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Advancing the digitalization of trade supporting documents in the Eurasian Economic Union member States and beyond

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Abstract

The Customs Code of the Eurasian Economic Union (EAEU), which entered into force on I January 2018, prioritized electronic customs declarations. However, most trade supporting documents (TSDs) used for customs clearance remain in paper form due to various reasons, such as legal issues and national features of TSD workflow within the common customs territory. Unfortunately, the failure to embrace electronic documents is counter to the modern digital world and not efficient for international trade.

The aim of this study is, therefore, to review the current practices of EAEU member States and their business approaches for submitting TSDs to customs authorities, identify possible business models for advancing TSD digitalization in EAEU, and propose standard-based and alternative innovative business models and possible practical solutions that could spur the transition of economic operators in the countries of EAEU to submitting documents electronically.

To clearly identify the objective of the study, all existing TSDs were determined and grouped. Legal aspects of TSD workflow regulations in the EAEU were reviewed as a basis for making assessments, comparisons, and perspective proposals. Advantages and disadvantages of the EAEU member-States' business models and business needs in TSD digitalization were revealed. Trends and innovative business models for TSD digitalization were described and analyzed from the perspective that one would be practical within EAEU. Proposed solutions discussed in this paper are based on the UN/CEFACT data model, e-data convertor, a data pipeline concept, EDI based on artificial intelligence, IoT solutions, and open trade blockchain data.

Results of the assessment showed that more active and efficient steps should be taken to facilitate TSD digitalization in all of the EAEU member-States and to align the levels of the trade environment for digitalization in general. The electronic TSD models can help avoid the need to manually convert and rekey data, and for physical contacts between participants and ultimately speed up supply chains without disrupting the existing information systems of the EAEU member states. One key recommendation for this transition is for regulators, such as the Eurasian Economic Commission, the EAEU member-States Governments and stakeholders to coordinate their efforts and make them more comprehensive.

Accordingly, TSD digitization is an important and necessary step towards achieving cross-border paperless trade. Currently, there are several models for the transition to electronic documents and data in the course of business-to-business (B2B) and business-to-government (B2G) interactions.

However, an issue still remains on how to facilitate implementation of TSD models among the business community and government agencies in practice. In this regard, the accession of countries to the Framework Agreement on Facilitation of Cross-border

Paperless Trade in Asia and the Pacific will contribute to promoting the TSD digitalization approaches described in the study.

Keywords: trade supporting documents, electronic documents, cross-border information exchange, paperless trade, digitalization

JEL Codes: F15, O33

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1. Trade supporting documents in international trade

Global flows of goods are not possible without a cross-border flow of information, which must be exchanged among various stakeholders, including, among them, government authorities and transport intermediaries. The information, referred to as trade documents, are provided and exchanged in paper or electronic form.

The United Nations Conference on Trade and Development (UNCTAD) estimates that five billion trade documents are exchanged every year around the world and the International Air Transport Association (IATA) estimates that the processing of paper trade documents costs approximately $1.5 billion dollars per year.[1]

1.1 What are trade documents (trade supporting documents)?

According to the United Nations Trade facilitation implementation guide, trade supporting documents (TSDs)[2] are trade, transport and official documents that either support specific statements made in the goods declaration, such as a commercial invoice (for example, for the amount of the invoice, the seller and the buyer), transport document (for example, for the sender, recipient, means also the mode of transport) or certificate of origin, or which must be presented as proof of fulfillment of certain import/export conditions (for example, import/export permits, health certificates and certificates of conformity technical standards).

According to the World Customs Organization, trade supporting documents are documents that must be submitted in addition to regulatory declarations. These documents are used for customs clearance of goods and transport.[3]

Article 3 of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific contains the following definition of a trade-related document as a commercial and regulatory document required to complete commercial transactions.[4]

According to the Dictionary of International Trade,[5] trade documents − paper documents (or electronic files) used in international trade prove that certain events have occurred.

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[1] UNCTAD. Trust Fund for Trade Facilitation Negotiations Technical Note No.16 (2016) Available at https://unctad.org/system/files/official-document/TN16_ElectronicTradedocSubmission.pdf.
[2] United Nations, Trade facilitation implementation guide, supporting documents Available at https://tfig.unece.org/contents/supporting-documents.htm#:~:text=Supporting%20documents%20are%20those%20trade,mode%20of%20transport)%20or%20the.
[3] World Customs Organization, Dematerialization, and paperless processing. Available at swcompendiumvol2partvi.pdf.
[4] United Nations, Economic and Social Commission for Asia and the Pacific (ESCAP). Resolution 72/4 of 19 May 2016: Framework Agreement on Facilitation of Cross-border Paperless Trade.
[5] Global Negotiator. Dictionary of International Trade. Available at https://www.globalnegotiator.com/international-trade/dictionary/trade-documents/.

Considering the regional context of the study, there is no clear definition of TSDs in the Eurasian Economic Union legislation. The Eurasian Economic Union Customs Code (hereinafter – EAEU CC) contains two definitions related to this, notably, "commercial documents" and "transport documents":[6]

(a) Commercial documents are used for conducting foreign trade and other activities and for the confirmation of effecting transactions related to the movement of goods across the customs border of the Union, such as proforma invoices (invoices), specifications, shipping (packing) sheets and other documents.

(b) Transport (shipping) documents prove the existence of a contract for carriage of goods and accompany them during such carriage, such as bill of lading, waybill, and a confirmation of the conclusion of a contract of freight forwarding.

Taking into account these definitions, the following is a general definition of TSDs.

Trade documents – trade, transport and official documents that accompany the international supply of goods and contain information about the quantitative, qualitative, and other characteristics of the transported goods, including the detailed data about the participants of the international consignment and information about the transport used.

For this study, TSDs are commercial and transport documents owned by businesses (inherently B2B documents), but sometimes are required by governmental agencies to complete trade regulatory procedures, and then become B2G documents.

The term TSD indicates B2B (commercial and transport) documents that become quasi B2G documents due to regulatory requirements.

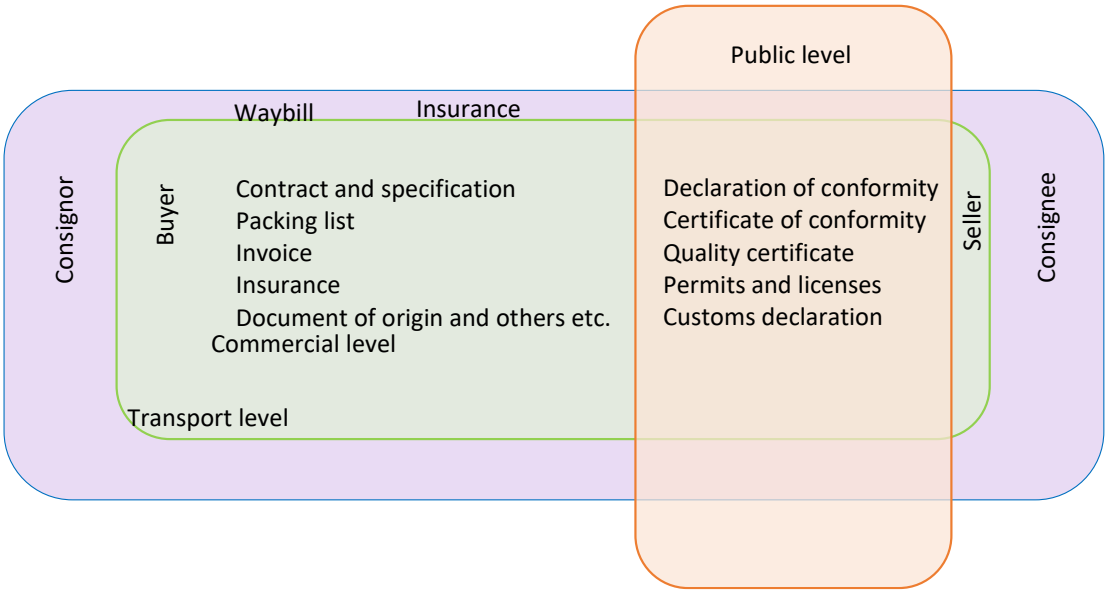
For example, the customs declaration is a trade regulatory document. But, in some countries, Customs requires traders to submit the commercial invoice and packing list as supplementary documents to a customs declaration. Accordingly, while a commercial invoice and packing list are inherently B2B trade documents, they are also seen as quasi B2G documents at customs clearance times due to regulatory requirements.

1.2 Trade supporting documents essence and business-to-business workflow

Trade documents support cross-border information exchanges in international trade. Several levels of cross-border exchanges take place in the course of international trade.

[6] Eurasian Economic Union. Treaty on the Customs Code of the Eurasian Economic Union Available from the unofficial translation of the treaty on the customs code of the Eurasian Economic Union of 11 April 2017. Available at http://www.eurasiancommission.org/ru/act/tam_sotr/dep_tamoj_zak/SiteAssets/Customs%20Code%20of%20the%20EAEU.pdf

Figure 1.1: Trade supporting documents workflow



As mentioned above, an international consignment of goods should be supported by the trade information to fulfil all regulatory requirements and law provisions. Accordingly, it is important that documents are drawn correctly for the supply of goods.

At the commercial level, documents confirm the existence of a transaction between the buyer and the seller. The deal is concluded in written form by signing a contract. A prerequisite for the agreement is payment for the goods, which is confirmed by the payment of the proforma invoice and the issuance of an invoice. The invoice contains the details of the seller and the buyer, and the names of the enterprises.

Goods transportation must be accompanied by a waybill. Standard forms of a waybill for different transport modes are being used, but traders can choose their own form. The waybill contains the following information about the product: name price quantity; and total cost. The value added tax (VAT) is also included. These data serve as the basis for the return of the product.

If necessary, goods and transport are insured. In this case, an insurance policy is drawn up. This document confirms the terms of the insurance contract.

