels as they handle limited numbers of transport operations, and therefore related information exchanges. Thus, the adjustment of their working practices (including through deployment of IT solutions and hardware) would not be as demanding as for bigger market players. The assumptions regarding the compliance costs per company are provided in Table Annex 4-2, differentiated by company size.

Table Annex 4-2: Compliance costs for electronic transport document per size of company

Company size	Number of trucks / Mobiles	Total mobile costs per company in EUR*	Total software costs per company in EUR	Total costs per company in EUR
Micro (0-9 employees)	-	-	-	-

Company size	Number of trucks / Mobiles	Total mobile costs per company in EUR*	Total software costs per company in EUR	Total costs per company in EUR
Small (10-49 employees)	10	3,000	5,000	8,000
Medium (50-249 employees)	50	15,000	€10,000	25,000
Large (above 250 employees)	300	90,000	€60,000	150,000

Source: Ecorys et al. (2018) Impact Assessment support study; Note: *Total mobile costs per company are calculated assuming a price of EUR 300/ smartphone

The following steps have been followed to calculate the compliance costs for businesses in the baseline and in the policy options:

- The number of companies by size and by Member State has been derived for the base year. Eurostat data for 2015 has been used for this purpose. The number of companies has been assumed to be constant over time.
- The compliance costs for electronic transport document per size of company and the uptake levels of electronic documents have been used to derive the total compliance costs in the baseline and the policy options.

Compliance costs for public administrations

The costs related to the certification of solution providers for public administrations will depend on the requirements that will be actually set. Indicatively, drawing on the experience of the Belgian e-CMR pilot, setting-up such system may imply about 1,050 hours for the relevant authority for the initial set-up plus recurrent costs estimated at 20-40 hours per week¹⁵⁰. Drawing on this example, the set-up of the system would imply one-off certification costs of about EUR 30,000 per Member State and recurrent costs of about EUR 45,000 per year per Member State. For the calculation of the total compliance costs for public administrations at EU level, similar costs have been assumed for all Member States in lack of more specific information.

Enforcement costs for public administrations

Regarding the time spent on inspections, the availability of all relevant cargo information before inspections will facilitate the processes and allow more and better targeted (risk-based) controls. This does not only increase the efficiency and effectiveness of enforcement but could also reward businesses with a tracking record of compliance. Interviews with national authorities show that they do not expect the increased information availability to change the number of inspections they are performing, but rather to allow better targeting.

The total level of enforcement costs would be highly dependent on the actual system architecture, which will depend on the choice of a Member State or specific authority. Nevertheless, the experience of EUCARIS¹⁵¹, where the basic subscription is set at EUR 16,000 and additional functionalities add to this cost between EUR 20,000-40,000 yearly, sets the scene to understand the potential order of magnitude of potential additional costs for authorities. In total, the EUCARIS system costs slightly less than EUR 1 million annually and handles 75 million transactions annually. Considering a proportional cost

¹⁵⁰ Presentation by the Federal Ministry of Transport and Mobility during the stakeholder workshop on 10 January 2018.

¹⁵¹ A network of networks of A2A electronic information exchange for road transport related vehicle certificates <https://joinup.ec.europa.eu/document/eucaris-european-car-and-driving-licence-information-system-eucaris-0>

approach, a system that would need to handle more than 1.5 billion documents a year could cost in the range of EUR 20 million annually. If divided proportionally between the authorities of all 28 EU MS this is slightly more than EUR 700,000 per Member State yearly.

Drawing on the experience of EUCARIS, the total enforcement costs for the public administrations at EU level in PO2, PO3 and PO4 has been assumed equal to EUR 20 million annually.

All costs/benefits are expressed as present value using a 4% discount rate.

3. ASSUMPTIONS USED FOR ASSESSING IMPACTS ON MODAL SHIFT

The reduction in the time and transport costs per tonne-kilometre (i.e. due to higher uptake of electronic transport information exchange systems/solutions) for transport operators in the policy options (and the sensitivity analysis PO3a/PO4a) relative to the baseline scenario are presented in Table Annex 4-3 to Table Annex 4-10 below. They are used as input in the PRIMES-TREMOVE model for deriving the impacts of policy options on modal shares, together with the impacts congestion, on CO₂ and air pollutant emissions. These input assumptions are based on the Ecorys et al. (2018) Impact Assessment support study. They draw on stakeholders' consultation and literature review and are derived based on the time and administrative costs saved due to the use of electronic documents and their respective shares in the total time and transport costs per tonne-kilometre.

Table Annex 4-3: Assumptions regarding the changes in transport costs per tonne-kilometre relative to the baseline in PO1

	PO1					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	0.0%	-0.1%	0.0%	-0.2%	0.0%	-0.3%
BG	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%
CZ	0.0%	0.0%	0.0%	-0.2%		
DK	0.0%	-0.1%	0.0%	-0.4%	0.0%	-0.5%
DE	0.0%	-0.1%	0.0%	-0.2%	0.0%	-0.3%
EE	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.5%
IE	0.0%	-0.1%	0.0%	-0.2%	0.0%	-0.5%
EL	0.0%	0.0%	0.0%	-0.6%	0.0%	-0.4%
ES	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.4%
FR	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.4%
HR	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%
IT	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%
CY	0.0%	-0.1%				
LV	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%
LT	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%
LU	0.0%	-0.1%	0.0%	-0.3%	0.0%	-0.2%
HU	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.1%
MT	0.0%	-0.1%				
NL	0.0%	-0.1%	0.0%	-0.3%	0.0%	-0.3%
AT	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.3%

	PO1					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
PL	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.3%
PT	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%
RO	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.1%
SI	0.0%	-0.1%	0.0%	-0.2%		
SK	0.0%	-0.1%	0.0%	-0.2%	0.0%	-0.2%
FI	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.4%
SE	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.4%
UK	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.5%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

Table Annex 4-4: Assumptions regarding the changes in transport costs per tonne-kilometre relative to the baseline in PO2

	PO2					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	-0.3%	-0.4%	-0.9%	-1.4%	-2.1%	-2.6%
BG	-0.1%	-0.1%	-0.1%	-0.1%	-0.5%	-0.6%
CZ	-0.2%	-0.3%	-0.8%	-1.1%		
DK	-0.4%	-0.6%	-1.6%	-2.4%	-2.2%	-3.1%
DE	-0.2%	-0.3%	-1.0%	-1.5%	-2.2%	-2.7%
EE	-0.2%	-0.2%	-1.1%	-1.6%	-2.2%	-3.1%
IE	-0.4%	-0.6%	-0.9%	-1.4%	-2.2%	-3.0%
EL	-0.2%	-0.3%	-2.7%	-4.0%	-1.9%	-2.6%
ES	-0.2%	-0.3%	-0.8%	-1.2%	-1.8%	-2.5%
FR	-0.2%	-0.3%	-0.9%	-1.4%	-2.2%	-2.7%
HR	-0.1%	-0.2%	-0.2%	-0.4%	-2.0%	-2.8%
IT	-0.2%	-0.3%	-0.5%	-0.7%	-2.0%	-2.8%
CY	-0.3%	-0.4%				
LV	-0.1%	-0.2%	-0.3%	-0.5%	-1.7%	-2.3%
LT	-0.1%	-0.2%	-0.3%	-0.4%	-1.7%	-2.4%
LU	-0.2%	-0.3%	-1.3%	-1.9%	-1.5%	-1.8%
HU	-0.1%	-0.2%	-0.4%	-0.6%	-0.7%	-0.8%
MT	-0.2%	-0.4%				
NL	-0.2%	-0.4%	-1.2%	-1.8%	-2.3%	-2.9%
AT	-0.2%	-0.3%	-1.0%	-1.5%	-2.1%	-2.5%
PL	-0.2%	-0.2%	-0.4%	-0.6%	-1.6%	-2.2%
PT	-0.1%	-0.2%	-0.3%	-0.5%	-1.8%	-2.5%
RO	-0.1%	-0.1%	-0.3%	-0.4%	-0.6%	-0.7%
SI	-0.2%	-0.3%	-1.0%	-1.5%		
SK	-0.3%	-0.4%	-0.8%	-1.2%	-1.3%	-1.5%
FI	-0.2%	-0.3%	-0.6%	-0.9%	-2.0%	-2.8%
SE	-0.2%	-0.3%	-1.1%	-1.6%	-2.0%	-2.8%
UK	-0.2%	-0.3%	-0.7%	-1.0%	-2.5%	-3.4%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

Table Annex 4-5: Assumptions regarding the changes in transport costs per tonne-kilometre relative to the baseline in PO3/PO4

	PO3/PO4					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	-0.4%	-0.6%	-1.3%	-1.6%	-3.7%	-4.2%
BG	-0.1%	-0.2%	-0.1%	-0.2%	-0.9%	-1.1%
CZ	-0.3%	-0.4%	-1.1%	-1.3%		
DK	-0.6%	-0.9%	-2.3%	-2.8%	-3.4%	-4.3%
DE	-0.4%	-0.5%	-1.4%	-1.7%	-3.9%	-4.4%
EE	-0.3%	-0.4%	-1.6%	-1.9%	-3.4%	-4.2%
IE	-0.6%	-0.9%	-1.3%	-1.6%	-3.3%	-4.2%
EL	-0.3%	-0.5%	-3.8%	-4.5%	-2.9%	-3.6%
ES	-0.3%	-0.5%	-1.1%	-1.4%	-2.7%	-3.4%
FR	-0.4%	-0.5%	-1.4%	-1.6%	-3.7%	-4.3%
HR	-0.2%	-0.3%	-0.3%	-0.4%	-3.1%	-3.9%
IT	-0.3%	-0.4%	-0.7%	-0.8%	-3.1%	-3.9%
CY	-0.4%	-0.6%				
LV	-0.2%	-0.3%	-0.4%	-0.5%	-2.5%	-3.2%
LT	-0.2%	-0.3%	-0.4%	-0.5%	-2.6%	-3.3%
LU	-0.4%	-0.5%	-1.8%	-2.1%	-2.7%	-3.1%
HU	-0.2%	-0.2%	-0.6%	-0.7%	-1.2%	-1.4%
MT	-0.4%	-0.6%				
NL	-0.4%	-0.6%	-1.7%	-2.1%	-4.1%	-4.7%
AT	-0.3%	-0.5%	-1.4%	-1.7%	-3.7%	-4.2%
PL	-0.3%	-0.4%	-0.6%	-0.7%	-2.4%	-3.0%
PT	-0.2%	-0.3%	-0.5%	-0.6%	-2.7%	-3.4%
RO	-0.2%	-0.2%	-0.4%	-0.5%	-1.1%	-1.2%
SI	-0.3%	-0.4%	-1.4%	-1.7%		
SK	-0.5%	-0.7%	-1.2%	-1.4%	-2.2%	-2.5%
FI	-0.3%	-0.5%	-0.9%	-1.1%	-3.1%	-3.9%
SE	-0.3%	-0.5%	-1.5%	-1.9%	-3.0%	-3.8%
UK	-0.3%	-0.5%	-1.0%	-1.2%	-3.7%	-4.7%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

Table Annex 4-6: Assumptions regarding the changes in transport costs per tonne-kilometre relative to the baseline in PO3a/PO4a

	PO3a/PO4a					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	-0.3%	-0.5%	-1.1%	-1.4%	-3.2%	-3.7%
BG	-0.1%	-0.2%	-0.1%	-0.1%	-0.8%	-0.9%
CZ	-0.2%	-0.3%	-0.9%	-1.1%		
DK	-0.4%	-0.7%	-2.0%	-2.4%	-2.9%	-3.8%
DE	-0.3%	-0.4%	-1.2%	-1.5%	-3.3%	-3.8%

	PO3a/PO4a					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
EE	-0.2%	-0.3%	-1.3%	-1.6%	-2.9%	-3.8%
IE	-0.5%	-0.7%	-1.1%	-1.4%	-2.9%	-3.7%
EL	-0.2%	-0.4%	-3.3%	-4.0%	-2.5%	-3.2%
ES	-0.2%	-0.4%	-1.0%	-1.2%	-2.4%	-3.1%
FR	-0.3%	-0.4%	-1.1%	-1.4%	-3.0%	-3.6%
HR	-0.1%	-0.2%	-0.3%	-0.4%	-2.7%	-3.4%
IT	-0.2%	-0.3%	-0.6%	-0.7%	-2.7%	-3.4%
CY	-0.3%	-0.5%				
LV	-0.2%	-0.2%	-0.4%	-0.5%	-2.2%	-2.8%
LT	-0.2%	-0.2%	-0.4%	-0.4%	-2.2%	-2.9%
LU	-0.3%	-0.4%	-1.6%	-1.9%	-2.3%	-2.7%
HU	-0.1%	-0.2%	-0.5%	-0.6%	-1.1%	-1.2%
MT	-0.3%	-0.5%				
NL	-0.3%	-0.5%	-1.5%	-1.8%	-3.4%	-4.0%
AT	-0.2%	-0.4%	-1.2%	-1.5%	-3.2%	-3.6%
PL	-0.2%	-0.3%	-0.5%	-0.6%	-2.1%	-2.7%
PT	-0.1%	-0.2%	-0.4%	-0.5%	-2.4%	-3.1%
RO	-0.1%	-0.2%	-0.4%	-0.4%	-0.9%	-1.1%
SI	-0.2%	-0.4%	-1.2%	-1.5%		
SK	-0.3%	-0.5%	-1.0%	-1.2%	-1.9%	-2.2%
FI	-0.2%	-0.4%	-0.7%	-0.9%	-2.7%	-3.4%
SE	-0.2%	-0.4%	-1.3%	-1.6%	-2.6%	-3.4%
UK	-0.2%	-0.4%	-0.8%	-1.0%	-3.2%	-4.2%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