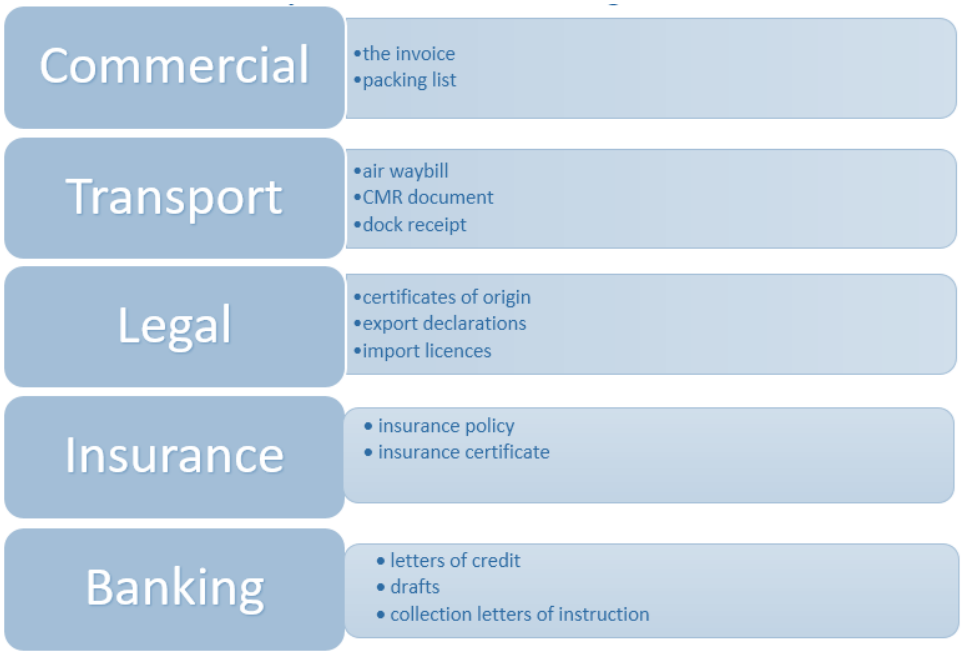
Certain types of products require several certificates, such as a certificate of origin, safety certificate, quarantine or veterinary certificate, and fire safety certificate These documents can be considered as regulatory documents.

1.3 Trading supporting document types and classifications

Trade supporting documents in this study can be broadly divided into two categories: key B2B documents that cover (a) commercial exchange and (b) transport exchange.

The documents commonly used in international trade may also be grouped by function into five categories (see figure 1.2).

Figure 1.2: Trade supporting documents categories



These documents are issued by exporters, shipping lines, airlines, international trucking companies, freight forwarders, logistics companies, banks and insurance companies.

Obviously, the set of documents varies for each specific case, depending on the actual conditions of the transaction, transportation, and the specifics of the goods.

The key document on the basis of which the whole deal is built is the foreign economic contract.

1.4 Where trade supporting documents are being using?

Trade supporting documents are required for customs clearance when exporting and importing products, however, a customs declaration can be created without them. Usually, TSDs are attached to the customs declaration for customs clearance and remain with the cargo throughout the transportation route.

In the Revised Kyoto Convention, it is stated that supporting documents play an essential part in the overall checking of the goods declaration. Customs take the necessary steps to ensure that the declaration is correctly completed. As part of this, Customs must check to determine if the relevant supporting documents fulfil the prescribed conditions. The role of TSDs, is, therefore, envisaged, but it is also stressed in the Convention that Customs should require only those documents necessary: (a) to permit control of the operation, and (b) to ensure that all requirements relating to the

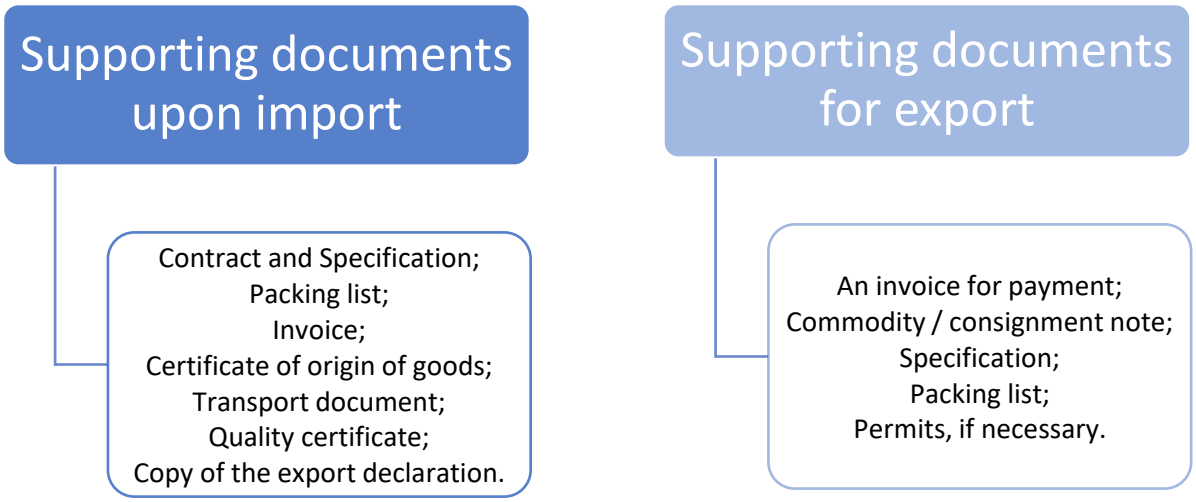
application of customs law have been complied with (Standard 3.16 of the general annex). In addition, the Convention provides flexibility to customs administrations in prescribing the timing and manner of lodgment of supporting documents. They may be lodged electronically with Customs (Standard 3.18), installed prior to the arrival of goods (Standard 3.25), or submitted within a specified period for reasons deemed valid by Customs (Standard 3.17)[7].

1.5 Trade supporting document in cross-border procedures

Supporting documents are required for most cross-border regulatory authorities and are a leading causes of process delays.

Current legislation and the accepted practice of document circulation includes the following minimum list of shipping documents for importing and exporting goods (figure 1.3).

Figure 1.3: Supporting documents



Depending on the non-tariff regulation measures applied to a specific product, another set of permits is required.

The list of shipping documents for a specific transaction depends on, for example, the terms of delivery, particular characteristics of the goods and harmonized system (HS) codes.

Accordingly, in this chapter, the term TSDs is identified and their significance in cross-border trade is discussed. It also contains a list of TSD classifications by areas of use and functions.

[7] World Customs Organization, Dematerialization, and paperless processing. Available at swcompendiumvol2partvi.pdf.

2. The current practices of the Eurasian Economic Union member-States and business models of submitting trade documents to Customs

2.1 How the Eurasia Customs Code regulates trade supporting documents

The EAEU Customs Code uses the collective term "*customs operations performance documents*" (COPDs) for documents of business interest to customs authorities, including TSDs. A substantive grouping of COPDs identifies subsets of documents depending on, for example, the area of use and customs operations

Regarding TSDs accompanying commercial deliveries, in particular, the following definitions are applied:

- **Commercial documents** − Documents used for conducting foreign trade and other activities and the confirmation of transactions related to the movement of goods across the customs border of the Union (proforma invoices (invoices), specifications, shipping (packing) sheets and other documents);
- **Transport (shipping) documents** - Documents that prove the existence of a contract for carriage of goods and accompany them during such carriage (bill of lading, waybill, a document confirming the conclusion of a contract of freight forwarding and other documents).

This section includes a discussion of COPDs from the EAEU Customs Code for confirming compliance with non-tariff measures, such as characteristics of goods, payment of customs duties, documents on the origin of goods and customs documents.

The EAEU Customs Code specifies cases in which an economic operator must or may submit pre-arrival information (PAI) − information in electronic form about goods intended to be moved across the EAEU customs border, international transport vehicles transporting such goods, the time and place of arrival of goods into the EAEU customs territory and, passengers arriving at the EAEU customs territory.

Pre-arrival information contains information from TSDs. That is, if PAI is submitted, then TSDs should not be required. At the same time, in practice, the submission of TSDs in some cases is still necessary. This depends, among other things, on the purpose of the PAI submission (only risk assessment or acceleration of customs operations at the border, associated, for example, with confirmation of compliance with non-tariff measures).

Accordingly, PAI can be presented in two different ways: (a) a data set of information or (b) an electronic document. An electronic document means information signed by e-signature of the declarant. In such cases, PAI submitted as an electronic document has legal significance and can be regarded by Customs as more reliable information, making it possible to use it for customs operations performance (in international

practice, it is equivalent to a pre-arrival declaration). PAI as a data set of information can also be used by Customs for risk-management and then reused in customs information systems.

In addition to COPD, the EAEU Customs Code applies the concept of *"information required to carry out customs operations"* (COPI). As there is no definition of COPI, the information required of such information is ambiguous. The EAEU Customs Code does not always set out the ultimate list of the required information. For example, when checking a customs declaration before the release of goods, the customs authority has the right to request commercial documents, accounting documents, a certificate of origin of goods and (or) other documents and (or) information, including written explanations necessary to establish the accuracy and completeness of the verified information declared in the customs declaration, and (or) information contained in other documents.

2.2 When does Customs need trade supporting documents?

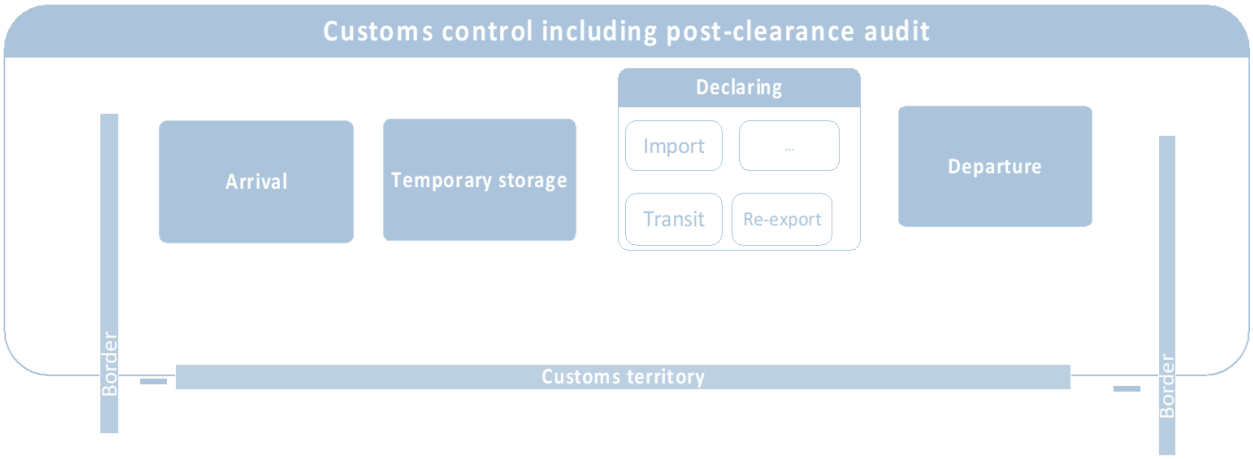
Economic operators are obliged to submit to Customs the documents required to carry out customs operations. The right of customs authorities to require documents is limited to documents that are necessary to ensure compliance with the law and the submission of which is required by the EAEU Customs Code.