Table Annex 4-7: Assumptions regarding the transport time savings relative to the baseline in PO1

	PO1					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
BG	0.0%	-0.2%	0.0%	0.0%	0.0%	0.0%
CZ	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
DK	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
DE	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
EE	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
IE	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
EL	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
ES	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
FR	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
HR	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
IT	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CY	0.0%	-0.1%				
LV	0.0%	-0.2%	0.0%	0.0%	0.0%	0.0%
LT	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
LU	0.0%	-0.3%	0.0%	0.0%	0.0%	0.0%
HU	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
MT	0.0%	-0.2%				

	PO1					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
NL	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
AT	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
PL	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
PT	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
RO	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
SI	0.0%	-0.1%	0.0%	0.0%		
SK	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
FI	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
SE	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%
UK	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

Table Annex 4-8: Assumptions regarding the transport time savings relative to the baseline in PO2

	PO2					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	-0.2%	-0.3%	-0.1%	-0.1%	0.0%	0.0%
BG	-0.6%	-1.0%	-0.1%	-0.1%	0.0%	0.0%
CZ	-0.5%	-0.8%	-0.1%	-0.1%	0.0%	0.0%
DK	-0.3%	-0.5%	0.0%	-0.1%	0.0%	0.0%
DE	-0.3%	-0.4%	0.0%	-0.1%	0.0%	0.0%
EE	-0.4%	-0.6%	-0.1%	-0.1%	-0.1%	-0.1%
IE	-0.4%	-0.6%	-0.1%	-0.1%	0.0%	0.0%
EL	-0.5%	-0.8%	0.0%	0.0%	0.0%	0.0%
ES	-0.2%	-0.4%	0.0%	0.0%	0.0%	0.0%
FR	-0.2%	-0.3%	0.0%	0.0%	0.0%	0.0%
HR	-0.3%	-0.5%	0.0%	-0.1%	0.0%	0.0%
IT	-0.2%	-0.3%	-0.1%	-0.1%	0.0%	0.0%
CY	-0.5%	-0.7%				
LV	-0.6%	-0.9%	0.0%	-0.1%	0.0%	0.0%
LT	-0.4%	-0.6%	0.0%	-0.1%	-0.1%	-0.2%
LU	-0.9%	-1.3%	-0.2%	-0.3%	0.0%	-0.1%
HU	-0.3%	-0.5%	-0.1%	-0.1%	0.0%	0.0%
MT	-1.0%	-1.5%				
NL	-0.5%	-0.7%	-0.1%	-0.1%	0.0%	0.0%
AT	-0.3%	-0.5%	-0.1%	-0.1%	0.0%	0.0%
PL	-0.3%	-0.5%	0.0%	-0.1%	-0.1%	-0.1%
PT	-0.3%	-0.5%	-0.1%	-0.1%	0.0%	0.0%
RO	-0.4%	-0.6%	0.0%	-0.1%	0.0%	0.0%
SI	-0.4%	-0.5%	-0.1%	-0.1%		
SK	-0.4%	-0.7%	-0.1%	-0.1%	0.0%	0.0%
FI	-0.4%	-0.6%	0.0%	-0.1%	0.0%	0.0%
SE	-0.3%	-0.5%	0.0%	0.0%	0.0%	0.0%
UK	-0.3%	-0.5%	0.0%	-0.1%	0.0%	0.0%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

Table Annex 4-9: Assumptions regarding the transport time savings relative to the baseline in PO3/PO4

	PO3/PO4					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	-0.4%	-0.5%	-0.1%	-0.2%	-0.1%	-0.1%
BG	-1.1%	-1.5%	-0.1%	-0.1%	0.0%	0.0%
CZ	-0.8%	-1.2%	-0.1%	-0.1%	-0.1%	-0.1%
DK	-0.6%	-0.8%	-0.1%	-0.1%	0.0%	0.0%
DE	-0.4%	-0.6%	-0.1%	-0.1%	0.0%	0.0%
EE	-0.7%	-1.0%	-0.1%	-0.1%	-0.1%	-0.1%
IE	-0.7%	-1.0%	-0.1%	-0.1%	0.0%	0.0%
EL	-0.9%	-1.3%	0.0%	0.0%	0.0%	0.0%
ES	-0.4%	-0.6%	0.0%	-0.1%	0.0%	0.0%
FR	-0.4%	-0.5%	0.0%	-0.1%	0.0%	0.0%
HR	-0.5%	-0.8%	-0.1%	-0.1%	0.0%	-0.1%
IT	-0.3%	-0.4%	-0.1%	-0.1%	0.0%	0.0%
CY	-0.8%	-1.2%				
LV	-1.0%	-1.5%	-0.1%	-0.1%	0.0%	0.0%
LT	-0.7%	-1.0%	-0.1%	-0.1%	-0.2%	-0.2%
LU	-1.5%	-2.1%	-0.3%	-0.4%	-0.1%	-0.1%
HU	-0.6%	-0.9%	-0.1%	-0.1%	0.0%	0.0%
MT	-1.6%	-2.4%				
NL	-0.8%	-1.1%	-0.1%	-0.1%	0.0%	0.0%
AT	-0.5%	-0.8%	-0.1%	-0.1%	0.0%	0.0%
PL	-0.6%	-0.8%	-0.1%	-0.1%	-0.1%	-0.2%
PT	-0.5%	-0.7%	-0.1%	-0.1%	0.0%	0.0%
RO	-0.6%	-0.9%	-0.1%	-0.1%	0.0%	0.0%
SI	-0.6%	-0.9%	-0.1%	-0.1%		
SK	-0.7%	-1.1%	-0.1%	-0.1%	0.0%	0.0%
FI	-0.6%	-0.9%	-0.1%	-0.1%	0.0%	0.0%
SE	-0.6%	-0.9%	0.0%	-0.1%	0.0%	0.0%
UK	-0.6%	-0.8%	-0.1%	-0.1%	0.0%	0.0%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

Table Annex 4-10: Assumptions regarding the transport time savings relative to the baseline in PO3a/PO4a

	PO3a/PO4a					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
BE	-0.3%	-0.5%	-0.1%	-0.1%	-0.1%	-0.1%
BG	-0.8%	-1.3%	-0.1%	-0.1%	0.0%	0.0%
CZ	-0.6%	-1.0%	-0.1%	-0.1%	0.0%	-0.1%
DK	-0.4%	-0.7%	-0.1%	-0.1%	0.0%	0.0%
DE	-0.3%	-0.5%	0.0%	-0.1%	0.0%	0.0%
EE	-0.5%	-0.8%	-0.1%	-0.1%	-0.1%	-0.1%
IE	-0.5%	-0.8%	-0.1%	-0.1%	0.0%	0.0%
EL	-0.6%	-1.1%	0.0%	0.0%	0.0%	0.0%
ES	-0.3%	-0.5%	0.0%	0.0%	0.0%	0.0%
FR	-0.3%	-0.4%	0.0%	0.0%	0.0%	0.0%
HR	-0.4%	-0.6%	-0.1%	-0.1%	0.0%	0.0%
IT	-0.2%	-0.4%	-0.1%	-0.1%	0.0%	0.0%
CY	-0.6%	-1.0%				
LV	-0.8%	-1.3%	0.0%	-0.1%	0.0%	0.0%
LT	-0.5%	-0.8%	-0.1%	-0.1%	-0.1%	-0.2%

	PO3a/PO4a					
	2025	2030	2025	2030	2025	2030
	Road		Rail		Waterborne transport*	
LU	-1.2%	-1.8%	-0.3%	-0.3%	-0.1%	-0.1%
HU	-0.4%	-0.7%	-0.1%	-0.1%	0.0%	0.0%
MT	-1.2%	-2.0%				
NL	-0.6%	-1.0%	-0.1%	-0.1%	0.0%	0.0%
AT	-0.4%	-0.6%	-0.1%	-0.1%	0.0%	0.0%
PL	-0.4%	-0.7%	-0.1%	-0.1%	-0.1%	-0.1%
PT	-0.4%	-0.6%	-0.1%	-0.1%	0.0%	0.0%
RO	-0.5%	-0.8%	-0.1%	-0.1%	0.0%	0.0%
SI	-0.5%	-0.7%	-0.1%	-0.1%		
SK	-0.5%	-0.9%	-0.1%	-0.1%	0.0%	0.0%
FI	-0.4%	-0.7%	0.0%	-0.1%	0.0%	0.0%
SE	-0.4%	-0.7%	0.0%	0.0%	0.0%	0.0%
UK	-0.4%	-0.7%	-0.1%	-0.1%	0.0%	0.0%

Source: Ecorys et al. (2018) Impact Assessment support study.

* Waterborne transport covers inland waterways and national maritime.

4. ASSUMPTIONS USED FOR THE UPTAKE OF ELECTRONIC DOCUMENTS

Drawing on the Impact Assessment support study¹⁵², this section presents the rationale for choosing the level of uptake of electronic documents in the baseline scenario.

Aviation is the transport mode that can showcase the most significant success in the uptake of electronic documents so far. This can be attributed to several factors: the highly concentrated and international nature of this sector; the high level of organisation achieved via IATA; the fact that there are less authorities involved in inspecting transport documents which facilitates the uptake of industry-led initiatives, etc.

The use of the e-AWB in aviation in Europe is currently assessed at being around 40% but the uptake rate has already been slowing down with the increase being limited to about 3 p.p in the last year.¹⁵³ A curbing point may be reached soon, possibly at a similar level to the global average (52%). This is because there is no indication that the barriers identified at global level would be resolved without coordinated action in the timeframe up to 2030:

- Persisting regulatory constraints and limitations in specific airports and countries;
- Lack of harmonisation between the stakeholders involved;
- Technological limitation and especially the capacity/willingness of SMEs to develop relevant systems; and
- Perceived complexity of e-AWB when multiple operators are involved.

Based on these considerations, in the baseline it has been assumed that the uptake rate of electronic documents in Europe will reach about 45% by 2025 and 50% by 2030.

The assumed developments in the **maritime** transport, is based on the experience of the Reporting Formalities Directive (RFD) which has not been as successful in creating a digital environment for B2A interaction. The uptake rate in the sector is currently negligible. Assuming the continuation of current RFD framework, an uptake rate of 5% by 2030 has been assumed in the baseline scenario.

¹⁵² Ecorys et al. (2018) Impact Assessment support study

¹⁵³ 2017 average based on IATA, e-AWB monthly report, December 2017. Annual increase calculated in the period January to December 2017.

Rail transport displays more significant use of digital solutions up to date, however in the majority of cases this has not led to a digital-only environment and only 5-10% of rail transport is fully-digital. This is mainly attributed to the uncertainty regarding the necessity to have paper documents. In the baseline scenario there is no indication that this situation would change and thus only a limited increase in the uptake of digital solutions is assumed (15% by 2030).

In **road transport**, despite the adoption of the e-CMR protocol in 2008, the uptake rate of digital solutions remains low at 1-3%. The uncoordinated development of different solutions and standards with a regional, national or local focus, the patchwork of protocol ratifications by EU Member States, and the variety of authority requirements and approaches between and within Member States, currently deters the uptake of digital solutions. There is currently no expectation for a coordinated industry-wide initiative for the sector or for a significant change in approach by authorities. In addition, the dominance of the SMEs in the sector does not facilitate the uptake. For these reasons, in the baseline scenario an uptake rate of 5% has been assumed by 2030.

In **inland waterway transport**, similarly to road transport, the dominance of SMEs and the low level of industrial coordination does not facilitate the uptake of transport information exchange systems/solutions. Therefore, an uptake rate of 5% has been assumed by 2030 similarly to the road transport sector.

Table Annex 4-11: Baseline scenario – assumptions on the uptake of electronic documents

	2018	2025	2030
Road	1%	3%	5%
Rail	5%	10%	15%
IWT	0%	2%	5%
Maritime	0%	2%	5%
Aviation	40%	45%	50%

Annex 5: Monitoring arrangements

A monitoring and evaluation framework has been developed on the basis that **Option 3** is the preferred policy option.

Operational objectives of the preferred policy option

As a first step, the development of the monitoring and evaluation framework requires the establishment of the operational objectives of the preferred policy option.

A set of operational objectives that are derived from the respective generic and specific objectives and reflect the nature and type of measures adopted is presented in Table Annex 5-1 below.