The customs code contains a provision that clarifies a list of documents (including TSDs) required by Customs, depending on the customs operations performed.

Under the EAEU Customs Code, the following are characteristics of *groups of customs operations:*

- Related to the arrival of goods in the customs territory of EAEU;
- Related to the departure of goods from the customs territory of EAEU;
- Related to the placement of goods for temporary storage;
- Related to customs declaration of goods;
- Related to customs control.

Figure 2.1: Customs operation types in the EAEU Customs Code



To explain further, COPDS presented upon *arrival of goods in the customs territory of EAEU and departure of goods from the customs territory of EAEU* are determined depending on the mode of transport by which the goods are transported.

The carrier, when notifying the customs authority about the arrival/departure of goods, submits the documents specified in column 1 of table 2.1. However, when notifying the customs authority about the arrival of goods in the customs territory of EAEU, the carrier may submit information about the PAI registration number in the form of an electronic document. In this case, PAI acts as a set of documents required in a normal situation.

To place goods for temporary storage, the carrier submits to the customs authority TSDs and customs documents (indicated in column 2 of table 2.1) containing information about the goods, the consignor and consignee of the goods, the country of their departure and the country of destination. However, the PAI registration number may be submitted instead. In this case, PAI acts as a set of documents required in a normal situation.

When *declaring goods*, for example, an application to the customs authority using the customs declaration of information about the goods, the selected customs procedure and (or) other information necessary for the release of goods, TSDs fall into the group of documents confirming the information declared in the customs declaration (indicated in column 3 of table 2.1).

As can be seen from table 2.1, the same TSDs are submitted to the customs authorities several times.

According to the EAEU Customs Code, customs declaration is carried out in electronic form,[8] for which a customs declaration in the form of an electronic document is used (within this section, a declaration for goods and a transit declaration is considered).

[8] In some cases, it is allowed to use a customs declaration in the form of a paper document, for example, when using transport (transportation), commercial and (or) other documents, including those provided for by international treaties, as a customs declaration).

It has been established that when submitting an electronic declaration for goods, the submission of documents confirming the information declared in the customs declaration is not required. However, when declaring the customs procedure for customs transit, the declarant must include the electronic transit declaration with some documents (if the customs authorities cannot obtain such documents and (or) information from information systems. For example, if documents are submitted earlier, Customs should not ask to see the same documents again). These documents confirm (a) compliance with non-tariff regulations; (b) payment of customs duties and taxes; (c) compliance with *EAEU member States legislation* control over compliance that is entrusted to Customs.

Despite these provisions, the declarant must have documents that prove the information in the customs declaration at the time of submission of the customs declaration to the customs.

In turn, Customs, during the customs control before the release of goods, has the right to request from the declarant the documents, which is indicated in the customs declaration.

As part of a post-clearance audit, Customs has the right to request from the declarant, carrier, and other interested parties the documents necessary for customs control.

Accordingly, within *the framework of customs control*, TSDs are in the group of documents required for customs control (indicated in column 4 of table 2.1).

Table 2.1: Trade supporting documents for Customs

1	2	3	4
Arrival of goods to the customs territory of EAEU and departure of goods from the customs territory of EAEU	**Placement of goods for temporary storage**	**Customs declaration of goods**	**Customs control**
Transport (shipping) documents	Transport (shipping) documents	Transport (shipping) documents	Customs documents
Commercial documents for transported goods	Commercial documents	Commercial documents, including confirming the transaction with goods	Documents confirming the information declared in the customs declaration
Comments confirming compliance with non-tariff measures	Customs documents	Documents confirming compliance with non-tariff measures, measures to protect the internal market	Documents confirming compliance with restrictions on the use and (or) disposal of goods in connection with the use of privileges in the payment of customs duties and taxes

Documents accompanying international postal items during their transportation, as defined by the acts of the Universal Postal Union		Documents of origin of goods	Documents drawn up during customs operations
Documents for an international transport vehicle (for road transport), standard carrier documents (general declaration − for water transport, general declaration − for air transport, transfer sheet for railway rolling stock −- for railway transport)		Documents confirming the characteristics of goods used in their classification, a preliminary decision on the classification of goods (if any)	Documents confirming the conditions for the use of goods in accordance with the declared customs procedures
Documents containing information about goods (cargo declaration − for water transport, cargo sheet − for air transport)		Documents confirming the payment of customs payments, special, anti-dumping, countervailing duties and (or) ensuring the fulfillment of the obligation to pay them	
Documents containing information about supplies (for water, air, and rail transport)		Documents confirming compliance with the goals and conditions for the provision of benefits for the payment of customs payments	
Documents containing information about the crew, passengers, and their luggage (crew list, declaration of personal belongings of the ship's crew, list of passengers - for water		Documents confirming the declared customs value of goods, including its value and the method for determining the customs value of goods	

transport, passenger list − for air transport)			
Transit declaration, goods declaration (in established cases)		Documents confirming the change in the deadline for payment of customs duties and taxes	
		Documents on registration and nationality of a vehicle for international transportation (in the case of transportation of goods by road when they are placed under the customs procedure of customs transit)	
		Documents confirming the conditions for placing goods under the declared customs procedures (for example, a document on the conditions for processing goods, a conclusion on the possibility of destruction of goods)	
		Documents confirming the declared value of operations for the processing of goods when placed under the customs procedure for the release for domestic consumption of products of processing of Goods placed under the customs procedure for processing outside the customs territory	
		Documents confirming the powers of the person filing the customs declaration	

2.3 Paper or electronic trade support documents?

Trade supporting documents are submitted to the customs authorities in the form of electronic documents or paper documents. Copies of documents can be submitted if the legislation, including international treaties, does not establish the obligation to submit the originals.

The EAEU Customs Code does not establish the dependence of the form of customs declaration of goods (electronic or paper) and the type of TSD (paper or electronic) submitted. The regulation of this issue is influenced by the practice carried out between economic operators and customs authorities in EAEU member States, which depends, among other things, on the level of information communications technology (ICT) development, capabilities and requirements of States (government agencies and business structures). For example, often a customs declaration is submitted in electronic form, while TSDs are submitted in paper form. This issue is discussed in more detail in the next paragraph.

Submission of paper documents restrict or even prevent the use of information technologies. In particular, the automatic release of goods by the information system of the customs without human intervention becomes an unrealizable technology if in the process, there is a stage of processing documents that is not machine-readable.

The practice shows that, even though using electronic TSDs offers cost reductions, it is not commonly used. Among the barriers are the underdevelopment of a relevant legal framework, including cases when following international agreements, only a paper document has legal force (for example, a certificate of origin of goods). Lack of information systems and technologies makes it difficult to take advantage of the potential of electronic document flow.

Electronic TSDs are promoted by various global instruments, such as international organizations, integration associations (unions), international treaties (conventions) and interstate business initiatives.

For example, the Eurasian Economic Commission approved[9] an order not to provide additional stamps from customs authorities in transport (transportation), commercial, and (or) other paper documents starting in March 2021, when performing customs operations in electronic form, except for some specially stipulated cases. Accordingly, if a customs operation is performed electronically, there is no need to duplicate the facts of the performance on paper. In addition, following this decision, for its implementation, the Governments of the EAEU member must ensure that changes are made to national legislation.

[9] Decision of the Eurasian Intergovernmental Council of 17 July 2020, No. 5 on the failure to affix marks of customs authorities in transport (transportation), commercial and (or) other documents when performing customs operations in electronic form.

A plan to develop electronic document flow at sea checkpoints of the Eurasian Economic Union member States is being implemented.[10] A complete transition to electronic document management, the use of digital technologies at sea checkpoints, data unification within the framework of electronic document management, and a transition to data exchange are targeted to be achieved by 2026.

On 25 May 2021, annex 11 to the Customs Convention on the International Carriage of Goods under cover of TIR Carnets (TIR Convention, 1975), adopted under the Economic Commission for Europe (ECE), entered into force. The new provisions are the legal basis for the transition to a paperless international transit procedure. Following Article 3 of the annex 11, the contracting parties connect their customs systems to the international TIR system by the eTIR specifications.

On 5 June 2011, the Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road, adopted under the United Nations in 1956, concerning the electronic consignment note (e-CMR) entered into force. It establishes the legal framework and standards for using electronic means of recording and storing consignment note data. In particular, the consignment notes, as well as any demand, declaration, instruction, request, reservation, or other communication relating to the performance of a contract of carriage to which the CMR Convention applies, may be carried out by electronic communication.[11]

2.4 How to submit trade supporting documents to Customs? Current practice of the Eurasian Economic Union member States

Under the EAEU Customs Code, there are two ways to define document exchange (B2G and G2B interaction): (a) in electronic form (through interaction of information systems of customs and information systems of economic operator or using Internet resources); or (b) by submitting (sending) paper documents.

Priority is given to the electronic form of interaction. Paper TSDs must be submitted under conditions in which it is technically not feasible to submit electronic forms or in cases established by law.

As mentioned above, TSDs do not have to accompany the electronic customs declaration but may be requested by Customs when checking a registered customs declaration.

The varying rules applicable to TSD submission provided in the EAEU Customs Code to simplify the process of information exchange between customs and economic operators are given below: The right of the declarant to submit, before filing a customs declaration for goods or after filing a customs declaration for goods, before the release

[10] Approved by the Decision of the Eurasian Intergovernmental Council dated 5 February 2021 No. 1 on the concept for the development of electronic document management at sea checkpoints of the member States of the Eurasian Economic Union.