Table Annex 5 -1 – Operational objectives

General objectives	Specific objectives	Operational objectives
<p>Contribute to removing barriers to the smooth functioning of the Single Market, to the modernisation of the economy and to the greater efficiency of the transport sector, through enabling wider use of digital technologies.</p>	<p>Ensure the establishment, in all EU Member States, of the obligation of acceptance of electronic cargo transport documents/information by all relevant public authorities</p> <p>Ensure the uniform implementation by authorities of the obligation of acceptance</p> <p>Ensure the interoperability of IT systems and solutions for electronic exchange of cargo transport information, in particular for B2A regulatory information communication</p>	<ul style="list-style-type: none"> • Ensure the adoption of common criteria for compliance by transport documents/information in order to be accepted by all Member States authorities • Ensure the adoption of common rules for the access to and checks of electronic freight transport documents/information by Member States' authorities • Ensure the adoption of common technical requirements for the criteria for compliance by electronic transport documents/information

Monitoring and evaluation framework – Relevant indicators and data sources

The monitoring framework should cover the following aspects of the initiative:

- **Application:** Focuses on the actual changes observed as a result of the realisation of the policy and is closely linked with the specific and general objectives. Data for some of the relevant indicators should be relatively easily available and should be possible to include in the reports submitted by authorities or collected directly by the Commission services. Other aspects will have to be covered as part of the evaluation of the legislation where surveys and other tools will be used to collect relevant information (such as costs of compliance).
- **Implementation:** Covers changes to the legal framework and adoption of measures that are necessary to enable the implementation of the selected policy measures. The relevant indicators are closely linked with the operational objectives. Moreover, the section covers cost to various actors related to the implementation of the measure. In most cases, relevant data should be available from the Commission services or possibly rely on reporting from the national authorities.

- Contextual information, if applicable: We consider that greater information on the level of use of electronic documentation but also overall level of the technological development. This is in addition to the more contextual information concerning the evolution of road freight transport (international) which is already monitored and overall level of administrative costs for both authorities and business.

Table Annex 5-2 below presents the indicators and data sources proposed for the four different aspects.

Table Annex 5-2: Proposed monitoring and evaluation framework

Relevant objectives	Level of indicator (i.e. impacts/ results and outputs) and (if relevant) area of intervention	Indicator(s)	Source(s)
Application			
The general objective of the initiative is to contribute to removing barriers to the smooth functioning of the Single Market, to the modernisation of the economy and to the greater efficiency of the transport sector, through enabling wider use of digital technologies.	<u>Impacts on the internal market</u>	Percentage of fully digitalised cross-border transport operations on the territory of the EU Number of companies providing of IT solutions to business and authorities	Evaluation (survey)
	<u>Impacts on multimodality</u>	Percentage of fully digitalised multimodal transport operations on the territory of the EU	Evaluation (survey)
	<u>Impacts on enforcement levels</u>	Percentage of regulatory checks performed electronically of total regulatory checks, per transport mode Percentage of irregularities discovered of total regulatory checks when performed digitally compared to checks performed on paper documents	Evaluation (survey)
Ensure the establishment, in all Member States, of the obligation of acceptance of electronic cargo transport documents/information by all relevant public authorities	<u>Impacts on the acceptance level</u>	Number of Member States (and authorities) accepting electronic transport information and documentation	Member States reporting
Ensure uniform application by authorities of the obligation of acceptance	<u>Impacts on the administrative costs for businesses</u>	FTE spent on B2A regulatory information communication in absolute values and as a percentage to all FTE spent on managing transport information and	Evaluation (survey)

Relevant objectives	Level of indicator (i.e. impacts/ results and outputs) and (if relevant) area of intervention	Indicator(s)	Source(s)
		documentation (paper vs electronic) Administrative costs related to B2A regulatory information communication in absolute values and as a percentage to the all FTE spent on managing transport information and documentation exchanges (paper vs electronic) Staff training costs	
	<u>Impacts on the administrative costs for the authorities</u>	FTE spent on managing (issuing/inspecting) transport information and documentation (paper vs electronic) in absolute values and as a percentage to the all FTE spent on enforcement activities	Evaluation (survey)
Ensure the interoperability of IT systems and solutions for electronic exchange of cargo transport information, in particular for B2A regulatory information communication	<u>Impacts on digitalisation levels by businesses</u>	Number of compliant IT solutions and services providers available for B2B and B2A communication	Member States reporting
Implementation of adopted measure			
Ensure the adoption of common criteria for compliance by transport documents/information in order to be accepted by all Member States authorities	Output – implementation	Percentage of companies and, respectively, percentage of SMEs using IT solutions for electronic exchanges of transport information and documentation (in both B2a and B2B communication), per transport mode and in multimodal operations	Member States reporting Evaluation (survey)
Ensure the adoption of common rules for the access to and checks of electronic freight transport documents/information by Member States' authorities	Impacts – compliance costs for authorities	IT investment costs Staff training costs	Evaluation (survey)

Relevant objectives	Level of indicator (i.e. impacts/ results and outputs) and (if relevant) area of intervention	Indicator(s)	Source(s)
Ensure the adoption of common technical requirements for the criteria for compliance by electronic transport documents/information	Impact – costs for businesses Impact – costs for authorities	Average hardware costs for deploying IT solutions by businesses(on the market) Average costs of IT solutions on the market Average hardware and software costs for IT solutions (on the market)	Market monitoring Evaluation (survey)
Contextual information			
Evolution of freight transport		Level of freight transport activity (domestic, international and cabotage operations) (in t-kms and v-kms)	Eurostat
Evolution of the technological level		Number of security breach incidents	Evaluation (survey)
Administrative costs		Administrative costs for the industry (by mode) Administrative costs for the authorities	

Annex 6: Political context of the initiative and coherence with key EU policy objectives

Digitalisation of government services and business-to-administration interactions is a key element to the success of the single market, by helping to remove existing digital barriers and delivering efficiency benefits. By aiming to establish an enabling legal framework for moving away from the use of paper documents to electronic information exchange for keeping record of, and communicating information on, the goods' movement, this initiative would generate a large potential to improve the efficiency, reliability and cost-effectiveness of the freight transport operations. It would contribute to several policy objectives as set out in a number of EU policy-setting documents and initiatives.

The White Paper on Transport

The 2011 White Paper¹⁵⁴ set out a number of concrete initiatives to build a competitive transport system that will increase mobility, remove major barriers in key areas and fuel growth and employment. Among these, it included measures aimed at "creat[ing] the appropriate legal environment" for inter-modal freight documentation, insurance and liability and real time delivery information, including for smaller consignments, with a view to ensure the increase of transport competitiveness.

The *Communication on a European Strategy for Low-Emission Mobility*¹⁵⁵ highlighted that digital technologies offer enormous potential for optimising the transport system and open up new opportunities for manufacturing and services. Digital technologies also support the integration of transport with other systems, such as the energy system, and make the mobility sector more efficient.

But to reap the full benefits of digitisation in the field of transport, it is necessary to create the regulatory frameworks to incentivise the development and market uptake of such technologies, and to set standards to ensure interoperability, including across borders, and enable data exchange while at the same time addressing data protection and cyber-security issues. In the context of this initiative, any proposal to extend digitalisation, and especially the development of digital services, will take into account existing EU policy frameworks notably on the General Data Protection Regulation (GDPR) and the Regulation on electronic identification and trust services (eIDAS).

Single market policy: boosting jobs, growth and investments

The 2015 Single Market Strategy¹⁵⁶ mentioned that interoperability and standardisation in the area of transport (e-freight) are considered critical to the Digital Single Market. Additionally, the 2016 EU eGovernment Action Plan 2016-2020¹⁵⁷ indicated the Commission's action on digitalisation of transport documents for all modes and the promotion of their acceptance by public authorities.

¹⁵⁴ [COM/2011/0144](#), pp. 13, 19

¹⁵⁵ European Commission Communication, *A European Strategy for Low-Emission Mobility*, COM(2016) 501 final, https://ec.europa.eu/transport/sites/transport/files/themes/strategies/news/doc/2016-07-20-decarbonisation/com%282016%29501_en.pdf

¹⁵⁶ [COM\(2015\) 192](#), pp. 82-84.

¹⁵⁷ [COM\(2016\) 179](#), p. 8.

The establishment of a uniform regulatory environment for electronic information exchange with the authorities, as proposed by this initiative, can also have significant positive impacts for the internal market.¹⁵⁸ Businesses suffer both direct compliance costs, such as expenses related to supplying information and documents to the relevant authority, and indirect costs, such as those arising from procedural delays and lost business opportunities. Based to estimates¹⁵⁹ by the Organisation for Economic Cooperation and Development (OECD), these costs may range from 2% to 15% of the value of traded goods.

Social and environmental policy

The European Commission is working towards a form of mobility that is sustainable, energy-efficient and respectful of the environment. The Transport White Paper calls for a modal shift towards rail and waterborne transports¹⁶⁰.

According to eGovernment Action Plan 2016 - 2020 digital technologies as an integrated part of governments' modernisation strategies are the means to bring further economic and social benefits for society as a whole.¹⁶¹

regarding transportation and the volumes of cargo per kilometres shipped in Europe.

Research and innovation

Horizon 2020¹⁶² is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. Horizon 2020 will target efficient and environmental friendly transport, security and safety with better mobility and less congestion, a global leadership for the European transport industry and a socio-economic and behavioural research and forward looking activities for policy making.

European Transport research contributes to finding solutions to the increasing mobility of people, with low-carbon technologies, clean vehicles, smart mobility systems and integrated services for passengers and freight.

European research aims to strengthen the competitiveness of our transport industries and to develop a better European transport system for the benefit of all. In the transport sector, research is at the core of developing new technologies for greener, smarter, more efficient transport means and innovative solutions for safer, more sustainable and inclusive mobility. Integrated, multimodal, low-emission freight transport systems and logistics are within the challenges that need to be tackled internationally.

The European Interoperability Framework

The EIF has been undertaken in the context of the Commission priority to create a Digital Single Market in Europe, and proposes an “interoperability by design” approach, based on a layered interoperability model containing: four layers of interoperability – legal, organisational, semantic and technical; a cross-cutting “integrated public service

¹⁵⁸ According to the World Bank study, about 30% (\$107 billion) of the total gain from trade facilitation in 75 analysed countries comes from the improvement in port efficiency and about \$33 billion emanates from the improvement in customs environment <http://documents.worldbank.org/curated/en/977511468764990679/pdf/wps3224TRADE.pdf>

¹⁵⁹ <http://www.oecd.org/trade/facilitation/35459690.pdf>

¹⁶⁰ European Commission, *White paper: Roadmap to a Single European Transport Area*, COM(2011) 144 final, p. 7, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN>

¹⁶¹ [COM\(2016\) 179](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0179)

¹⁶² <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/smart-green-and-integrated-transport>

governance” component; and a background “interoperability governance” layer.¹⁶³ It provides Member States’ administration specific guidance on how to set up interoperable digital public services. It offers concrete recommendations on how to improve governance of their interoperability activities, establish cross-organisational relationships, streamline processes supporting end-to-end digital services, and ensure that both existing and new legislation do not compromise interoperability efforts.

This initiative aims to contribute to the implementation of the European Interoperability Framework (EIF) Strategy¹⁶⁴, and the measures proposed as part of the preferred policy option are aligned with the strategy's objectives and recommendations. Furthermore, in defining technical specification for ensuring interoperability of the B2A information exchange, the ISA Core Vocabularies¹⁶⁵, alongside other European and international data interoperability standards, will be taken into account.

Textbox: Main EIF concepts

“Interoperability governance” refers generally to any decisions related to ensuring and monitoring interoperability at national and EU levels, such as on interoperability frameworks, institutional arrangements, organisational structures, roles and responsibilities, policies and agreements.

The **“integrated public service governance”** component of the framework refers to the need for coordination between multiple different public administrations mandated with planning, implementing and operating European public services, in order to provide these services in an integrated way. More specifically, integrated governance is recommended “to ensure: integration, seamless execution, reuse of services and data, and development of new services and ‘building blocks’”

To this end, the use of formal arrangements is recommended, by means of interoperability agreements including “specific and binding legislation at EU and/or national level or via bilateral and multilateral agreements” at legal interoperability level; and “standards and specifications” at semantic and technical levels, and in some cases also at organisational level. In addition, the inclusion of “appropriate change management processes in the interoperability agreements” is recommended as “critical” in order “to ensure the accuracy, reliability, continuity of the service delivered”, as well as “a business continuity/disaster recovery plan” in order to ensure continuity in a range of situations, such as cyberattacks or failure of building blocks.

“Legal interoperability” refers to ensuring the possibility of effective cooperation between different Member States’ public administrations, when they are acting according to specific national legal frameworks. To that end, “interoperability checks”, on the one hand, and “digital checks”, on the other hand, are recommended.

Interoperability checks are aimed at screening and removing barriers stemming from national legal frameworks, including through new legislation. Examples of interoperability barriers include: sectoral or geographical restrictions in the use and storage of data, over-restrictive obligations to use specific digital technologies or delivery modes to provide public services, contradictory requirements for the same or similar business processes, outdated security and data protection needs. Digital checks are recommended to check and eventually ensure the compatibility with the use of ICT means of newly proposed legislation.