[11] United Nations, Economic Commission for Europe (ECE), 'e-CMR' offers road transport industry 21st century solution (8 March 2011). Available at https://unece.org/transport/press/e-cmr-offers-road-transport-industry-21st-century-solution.

of goods, documents confirming information about the origin of goods, compliance with non-tariff regulation, if the customs cannot obtain information about such documents and (or) information from them from information systems:

- Documents confirming the information declared in the customs declaration for goods may not be submitted to Customs if such documents were previously submitted to such customs when performing customs operations or at the request of this Customs during customs control and are stored in the customs electronic archive;
- Documents required for performing customs operations may not be submitted to the customs authority if Customs can obtain information about such documents and (or) information from them from information systems of customs, as well as from information systems of State bodies (organizations) in the communication framework (Single Window system).

Customs formalities in EAEU are determined by EAEU law, and the national peculiarities, including using information technologies for their performance are determined by the EAEU member States' legislation.

The practice of submitting TSDs to Customs for customs declaration is different among the EAEU member States, although the European Economic Community has defined general rules. For example, if, based on the results of checking an electronic goods declaration (hereinafter, GD) or a transit declaration using a risk management system, it is established that it is necessary to submit original documents, then the automatic release of goods is interrupted, and the customs officer is continuing customs control. When filling out the GD, the declarant must indicate the documents confirming the information declared in the customs declaration (type code, number and, date), a sign that identifies the submission or non-submission of the document when submitting the declaration. Depending on how TSDs are being presenting, the customs information system is able to use various automatic verification algorithms.

The XML format is the EAEU standard for all formalized COPDs, including customs declarations exchanged between economic operators and customs authorities.

2.4.1 Armenia

During the customs declaration of goods in Armenia, the electronic GD and the documents confirming the information provided in it, submitted in electronic form, are certified by an electronic digital signature, The electronic form of paper TSDs is attained by scanning them and can be certified with an electronic digital signature if they are submitted to the customs authority along with an electronic GD.

Documents confirming compliance with prohibitions and restrictions can be issued by authorized bodies (organizations) in the form of electronic documents and be located in the Single Window. In this case, Customs, using the access, independently obtains the necessary information from information systems.

Electronic declarations of goods in Armenia became mandatory in 2020. TSD digitalization is enabling the rapid adoption of new technologies, which is becoming mandatory in Armenia as the member of EAEU.

Table 2.2: Pros and cons of the Armenian model

Pros	**Cons**
• Electronic customs declarations • Scanned copies of **TSDs** and their legal significance by means of electronic digital signature or authentication and authorization • Simplicity of scanning and submission of scanned copies, high speed of preparation of documents for customs • Interagency electronic interaction • Single Window established • No costs for software needed to convert paper documents into a formalized electronic form	• Combination of electronic workflow and paper workflow • Increased time for submitting paper documents to customs • Storage of paper documents (at least 5 years from the date of the end of the goods being under customs control) • Presence of physical contact, which is undesirable in the context of COVID-19 Human factor (errors) • Corruption risks in case of possible interaction of the declarant with the inspector • Negative eco-factor, as the use of paper documents has a negative impact on the environment

2.4.2 Belarus

In Belarus, GD is submitted in the form of an electronic document, and TSDs are submitted by email in the form of electronic copies by scanning the document, or physically when the submission of the original paper document is mandatory. The mechanism is considered to be conditionally effective if the release of goods is carried out via electronic GD without the need to check the documents confirming the information stated in it. Otherwise, paper-based, or non-formalized TSDs are submitting to Customs.

The Belarusian model uses only a small part of the potential of the EAEU Customs Code. If the maintenance of paper workflow is still justified in cases in which it is required to submit paper originals confirming compliance with the rules of law in this form, then in the overwhelming majority of other cases, the unrealized possibilities of

electronic documentation can be considered an obstacle to adapting to modern, promising technologies and effective conduct of international trade.

Table 2.3: Pros and cons of the Belorussian Model

Pros	Cons
• Electronic customs declarations • Scanned copies of TSDs can be prepared and submitted easily and quickly • Interagency electronic interaction • One-time submission of paper documents confirming compliance with prohibitions and restrictions • No costs for software for converting paper documents into a formalized electronic form	• Combination of paper workflow and electronic workflow • Increased time for processing paper documents in customs • Storage of paper documents (at least 5 years from the date of the end of the goods remains under customs control) • Presence of physical contact, which is undesirable in the context of COVID-19 • Human factor (errors) • Corruption risks in case of possible interaction of the declarant with the inspector • Negative eco-factor, as the use of paper documents has an adverse negative impact on the environment

2.4.3 Kazakhstan

Electronic customs declarations are used in Kazakhstan, with an emphasis on the use of information systems. The Kazakhstan Customs has developed a unified technological platform for customs and tax administration, created on the basis of ASYCUDA World.

Under the system, the authorities cannot demand TSDs from the declarant that can be obtained from information systems. Electronic GD and documents in electronic form, confirming the information stated in it, are signed with an electronic digital signature. Electronic copies of TSDs certified by such a signature submitted by scanning are considered electronic documents.

The verification of the registered electronic GD is carried out through the risk management system. Checking the presence of TSDs, information about such documents and (or) information from them is carried out through the information system.

For goods subject to prohibitions and restrictions, the accuracy of the declared information about the documents confirming compliance with the prohibitions and restrictions contained in the State data base is checked. In the absence of information in the data base, Customs checks the compliance of the declared information on permits by doing the following:

- A comparison with data obtained in the framework of information exchange with State bodies of Kazakhstan;
- A comparison with information about such documents specified in the official sources of state bodies (organizations) EAEU member States responsible for their issuance;
- A comparison with the information posted on the EEC website, which publishes the relevant information, including information related to the unified register of documents confirming the compliance of goods with the requirements of the EAEU technical regulation.

If Customs does not receive the necessary information in the specified ways, then the submission of documents confirming compliance with the prohibitions and restrictions must be provided by the declarant.

If Customs does not have the required documents and (or) information about them, the declarant must submit, before or after submitting an electronic **GD** and before the release of the goods, scanned documents on the origin of goods in the form of originals, and documents confirming compliance with prohibitions and restrictions.

The Kazakh model does not fully tap the potential of electronic workflow.

Table 2.4: Pros and cons of the Kazakh Model

Pros	Cons
• Customs information system complies with the standards of the World Customs Organization • Electronic customs declarations • Scanned copies of **TSDs** and their legal significance by means of an electronic digital signature accepted • Interagency electronic interaction • Single Window established • No costs for software for converting paper documents into a formalized electronic form	• Combination of electronic workflow and paper workflow • Increased time for processing paper documents in customs (excluding information systems) • Storage of paper documents (at least 5 years from the date of the end of the goods being under customs control) • Presence of physical contact, which is undesirable in the context of COVID-19 • Human factor (errors) • Corruption risks in case of possible human-human interaction • Negative eco-factor, as the use of paper documents has a negative impact on the environment

2.4.4 Kyrgyzstan

Kyrgyzstan requires the declarant to submit the written form of customs declaration **GD** along with a formalized electronic form of GD and TSDs on paper. However, Customs can check the documents to confirm compliance with the prohibitions and restrictions by referring to the Single Window. In this case, such documents are not required from the declarant.

Attempts are constantly being made to modernize customs information systems. To date, they have not been highly successful. However, this provision can have one advantage − the modernization process can be simplified through accumulated experience and ready-made solutions of EAEU partners.

Table 2.5: Pros and cons of the Kyrgyzstan model

Pros	Cons
• Interagency electronic interaction • Single Window established • No costs for software to convert paper documents into a formalized electronic form	• Paper customs declarations, paper **TSDs** (paper workflow) • Electronic digital signature not accepted • Increased time to process paper documents in Customs (excluding information systems) • Storage of paper documents (at least 5 years from the date of the end of the goods is under customs control) • Physical contact, which is undesirable under such conditions as COVID-19 • Human factor (errors) • Corruption risks in human-human interaction • Negative eco-factor, as the use of paper documents has a negative impact on the environment

2.4.5 Russian Federation

In the Russian Federation, all TSDs for customs clearance must be submitted to Customs in electronic format, regardless of the original form of the documents. Such documents must be formalized (in accordance with the formats and structures established by the Federal Customs Service) and signed with an electronic signature. If initially TSDs are on paper or not in XML format, the declarant must convert them into the required electronic format. This means, that in practice, the declarant must manually transfer data from paper documents or copy-past information from MS Excel, Word, and other documents to electronic formats. Documents containing graphic elements that cannot be formalized, such as technological schemes, drawings, diagrams, graphs, photographs, and pictures can be presented in the form of electronic images, including those submitted through scanning.

In the Russian Federation, information technologies are actively used in which documents in electronic form confirming the information declared in the electronic customs declarations are preliminarily placed in the electronic archive of the

declarant's documents located in the Unified Automated Information System of Customs. In this placement, each document is automatically assigned with an identification number. A document placed in the archive prior to the filing of GD is deemed to be submitted to Customs after the registration of a GD, if such a GD contains the details and identification number of such a document.

This process ensures that electronic customs declarations and electronic TSDs are submitted to Customs. It is also a plus that the information systems of the Customs can automatically check the information in TSDs and compare it with the information specified in GD. However, the process to prepare electronic TSDs is not straightforward and time consuming.

Table 2.6: Pros and cons of the Russian model

Pros	Cons
• Electronic customs declarations, electronic **TSDs** and remote submission of electronic documents • Ability to automatically process electronic documents • Electronic storage and the ability to reuse electronic documents • Interagency electronic interaction • Reduced time in processing electronic documents in Customs • Minimizes role of humans in the customs operations • The intelligent risk management system can analyze the history of transactions and make predictions • Positive eco-factor and no-impact on the environment	• Time-consuming operations involved in preparing formalized electronic **TSDs** • Duplication of paper workflow and electronic workflow • Customs does not see the original documents and must trust the documents produced by the declarant by copy and pasting from paper documents • Costs of software for converting paper documents into a formalized electronic form • Declarant required to keep paper documents (at least 5 years from the date of realizing the goods)

In summary, none of above models are optimal and fully meet the needs of business and government in the digital era.