“Operational interoperability” concerns the alignment of the business processes, responsibilities and expectations of the public administrations to effectively and efficiently provide European public services.

¹⁶³ The summary below is based on the description provided in the “New European Interoperability Framework” (2017) brochure.

¹⁶⁴ As revised and updated by COM(2017) 134 final, and detailed in “New European Interoperability Framework” (2017) brochure.

¹⁶⁵ Through the interoperability programmes ISA and ISA2 (https://ec.europa.eu/isa2/home_en), the Commission has jointly defined with the Member States the ISA Core Vocabularies. These are simplified, re-usable and extensible data models that capture the fundamental characteristics of an entity in a context-neutral fashion. They have been already adopted by some Member States and some major transEuropean systems like BRIS for the interconnection of Business Registries.

More specifically, it is recommended that the public administrations document their business processes according to commonly accepted modelling techniques, including the associated information exchanged, and agree on how existing processes should be aligned, or to define and establish new ones.

Furthermore, organisational interoperability should also aim at meeting user community requirements, by making services available, easily identifiable, accessible and user-focused. This may require the establishment of memoranda of understanding (MoU) or service level agreements (SLA) between the public administration organisations involved. For cross-border actions, European level agreements (global or multilateral) are recommended.

“**Semantic interoperability**” is defined as ensuring “that the precise format and meaning of the exchanged data and information is preserved and understood throughout exchanges between parties”, with a semantic and a syntactic dimension. The semantic aspect concerns measures aimed at ensuring that the data elements are “understood in the same way by all communicating parties”, and includes the development of vocabularies and schemata to describe data exchanges. The syntactic aspect concerns the description of the exact format of the information to be exchanged in terms of grammar and format.

Overall, support for the establishment of sector-specific and cross-sectoral communities that aim to create open information specifications, as well as encouragement to relevant communities to share their results, is recommended. In particular, agreements on reference data in the form of taxonomies, controlled vocabularies, thesauri, code lists and reusable data structures/models, are indicated as “key prerequisites” for achieving semantic interoperability.

“**Technical interoperability**” is described as covering “the applications and infrastructures linking systems and services”, including aspects such as interface specifications, interconnection services, data presentation and exchange, and secure communication protocols. To ensure technical interoperability, it is recommended is to “use [whenever possible] formal technical specifications.”

Statistics

Digitalisation enables more and better quality data. This has also been indicated by several stakeholders during the consultation process for this initiative.

Annex 7: Legal context and coherence with other relevant EU legislation and initiatives

1. COHERENCE WITH OTHER ON-GOING PROPOSALS/ INITIATIVES INCLUDING DIGITALISATION PROVISIONS

The *Reporting Formalities Directive 2010/65/EC (RFD)* and the possible proposal to revise it and establish a *European Maritime Single Window environment* (currently under an impact assessment process), aim at harmonizing and simplifying the B2A reporting that a ship is required to fulfil in connection to a port call (e.g. customs formalities, safety/security related information, border control issues, etc.).

The RFD is concerned with a predetermined list of information requirement to be provided to different national authorities at specific points in time (arrival and departure from ports). The creation of a single window not only establishes the obligation of acceptance of electronic transmission, but also the creation of a single entry point to be used for all public entities and which will act as an interface between operators and the national systems of the various authorities.

Whereas the RFD is concerned with a system for *regular submission* of information, the present impact assessment is confronted with the issue of how information can be made available electronically *if and when requested*. Furthermore, whereas the RFD concerns information requirements for port call clearance, this initiative concerns transport information requirements before the goods reach the port (to exit the EU territory), or after they have left the port (entering the EU territory). Nevertheless, there are synergies between the two initiatives. These are to be found in the data model and interoperability requirement to be used.

It may be added that the bill of lading used in the maritime sector is not included among the documents to be submitted through the maritime single window, but it is concerned by this initiative, inasmuch as the information contained therein is requested by authorities.

Another relevant initiative is *the Proposal No 2017/0290 (COD) for the revision of Directive 92/106/EEC on combined transport of goods*, currently under consideration by the legislator. The Proposal includes a provision to allow submitting electronic transport documents as evidence that a specific movement of goods constitutes or is part of a combined transport operation. The scope of the proposal is limited to combined transport operations as defined by that proposal. In addition, it does not include any specification on the requirements to be fulfilled by the electronic form of the document, leaving that to the interpretation of the Member States or their enforcement authorities. The Proposal does not cover the further purposes for which a transport document is controlled by authorities.

The Proposal No 2017/0123 (COD) for amending Regulation (EC) No 1072/2009 on common rules for access to the international road haulage market, also under consideration by the legislator at the time of writing, aims to clarify the framework for

cabotage operations. The Proposal establishes that the evidence, necessary at assessing compliance with cabotage rules, would be presented or transmitted electronically and makes a reference to eCMR as means of the electronic transmission. Nevertheless, its scope is limited to purpose-specific (i.e. cabotage rules compliance) control activities. Similarly to the provision in the combined transport proposal, this Proposal does not include specifications on the requirements to be fulfilled by the electronic form of the document, leaving that to the interpretation of the Member States or their enforcement authorities.

*A new initiative on digital tools for inland waterways transport legislation*¹⁶⁶ focuses on replacing the paper version of Union certificates of qualification, service record books and logbooks, by electronic tools, such as electronic professional cards and electronic vessel units. The transport documents or information concerning the cargo are outside of the scope of this initiative.

Proposal No 2017/0086 (COD) for a Regulation on establishing a single digital gateway to provide information, procedures, assistance and problem solving services and amending Regulation (EU) No 1024/2012, includes provisions on functionalities for the European Consumer Centres, Your Europe Advice, SOLVIT, Intellectual Property Rights helpdesk, Europe Direct and Enterprise Europe Network. The purpose is to set up a gateway to provide information to citizens and businesses on their rights and various other issues. Services related to the provision of regulatory information on the transport of goods are not foreseen.

The *Proposal No 2018/0113 (COD)* for a directive amending Directive (EU) 2017/1132 as regards the use of digital tools and processes in company law. The proposal does not include any rules concerning transport operations and, as such, would not affect measures to be undertaken in the context of this initiative.

2. COHERENCE WITH OTHER EU LEGISLATION CURRENTLY IN FORCE

EU transport legislation¹⁶⁷

Aviation

The Commission Implementing Regulation 2015/1998 laying down detailed measures for the implementation of the common basic standards on aviation security following the Regulation 300/2008 on common rules of civil aviation security refers to the air waybill in its Annex. The provision specifies that any consignment should be accompanied by an air waybill or any other appropriate documentation which can be provided either in writing or electronic format. However, the scope of this provision is limited as it covers only security issues in aviation. Furthermore, it provides no specifications on the requirements to be fulfilled by the electronic form of the document, leaving that to the interpretation of the Member States or their enforcement authorities.