2.5 Business needs for the digitalization of trade supporting documents

Driven by the global growth of the digital economy and e-commerce, the digitalization of trade is a key disruptor.

The development of information technology is proceeding in leaps and bounds, resulting in an ever-increasing number of supporters and participants of the TSD digitalization process. In a 2018 report, the European Commission estimated that the regional rate of uptake of electronic transport documents for maritime trade rounded to 0 per cent[12]. However, the Covid-19 pandemic has triggered a significant increase in usage. For example, the International Chamber of Commerce (ICC) has noted that a transition to digital means is one of the most prominent themes in trade finance. According to the ICC Global Trade Survey 2020, 36 per cent of the respondents expect either moderate or significant growth in the share of their trade finance business provided through digital ecosystems. This figure increased to 55 per cent respondents from global banks[13].

Using electronic documents offers many potential benefits compared to paper documents. Among them are the following:

- Cost savings;
- Greater efficiencies in the processing and labor;
- Increased security and compliance;
- environmental benefits.[14]

According to the estimates of carriers, the financial costs for processing electronic documents are three to four times less in comparison with paper documents. The driver of TSD digitalization results in not only a decrease in costs, but also an increase in profits This is an incentive for business initiatives to support using electronic documents.
For example, as of December 2018, the penetration rate of one of the e-freight electronic Air Waybill, was at 60.8 per cent worldwide[15].

The International Logistics Performance Index (LPI) indicators can serve as a qualitative benchmark for business needs. It is s a weighted average score of a country across six key dimensions: customs performance; infrastructure quality ease of shipping; quality of logistics services; cargo tracking; and on-time deliveries. The Index helps identify trade logistics challenges and opportunities, and what can be done to

[12] Law Commission (2021). Digital assets: electronic trade documents. Electronic trade documents consultation paper. Digital assets: electronic trade documents. 25 June. Available at https://www.lawcom.gov.uk/project/electronic-trade-documents/.
[13] International Chamber of Commerce, *2020 Global Survey on Trade Finance* (2020). Available at https://iccwbo.org/publication/global-survey/.
[14] Law Commission, Digital assets: electronic trade documents. Electronic trade documents consultation paper. Digital assets: electronic trade documents (25 June 2020). Available at https://www.lawcom.gov.uk/project/electronic-trade-documents/.
[15] VCC Paper on the Digital Transformation in Logistics Sector (2019), 25 June. Available from https://www.vcargocloud.com/our-solutions/brochures-and-resources/ .

improve efficiency. For example, the weighted average rank of EAEU member States in 2018 was 90. By country, in Armenia, 92; Belarus,103; Kazakhstan,71, Kyrgyzstan, 108; and Russian Federation,75.[16].

Electronic TSDs are not something for the future. It is needed now to in order to take advantage of the evolutionary step towards improving the flow of goods. On the one hand, cutting-edge technologies are being introduced into practice (IoT, blockchain, artificial intelligence and big data), while on the other hand, the era of paper TSDs is continuing to linger. As trade chains are interconnected, it is necessary to align technologies to eliminate losses at points of contact at different levels (between countries, between the regulatory authorities of one country, between operated information systems). The speed of technology adoption at all sites is critical.

This process depends on the actions taken not only by the business community, but also by regulatory structures. The legal framework must be improved to ensure data interoperability and trust in electronic TSDs created in different jurisdictions. Under the auspices of the European Economic Community, legislative initiatives for the digitalization of EAEU are being developed, including digital trade, digital transport corridors and an agreement on data circulation.[17] However, it is important to form a cross-border space of trust in EAEU, not only for the purpose of interstate exchange of data and electronic documents in cross-border government-to government (G2G exchange, but also in cross-border B2B exchange.

Different technologies for implementing data circulation, such as blockchain, data pipeline and e-Documents, or types of supply chains (in particular, depending on the method of transporting goods) have their own specifics needs, expectations and proposals. For example, as previously mentioned, e-CMR allows users to meet business needs, such as cost savings (reduced document processing costs, more efficient administrative work, and faster billing) and increase transparency (data accuracy, tracking of shipments, access to information and real-time confirmation of receipt and delivery). With the benefits of the digital format, e-CMR waybills are also easily combined with other services used by transport companies, such as customs declarations or transport management services.[18]

Logistics companies are among the front runners in supply chains. New technology and new business models offer many opportunities for this industry to develop. They can improve processes in the ecosystem – from methods of shipment to cargo management, to supporting administrative activities, such as documentation and payments. In order to form an ecosystem of EAEU digital transport corridors in

[16] World Bank, The World Bank. global rankings 2018. (June 2018) Available at https://lpi.worldbank.org/international/global.

[17] Decision of the Supreme Eurasian Economic Council of 11 October 2017, No. 12 on the main directions for the implementation of the digital agenda of the Eurasian Economic Union until 2025 of the year.

[18] The International Road Transport Union. Making freight truly paperless: e-CMR. Available at https://www.iru.org/what-we-do/facilitating-trade-and-transit/e-cmr.

2021−2022, the following actions are being implemented: services for the use of electronic international waybills (for rail and road transport); a service for the use of an electronic protocol for weight and dimensional control; a transportation tracking service using electronic navigation seals (for agreed types transport); and a service for information exchange of the EAEU digital transport corridor ecosystem with systems of third countries.[19]

In the global context, in the short term, efforts could be focused on the development of areas, such as the standardization of multimodal data exchange, the standardization of electronic requirements for a greater number of different types of TSDs or finding a new approach in TSD digitalization.

Regarding the advantages of TSD digitalization, it should also be noted that implementing new technological solutions and electronic systems entails a long and costly procedure. At the same time, universal and standardized digital products do not take into account national specifics. The issue of reliability and legal significance of the data also adds complexity.

In summary, it should be noted that in all EAEU countries, work is under way to introduce technologies for the electronic exchange of documents in B2B, B2G and G2G segments. Customs of the EAEU States traditionally are leaders in terms of the rate of automation, which undoubtedly has a positive effect on the speed of execution of foreign trade formalities. At the same time, paper document circulation is almost widely used, and electronic documents are not being replaced by paper documents. Instead, they are only be supplemented by a legally significant paper document. This does not meet the needs of business and government. Accordingly. it is necessary to find solution to overcome the problems of using electronic TSDs and also search for new models for the widespread introduction of electronic TSDs into the practice of business and government.

The next chapter is focused on the history of the development of the electronic data interchange in international trade and trends in TSD digitalization, which will help to understand the models for the implementation of electronic TSDs that can be used by EAEU member States.

[19] Order of the Council of the Eurasian Economic Commission of 23 November 2020 No. 29 on the list of services and digital infrastructure implemented in order to form an ecosystem of digital transport corridors of the Eurasian Economic Union.

Table 2.7: Pros and cons of document management in different countries

Pros

1	**Electronic interaction** 1 - information systems, web-services, e-mail, etc. 1.1 - customs information system complies with the standards of the World Customs Organization AM (1), BY (1), KG (1), KZ (1,1.1), RU (1)	
2	**Electronic customs declaration** AM, BY, KG, KZ, RU	
3	**Electronic TSD or scanned copies of TSD** 1 - electronic documents; 2 - scanned copies; 3 - electronic digital signature; 4 - authentication and authorization AM (2,3,4), BY (2), KZ (2,3), RU (1)	
4	**Preparing of TSD** 1 - simplicity of scanning, high speed of preparation of scanned copies 2 - no costs for software converting paper documents into formalized electronic forms AM (1,2), BY (1,2), KG (2), KZ (1,2)	
5	**Submitting of TSD** 1 - remote submission of electronic documents 2 - simplicity of submission of scanned copies 3 - one-time submission of paper documents confirming compliance with prohibitions and restrictions AM (2), BY (2,3), KZ (2), RU (1)	
6	**Processing of TSD** 1 - ability to automatically process, reuse electronic documents; 2 - reduced time for processing of electronic documents by customs; 3 - basis for humanless operations in customs; 4 - intelligent risk management system can analyze the history of transactions and make predictions RU	
7	**Interagency electronic interaction** AM, BY, KG, KZ, RU	
8	**Single Window** AM, KG, KZ	
9	**Storage of TSD** - electronic storage of electronic documents RU	
10	**Ecology** - positive eco-factor and no-impact on the environment RU	

	Cons
1	**Document flow** 1 - paper workflow 2 - combination of electronic and paper workflow 3 - duplication of electronic and paper workflow AM (2), BY (2), KG (1), KZ (2), RU (3)
2	**Submitting of TSD** - transmitting of big-size PDF files AM, BY, KZ
3	**Storage of TSD** 1 - storage of paper documents (at least 5 years from the date goods stop being under customs control) 1.1 - declarants must keep paper documents (at least 5 years from the date goods stop being under customs control) AM (1), BY (1), KG (1), KZ (1), RU (1.1)
4	**Preparing of TSD** - costs for software converting paper documents into formalized electronic forms - time-consuming operations for converting paper documents into formalized electronic forms RU
5	**Ecology** - negative eco-factor (negative impact on the environment in context of paper documents) AM, BY, KG, KZ
6	**Processing of TSD** 1 - increased time for processing of paper documents or scanned copies by customs 2 - customs do not see original documents and must trust electronic documents declarants produce by copy-pasting from paper documents AM (1), BY (1), KG (1), KZ (1), RU (2)
7	**Human factor** 1 – errors; 2 - corruption risks in context of possible human-human interaction; 2.1 - high corruption risks in context of human-human interaction; 3 - possible physical contact (undesirable in context of COVID-19); 3.1 - physical contact (undesirable in context of COVID-19) AM (1,2,3), BY (1,2,3), KG (1,2.1,3.1), KZ (1,2,3)

Note: AM, Armenia; BY, Belarus; KG, Kyrgyzstan; KZ, Kazakhstan; RU, Russian Federation;

3. International practices and business models for submitting trade documents to Customs

The aim of this chapter is to consider the established practice of working with TSDs and the business models for submitting trade documents to government agencies in the European Union, Singapore, the Republic of Korea, and Georgia.

3.1 The European Union experiences

In accordance with European Union law, all goods imported into the European Union must be declared to the customs authorities of the respective member State using the single administrative document[20].

Any person directly or indirectly involved in customs formalities or in customs controls must, at the request of the customs authorities and within any time-limit specified, provide those authorities with all the requisite documents and information, in an appropriate form, and all the assistance necessary for the completion of those formalities or controls.[21].

However, the European Union Customs Code does not contain provisions that disclose what form of submission of documents is considered “appropriate.” Mostly TSDs are provided as PDF scanned copies along with the single administrative document. This may be because economic operators tend not to use B2B electronic document management, which is especially the case for medium and small businesses. Customs offices could, however, request the original paper documents when the paper document is relevant, such as EUR1 (special paper, watermark).

Based on the operation and the nature of the imported goods, additional documents need to be declared with the single administrative document and shall be presented together with it. The most important documents are the following: [22]:

- Documentary proof of origin, normally used to apply a tariff preferential treatment
- Certificate confirming the special nature of the product

[20] The Union Customs Code (UCC) adopted in Regulation (EU) No 952/2013 of the European Parliament and the Council (OJ L-269 10 November 2013 (CELEX 32013R0952) and the UCC Transitional Delegated Act adopted in Commission Delegated Regulation No 2016/341 (OJ L-69 15/03/2016) (CELEX 32016R0341).
[21] Article 51: Provision of information to the customs authorities. The Union Customs Code (UCC) adopted in Regulation (EU) No 952/2013 of the European Parliament and the Council (OJ L-269 10 October 2013) (CELEX 32013R0952).
[22] European Commission. Customs clearance documents and procedures. Available at https://trade.ec.europa.eu/access-to-markets/en/content/customs-clearance-documents-and-procedures.

- Transport Document
- Commercial Invoice
- Customs value declaration
- Inspections Certificates (Health, veterinary, plant health certificates)
- Import licenses
- Community surveillance document
- Cites certificate
- Documents to support a claim of a tariff quota
- Documents required for excise purposes
- Evidence to support a claim to VAT relief

Trade supporting physical documents should accompany the consignment of goods. For example, when it is necessary to check the transit cargo in transit through the European Union, documents must be submitted for verification. If the goods travels outside the European Union, then such documents also must accompany the delivery of the goods, as there is no mechanism for providing legally significant electronic TSDs for other countries.

In addition, Article 51 contains a provision stating that the person concerned should keep the documents and information for at least three years by any means accessible by and acceptable to the customs authorities.[23] This requirement allows the customs authorities within three years to make a request for physical documents for any of the declared deliveries and verify the accuracy of the information declared in the single administrative document.

Accordingly, the European Union uses a flexible approach to TSD digitalization. Customs laws require documents to be submitted with the single administrative document in an appropriate form. This means that the customs authorities must receive the documents in a form in which they can study them. Regarding B2B commercial and transport documents, PDF scanned copies are mainly used, while there is a requirement to store the originals of physical documents for three years for post clearance audit.

[23] Article 51: provision of information to the customs authorities. the union customs code (UCC) adopted in regulation (EU) no 952/2013 of the European Parliament and the council (oj l-269 10 October 2013) (celex 32013r0952).

Table 3.1: Pros and cons of the European Union Model

Pros	Cons
• Electronic customs declarations • Submission of scanned copies is easy to do and can done quickly as compared to electronic documents) • Interagency electronic interaction • One-time submission of paper documents confirming compliance • No costs for software to convert paper documents into a formalized electronic form	• Combination of paper workflow and electronic workflow • Increased time to process paper documents or the scanned copies in Customs • Storage of paper documents (at least 3 years from the date of the end of the goods being under customs control) • Presence of physical contact, which is undesirable in the context of COVID-19 • Human factor (errors) • Negative eco-factor, as the use of paper documents has a negative impact on the environment

3.2 Singapore experience

All trade formalities in Singapore are handled through TradeNet, which integrates import, export and transshipment documentation procedures. Through TradeNet, Singapore Customs and other competent authorities track the movement of goods and ensure regulatory compliance. TradeNet is also facilitates the country's national single window for trade declarations.[24]

Declaring entities need to register with the Accounting and Corporate Regulatory Authority or the relevant Unique Entity Number (UEN) Issuance Agency to obtain a UEN; and activate their customs accounts. After activating the account, it is possible to appoint a declaring agent to apply for customs permits via TradeNet on behalf of a declarant. To apply for its own customs permits or on behalf of its clients, a stakeholder has to register as a declaring agent and apply for a TradeNet user ID.[25]

All imports, exports and transshipments must be covered by relevant permits. If the goods are subject to control by the relevant competent authority, compliance with the

[24] Singapore. Permit application guide Available at https://www.tradenet.gov.sg/tradenet/login.jsp.
[25] Singapore Customs. Quick guide for new traders and registration services (23 May 2022). Available at https://www.customs.gov.sg/businesses/new-traders-and-registration-services/overview.

respective competent authority's requirements is necessary in order to prepare a correct and complete permit application. After submitting the permit application, the declaring entity may be required to fax immediately to the competent authority the relevant TSDs with the unique reference number (URN) quoted on the top right-hand corner of each document. For applications to the Controller of Undesirable Publications, the TSDs must be attached to the permit application.[26]

All goods imported into Singapore are regulated under the Customs Act, the Goods and Services Tax (GST) Act and the Regulation of Imports and Exports Act. Before the actual importation, the importer is required to obtain a customs permit. Documents required for the clearance of goods are the following:[27]

- For containerized cargo: the container number and shipper seal number must be declared when applying for the customs permit. When importing by sea, it is not required to present the customs permit and supporting documents to the checkpoint officers at the entry points. When importing by air or land, the printed copy of the customs permit, and TSDs, such as invoices, packing lists and air waybill/consignment notes, must be shown to the checkpoint officers at cargo clearance for verification.
- For conventional cargo and hand-carried goods: the goods must be presented, along with a printed copy of the customs permit and TSDs, such as an invoice, packing list and bill of lading/air waybill, to the checkpoint officers at the entry points for verification.
- For air imports granted GST relief at the Changi Airfreight Centre Checkpoint: the permit waiver is granted on non-controlled and non-dutiable air imports imported by post or air with a total cost, insurance, and freight (CIF) value not exceeding 400 Singapore dollars (S$) (US$288). To facilitate the cargo clearance of such air courier parcels/consignments at the Changi Airfreight Centre, freight forwarders/handling agents are allowed to use a summary list, together with the invoice and house airway bill (HAWB)/consignment note for each parcel/consignment with a CIF value not exceeding US$400.00 containing only non-controlled and non-dutiable items. For clearance of dutiable and controlled goods and goods originally imported by land, sea, or truck-flights (regardless of CIF value) and other goods with CIF exceeding S$400.00, a customs in-payment (GST) permit is required to account for each consignment, and the individual

[26] Singapore Customs. "Competent authorities' requirements for controlled items." Available at https://www.customs.gov.sg/businesses/national-single-window/overview/competent-authorities-requirements.

[27] Singapore Customs. "Documents for clearance of goods." Available at https://www.customs.gov.sg/businesses/national-single-window/overview/competent-authorities-requirements; https://www.customs.gov.sg/businesses/importing-goods/import-procedures/documents-for-clearance-of-goods.

house airway bill, commercial invoices, together with the customs permit, are to be presented to the checkpoint officer for verification.

Relevant TSDs relating to the purchase, import, sale, or export of the goods must be retained for five years from the date of approval of the permit application. These documents can be stored as physical hard copies or as images. They must be produced upon request from Singapore Customs.[28]

Generally, TSDs, namely electronic copies, the commercial invoice, packing list, and bill of lading/air waybill, and, depending on the commodity, a competent authority approval letter (where applicable) and/or the necessary permits from regulatory authorities and any other documents as specified by Singapore Customs. must be given to Singapore Customs. When submitting TSDs in TradeNet during declaration applications, up to six such documents can be attached for each declaration. Accepted file formats are MS Word, MS Excel, Adobe PDF, Image Files (Bitmap, JPEG, GIF, EMF, PNG, and TIF). Also, traders can submit TSDs not only at the point where they submit their declarations, but they also can upload them after submitting the declarations.

Table 3.2: Pros and cons of the Singapore Model

Pros	Cons
• Electronic system for goods declaring • Single Window established (TradeNet) • Customs permits in structured data format • Electronic data repository for data reuse (Networked Trade Platform) • Submission of scanned copies is easy to do and can done quickly as compared to electronic documents) • Possible to get machine-readable data • Scanned documents are reusable	• Combination of paper workflow and electronic workflow • Time-consuming process of scanning paper documents • Increased time for manual verification of paper or scanned documents by Customs • May have to compare (check) scanned copies with original paper documents • Storage of paper documents (at least 5 years from the date of the permit application approval) • Possible physical contact, which is undesirable in the context of COVID-19

[28] Singapore Customs, Quick guide for importers (2022). Available at https://www.customs.gov.sg/businesses/importing-goods/overview.

• No costs for software to convert paper documents into a formalized electronic form	• Human factor (errors) • Negative eco-factor (using paper documents is not environment friendly)

3.3 The Republic of Korea experience

General procedures of the Korea Customs Service for clearance of goods assumes three types of clearance by risk management:

a1. PL clearance (paperless)

a2. Documents inspection clearance

a3. Physical inspection clearance.

Accordingly, in most cases, applications follow the a1 type of clearance in which there is no need to submit any supporting documents. Regarding the a2 type of clearance, traders should submit scanned copies of supporting documents to the Customs Single Window system. The third type of clearance requires traders to submit physical supporting documents to the inspector.

The following documents are required for customs clearance procedures in the Republic of Korea: [29]:

- Import declaration form
- Commercial invoice: an original invoice and two copies must be presented with the shipping documents and include total value, unit value, quantity, marks, product description and shipping from/to information

[29] Import Declaration Guideline. Available from https://www.customs.go.kr/english/cm/cntnts/cntntsView.do?mi=8055&cntntsId=2731shipments%2Fsouth-korea%2Fcustoms-procedures&&actualiser_id_banque=oui&id_banque=11&memoriser_choix=memoriser.