Road

¹⁶⁶ The Inception Impact Assessment report can be found at http://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-6171228_en

¹⁶⁷ Chapter VI "Transport" of the TFEU

Regulation (EC) No 1072/2009 on common rules for access to the international road haulage market is limited to cabotage control activities. The regulation is under amendment, see above.¹⁶⁸

Rail

The Commission Regulation EU No 1305/2014 on the technical specification for interoperability relating to the telematics applications for freight subsystem of the rail system in the European Union and repealing the Regulation (EC) No 62/2006 is linked to CIM Convention and refers to the digitally exchange of consignment notes data between railway undertakings and customers, namely B2B relations. The scope is limited to the aforementioned relations and does not cover the controls by enforcement authorities of the transport documents.

Maritime

EU Directive 2010/65/EC is a tool to establish a simplified reporting environment for ships by asking Member States to provide a single reporting entry point for a number of reporting formalities for ships. The RFD did not introduce any new reporting obligations for shipping but aimed at reducing administrative burden, simplifying requirements, replacing paper submissions with harmonized digital submissions and harmonizing reporting on national level. Currently, as mentioned above, the Directive is under revision in order to better achieve its purpose.

Inland Waterways

Commission Regulation EU No 164/2010 on the technical specifications for electronic ship reporting in inland navigation referred to in Article 5 of *Directive 2005/44/EC* of the European Parliament and of the Council on harmonised river information services (RIS) on inland waterways in the Community refers to a digital message concerning information about dangerous cargo and non-dangerous cargo. Both the Directive (RIS) and the Commission Regulation do not concern control activities aimed at enforcing regulatory requirements. They concern the deployment of the harmonized information services to support traffic and transport management in inland navigation, including, wherever technically feasible, interfaces with other transport modes. In addition, the foreseen revision of RIS Directive is not expected to include the documents accompanying the cargo. This initiative will however take into account the message specifications provided by this legislation, in order to ensure data interoperability.

Combined transport

The *Combined Transport Directive (92/1063/EC)* is a support instrument encouraging the use multimodal transport of goods where the major part of transport is carried out by rail, inland waterways or maritime transport and is served by a short road leg in the beginning or end of the transport chain. A proposal for amendment is currently under discussion by the legislator, see above.

Regulation No 11/1960 concerning the abolition of discrimination in transport rates and conditions sets rules on documentation requirements for transport documents. It covers the carriage of all goods by rail, road or inland waterway within the Community. The Regulation covers control activities aimed at checking that there is no discrimination by

¹⁶⁸ See above the ongoing proposals/ initiatives

carriers, in the form of charging different rates and imposing different conditions for carrying the same goods over the same transport links, on grounds of the country of origin or of destination of the goods in question.

EU customs and fiscal legislation

Customs procedures and control methods are specified in the Union Customs Code which entered into force on 1 May 2016. The Union Customs Code puts emphasis on fully electronic communication between the customs administrations and economic operators and between customs authorities in different Member States, in a paperless environment.

A Customs Data Model has been established in order to ensure the data harmonisation for the exchange of information. This Data Model contains a data set encompassing data elements and definitions required by customs authorities throughout the EU. Furthermore, DG TAXUD improved the existing national customs IT systems and adapted them to the new requirements set out by the new legislation. At the same time, a number of centralised EU-wide IT systems are being developed and deployed. The objective is to achieve a full digital environment and high level of harmonisation in the whole customs domain. Safety and Security information has been enhanced, mainly through the improvement of data quality, enlarging the reporting to multiple parties along the logistic chain. For this specific purpose, a new centralised system is being developed, gathering all safety and security information, including that coming from the maritime transport.

The Union Customs Code and the Implementing and Delegated Acts do not harmonise the way controls are carried out by customs. They cover exchange of information between authorities and between authorities and operators, but authorities of Member States are still free to require paper documents when controls are carried out. The Code is not a legal basis for ensuring at EU level the equivalence of electronic transport documents to paper transport documents.

Transport information for simplified procedures would be possible to be provided through an electronic system or transport document for some related customs formalities (e.g. simplified transit), under the condition that the electronic transport document contains certain data elements, as specified in Annex B of the UCC Delegated and Implementing Act. It does not enter into any other details regarding the electronic transport document. In addition, the reference to the electronic transport document concerns only the application of the so called Union Transit procedure.

Additionally, according to *Directive 2006/112/EC* on the common system of VAT, information on the “first place of destination” as mentioned “on a consignment note or any other documents under which the goods are imported into the Member State of importation” can be as proof that the goods are transported within the EU. However, the format of the proof is not specified and, insofar as a consignment note is not the only document that could be used as proof, this initiative would not generate conflicting requirements in relation to the VAT legislation.

EU legislation on official controls on agri-food chain

The Regulation (EU) 2017/625 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant

health and plant protection products provides the framework for Member States (MS) to verify that businesses comply with agri-food chain rules. One of the benefits that this Regulation brings is an integrated computerised system to improve the exchange of information between Member States on official controls. This Regulation foresees the possibility that the operator responsible for the consignment can provide the information concerning the animals and goods also in electronic form. The Regulation also foresees the adoption of specifications concerning the electronic form requirements are foreseen, by means of Commission implementing legislation.

EU legislation on waste

Regulation (EC) No 1013/2006 establishes procedures and control regimes for the shipment of waste within the EU, having the origin or destination in the EU, or transiting the Union territory, including related regulatory information on the movement of the waste to be made available for control purposes. It also includes a provision allowing the exchange of this information in electronic format, if the authorities and the economic operators concerned agree, and the possibility for adoption of technical and organisational requirements for the organisation of the electronic exchange. The latter specifications have not yet been adopted. The measures in the context of this initiative would need to take into account the regulatory information and technical requirements in this legislation, in order to ensure the interoperability of the information exchange and exploit synergies.

EU electronic identification and trust services for electronic transactions legislation

The e-IDAS *Regulation (EU) No 910/2014* on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC provides that an electronic document shall not be denied legal effect and admissibility as evidence in legal proceedings solely on the grounds that it is in electronic form. It also lays down the conditions for cross-border recognition and acceptance of electronic identification means and trust services in the internal market. Measures concerning identification and authentication of the parties exchanging the transport information would need to take account of the provisions of eIDAS. However, the eIDAS Regulation does not oblige Member States to accept electronic documents or information therein as evidence in other cases than in legal proceedings. Therefore, a legislative framework requiring the cross-border acceptance of electronic freight transport information by public authorities would not interfere with the application of eIDAS as regards electronic transport documents.