- Certificate of origin: a certificate of origin, in duplicate, is required for certain products. Exporters are encouraged to discuss specific document requirements with their respective importer
- Packing list
- Bill of lading
- A certificate of inspection
- Maritime Insurance

Regarding supporting documents from other Republic of Korea agencies linked to Customs Single Widow, the agencies share documents in electronic forms. However, other commercial TSDs are not digitized.

Some of the Republic of Korean traders exchange cross-border trade documents in electronic forms (EDI or XML or other forms), for example, to confirm the terms of a contract or transport in cross-border trade. However, the Republic of Korea Customs does not accept them.

To date, Republic of Korea Customs accepts copied (or scanned) TSDs except some serious inspection cases. Other regulatory agencies still mostly request the original copy of the trade documents.

Table 3.3: Pros and cons of the Republic of Korea Model

Pros	Cons
• Electronic system for goods declaring (UNI-PASS) • Single Window established (KTNET) • Electronic data repository for data reuse • Submission of scanned copes of paper document is easy to do and can be done quicky as compared to electronic documents • Scanned documents are reusable • No costs for software to converting paper documents into a formalized electronic form	• Combination of paper workflow and electronic workflow • Scanning paper documents is time-consuming • Increased time for manual verification of paper or scanned documents by Customs • May have to compare (check) scanned copies with original paper documents • Storage of paper documents (at least 3 years from the date of approval of the permit application) • Possible physical contact, which is undesirable in the context of COVID-19

	• Human factor (errors) • Negative eco-factor (using paper documents is not environment friendly)

3.4 Georgian experience

The Georgian Customs Code[30] established that goods intended to be placed under a customs procedure must be covered by a customs declaration for a respective customs procedure. Apart from the exceptions, information between a trader and the customs authorities needs to be exchanged and stored using electronic data-processing techniques. If, in exceptional cases, the information is exchanged in tangible (written) form, the document sent needs to be signed by an authorized person, and the original copy of the document or a certified copy of it should be served on the addressee. For the purpose of customs control, the documents and other information must be kept at least three years in any form acceptable to and accessible by the customs authorities.

All documents supporting standard customs declarations, which are required for the application of the customs procedure must be kept with the declarant and be accessible for the Customs authorities at the time when the standard customs declaration is lodged. In cases in which a standard customs declaration is lodged by electronic data-processing techniques or in the case provided for by the legislation of Georgia, the requirement to enclose the documents is waived if they are submitted electronically. Upon request, those documents must be provided to the Customs authorities.

The Customs authorities may authorize a person to lodge a customs declaration, including a simplified customs declaration, in the form of an entry (of particulars) in the

[30] Georgian Law No. 4905-II ს from 28 July 2019 Available at https://matsne.gov.ge/en/document/view/4598501?publication=2.

declarant's records, provided that the person ensures that the particulars are accessible to the customs authorities.[31]

Submission of a customs declaration and declaring of goods can be complete after importing the goods into of Georgia or in advance (preliminary declaration).

The distinctive feature of the Georgian model is that completion of the customs declaration, except in cases provided by the Customs legislation, is carried out by the Customs authority, which has the right to delegate this authority to another party. The declarant, the representative of the declarant, the holder of a customs warehouse activity permit has the right to fill in the customs declaration, in particular, if they can connect to the appropriate server of the Georgia Revenue Service and have access to "e-Customs" and/or "Oracle".[32]

Regarding general declaration, the following documents need to be submitted:[33]

- Transport document (when transporting by road − transport consignment note or TIR-book; when transporting by sea − bill of lading; when transporting by air transport − air waybill; when transporting by rail − railway consignment note);
- Commercial document (the original or a copy of the goods sale contract or an invoice, or other settlement document (unless after a stay abroad for more than six months or in the case of a general declaration of goods provided for permanent entry into Georgia));
- Relevant permit and/or certificate and/or other additional document in accordance with the customs legislation.[34]

Goods may be declared in advance during the customs procedure of release for free circulation (import) before the goods are brought into the customs territory of Georgia.

To register the declaration documents can be submitted:

- Electronically through the Georgia Revenue Service website by uploading documents from the payer's portal. In this case, the customs officer fills in and registers the declaration and returns its electronic version via the website;
- By submitting documents in tangible form in the customs clearance zone or in another place of clearance, in service

[31] Customs Code of Georgia. Article 94 (1) Georgian Customs Code. Available at https://matsne.gov.ge/en/document/view/4598501?publication=2.
[32] Georgia Revenue Service. Release into free circulation (import) Available at https://www.rs.ge/LegalEntityCustomsProcedures-en?cat=1&tab=1.
[33] Ibid.
[34] Article 3 of Instruction "On Import of Goods and Submission of General Declaration" (annex No. 5) approved by Order № 257 of the Minister of Finance of Georgia on approval of the Instructions on the Movement and Registration of Goods on the Customs Territory of Georgia of 29 August 2019.

centres of the Service Department of the Georgia Revenue Service.

Generally, TSDs are provided for declaring goods in Georgia. Nevertheless, it is not necessary to submit trade documents for customs clearance purposes in cases in which there is an advanced or distance (electronic) declaration.

Usually, commercial invoice and consignment notes are attached to an e-Declaration. However, hard copies of both documents are required at the border where customs officers look for compatibility/authenticity of information in advance declaration about means of transport and goods. Documents can be provided in XML format as the declaring system is based on the ASYCUDA World system.

The principle of e-Customs is based on using the single taxpayer's electronic accounts for all customs-related documents starting from filling the customs declaration to requesting and receiving a relevant license/permit/certificate issued by other agencies and requesting a decision on advance ruling. In total, more than 130 services are available.

Table 3.4: Pros and cons of the Georgian Model

Pros	Cons

• Electronic system for goods declaring, which complies with the standards of the World Customs Organization • Single Window established • Electronic customs declarations • Reduced burden on the declarant due to completion of customs declarations is carried out by Customs • Submission of scanned copes of paper document is easy to do and can be done quicky as compared to electronic documents • May be able to get machine-readable data • Scanned documents are reusable • No costs for software for converting paper documents into a formalized electronic form	• Combination of paper workflow and electronic workflow • Scanning paper documents it time-consuming • Increased time for manual verification of papers or scanned documents by Customs • May need to compare (check) scanned copies with original paper documents • Possible delays at customs borders • Storage of paper documents (at least 3 years from the end of the year in which customs declarations for release for free circulation are registered or goods are placed under export procedure) • Possible physical contact, which is undesirable in the context of COVID-19 • Human factor (errors) corruption risks in case of possible interaction between declarant and customs officer • Negative eco-factor (using paper documents is not environment friendly)

Accordingly, the cases considered above show that the practice of submitting TSDs to State authorities largely corresponds to the practice and business models that have been developed in EAEU countries. A different approach is used only by the Russian Federation in which electronic legally significant TSDs are submitted in the form of formalized electronic documents.

Businesses, especially small and medium-sized ones, mostly use paper TSDs for cross-border trade. This is due to several factors: (a) the use of electronic documents is not possible because their legal significance is not recognized and government agencies check either the original document or a scanned copy of the documents; (b) in the case of the need for State control, such as in-transit cargo en-route, paper

documents are requested because State authorities may not have access to electronic TSDs at the place of actual control; (c) there are no accessible and widely used information systems for traders, which would provide cross-border information exchange of electronic documents; (d) lack of experience and understanding of the prospects for the use of electronic TSDs. Email and widespread document formats, such as PDF, MS WORD, MS EXCEL, are mainly used for exchange; and (e). businesses, especially small ones, are not ready to invest in automation. Many solutions are too expensive and unnecessary.

However, as noted above, existing business models are not without their drawbacks. Submission of physical TSDs and their scanned copies require additional inspection time on the part of the inspector. The data specified in these documents cannot be interpreted and verified automatically. This results in increased inspection time and costs.

Trends in the digitalization of TSDs indicate that there is a gradual transition to the widespread use of electronic TSDs. At the same time, business models are emerging in which the legal value of electronic TSDs is ensured.

The next section is focused on business models for the digitalization of trade supporting document that can be offered to EAEU countries and other countries.

4. Business models' overview: standard-based and alternative innovative business models for trade supporting document digitalization

4.1. Model based on dematerialization

Trade supported documents are required by most cross-border regulatory authorities and are one of the main causes of process delays.

Dematerialization of TSDs to enable electronic submission and verification facilitates cross-border and inland clearance procedures and, generally, is an indispensable part of a paperless environment. To ensure that this process is low cost, it is advisable to follow international standards.

The following are some elements for achieving dematerialization based on the World Customs Organization Recommendation on Dematerialization of Supporting Documents:[35]

[35] World Customs Organization, Recommendation of the customs co-operation council on the dematerialization of supporting documents, (2012). Available at http://www.wcoomd.org/-/media/wco/public/global/pdf/about-us/legal-instruments/recommendations/facilitation/rec_demat_en.pdf?la=en.

- Identify supporting documents that are normally required to accompany the cargo and goods declarations and examine the need for those documents for customs clearance with a view to eliminating them;

- Discontinue the requirement of presenting supporting documents in hard copy, if they have already been presented in electronic form;

- Enable automated customs clearance systems to automatically verify information contained in dematerialized supporting documents in cases in which such information is accessible electronically in (a) other government agencies' data bases (b) Single Window environments (and Cargo Community Systems) and (c) private repositories.

In addition, the Revised Kyoto Convention states that supporting documents may be lodged by electronic means with Customs[36] (Standard 3.18 of the general annex).

The WTO Trade Facilitation Agreement offers ways to simplify formalities in relation to import, export and transit. In particular, each member must, where appropriate, endeavour to accept paper or electronic copies of supporting documents required for import, export, or transit formalities[37] (paragraph 2.1 of Article 10). Considering that TSDs are unwieldy when handled in hard copy and customs declarations are submitted in electronic form, the only option left to governments is to handle them by an electronic version.

An elementary and widely used technique for converting paper TSDs into digital form is to read graphic information using an optical scanner. This enables the submission of digital copies of TSDs (electronic files in pdf, tiff, doc, and other formats) to the customs authority instead of physical copies in paper form. In the practice of completing customs formalities, this method has become widespread around the world (including in electronic interaction with Customs in the United States, in the EAEU member-States, and in Singapore.). There is, however, a big drawback, as the verification of scanned copies of documents is only possible manually by an authorized person of the customs authority.

However, TSDs can be scanned using optical character recognition (OCR) technology, which provides machine-readable and reusable data. As an element of artificial intelligence solutions for EDI, this technology allows the use of "intelligent" systems for automatic verification and analysis based on the risk management system information contained in dematerialized TSDs.

To ensure authenticity and integrity, dematerialized TSDs can be digitally signed, stored in secure repositories, and transferred in a secure manner.

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[36] World Customs Organization (2008). **Clearance and other customs formalities.** Available from http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/conventions/pf_revised_kyoto_conv/kyoto_new/gach3.aspx.

[37] World Trade Organization. Protocol amending the Marrakesh Agreement establishing the World Trade Organization. Decision of 27 November 2014. Available at https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/WT/L/940.pdf&Open=True.

The submission of dematerialized TSDs to the customs authority can be carried out simply by email or in a reliable but more sophisticated method as part of messages having standard electronic formats, such as XML, in accordance with the technical specifications for electronic interaction agreed between economic operators and Customs.

In this context, the WCO Data Model demonstrates international standardized approaches. Specifically, it supports binary images (Binary File Class within Additional Document Class). This approach makes it possible to include scanned TSDs in the customs declaration (Declaration Base Information Package as a B2G document contains Additional Document Class at different levels).

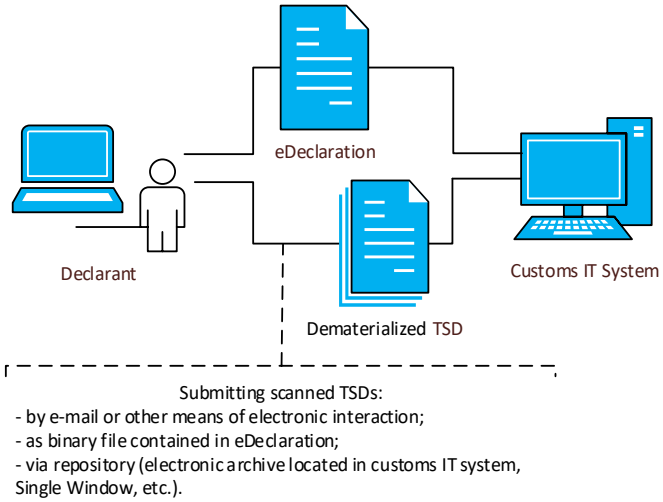
To ensure unambiguous connectivity of the customs document and documents accompanying the delivery of goods, customs declarations need to include the details of TSDs.

Accordingly, a model for dematerialization of TSDs for declaring goods at Customs is as follows.

The declarant scans the paper TSDs and sends it to the customs authority together with the electronic customs declaration. For the transmission of dematerialized TSDs, email or a method of electronic interaction agreed with the customs authority, based on standard technical solutions, is used. If TSDs are transmitted without ensuring reliability and integrity, such as without an electronic digital signature, the customs authority retains the right to request a paper original (see figure 4.1).

This model could be more flexible if the declarer has the option to submit scanned TSDs before submission of the customs declaration. Under this scenario, the declarant can prepare and upload TSDs in the customs repository at any stage before the release of goods (this function can be realized in a Single Window system). Electronic TSDs need to be referenced in the customs declarations. The references identify the permanent location of the dematerialized documents and allow Customs to download them when they are legally required (see figure 4.1).

Figure 4.1: Dematerialized trade supporting documents transmission



Trade supporting documents need to be submitted only one time by economic operators when completing customs formalities.

Alternatively, the procedures for receiving, checking, and storing dematerialized TSDs by customs authorities can be shifted to checkpoints across the State border (practice in Georgia). The benefit of this approach is that the risks of illegal goods entering the customs territory are minimized, but it can lead to delays in crossing the customs border and slow supply chains.

Dematerialization as described in this paragraph is a primary principal of a paperless environment. It can be successfully carried out to eliminate any paper form of TSD and other documents involved in supply chains. Moreover, it can be combined with other models described below (for instance, the UN/CEFACT Data Model and e-data convertor, and IoT solutions) to update business environments and supply chains and increase their efficiency, while addressing seamless information interactions.

Table 4.1: Pros and cons of the model based on dematerialization (scanned trade supporting documents)

Pros	Cons
• Easy and economical way for TSD digitalization and to set up an establish electronic workflow • Submission of scanned copes of paper document is easy to do and can be done quicky as compared to more flexible and fairer electronic documents	• Combination of paper workflow and electronic workflow • Primary level and quality of TSD digitalization • Time-consuming process of scanning paper documents

• Scanned documents are reusable • May be able to use electronic digital signature • May be able to receive machine-readable data	• Increased time for human processing of paper documents by Customs • May have to compare (check) scanned copies with original paper documents • Storage of paper documents • Possible physical contact, which is undesirable in the context of COVID-19 • Human factor (errors) • Corruption risks in case of possible interaction between the declarant and the customs officer • Negative eco-factor (using paper documents is not environment friendly)

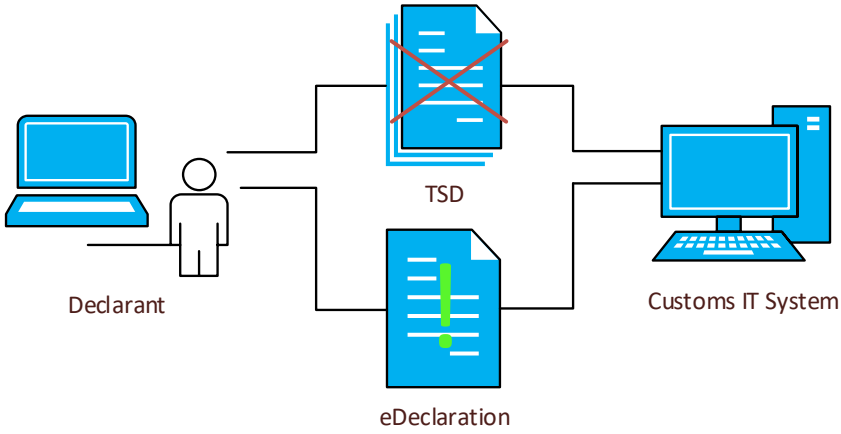
4.2. Paperless environment via methodological transformation

Technological developments along with lower costs for storage and networking have made facilities for the electronic handling of TSDs more accessible.

However, the introduction of information technologies into the business environment can also be a burden, as an environment with a variety of technically complex elements requires weighty financial support and highly qualified human resources. In such conditions, the creation of a paperless environment could be approached in an alternative way, namely a cardinal way of methodological transformation of TSD digitalization.

The methodological transformation of TSD digitalization can be achieved if the customs authority would not request to provide TSDs during customs clearance. Therefore, a paperless environment occurs when there is no submission of TSDs in the interaction between the declarant and the customs authority (see figure 4.2).

Figure 4.2: Trade supporting document-*less environment and new status of customs declaration*



The Revised Kyoto Convention states that the goods declaration is a statement made in the manner prescribed by Customs by which the persons concerned indicate the customs procedure to be applied to the goods and furnish the particulars which Customs require for its application (definition E19/F8. Of the General Annex). In this case, the content of the goods declaration is determined by the customs service (Standard 3.11 of the general annex).

Accordingly, a customs declaration is a document that accumulates information (including from TSDs) about goods and other information determined by customs regulators (bodies performing functions for the development of state policy and legal regulation in customs), necessary for customs purposes (release of goods). As a result, a customs declaration certified by an interested person in an appropriate way can act as a self-sufficient document and a guarantee for the full satisfaction of customs formalities. Subject to the status of the customs declaration, there is no need to submit TSDs to the customs authority. As before, TSDs are documents confirming and accompanying foreign trade transactions and international transportation of goods and must be kept in the archive of economic operators for a specified period of time after the release of goods together with a customs declaration. In turn, the customs authority, if necessary, can check the TSDs to perform the appropriate customs operations at the location of the declarant's archive as part of the on-site customs check, customs control after release. This model strengthens the responsibility of economic operators for the completeness and reliability of the information specified in the customs declaration and other violations committed at the time of the customs declaration of goods. To make the model more effective, attention should be paid to steps aimed at counteracting the practices of fly-by-night firms, when a post-clearance audit becomes impossible due to the self-liquidation of economic operators after the introduction of goods into domestic consumption, allowing unfair declaration.

The weak link in this model may be the procedure for making an electronic customs declaration (or its electronic form), as it must include information extracted from paper TSDs. The World Customs Organization Recommendation on Dematerialization of Supporting Documents[38] recommends that the customs administrations process for the release and clearance of cargo be based only on electronic declaration and automated verification. The option of using a paper customs declaration is only permissible as an exceptional temporary measure and a backup option (for example, cases of interoperability of electronic systems, power outages). Accordingly, for the production of an electronic customs declaration, it is necessary to use either a manual data entry or automated data entry technologies (in particular, scanning paper TSDs). If economic operators use electronic TSDs in their activities, then electronic exchange of documents (data) should be established, taking into account the solutions used by participants in trade chains and be mainly based on international standards.

In general, the considered model is one of the easiest paperless environments to organize. It is based on the principle of exclusion of complex technical components. However, activities must be carried out related organizational and legal functions to change the status quo and make changes in practical applications.

Table 4.2: Pros and cons of the TSD-less Environment Model

Pros	Cons
• Supports electronic workflow • Reduced number of documents required from the declarant • Acceleration of preparation of documents for customs clearance • Strengthens the status of the customs declaration	• Legal base needs to be adjusted • Customs IT and risk management systems need to be adjusted • Increases the responsibility of the declarant • On-site checks for Customs

4.3 Model based on the UN/CEFACT data model and an e-data convertor

Transforming a paper-based documentation system into an electronic format can speed up trade. TSD digitalization and electronic data submission can be conducted using electronic messages and transactions – known as electronic data interchange (EDI), using such formats as UN/EDIFACT, XML and JSON. Typically, these systems provide an application-programming interface (API) to facilitate interaction with the data base.

The TSD Basic Digitalization Model is based on UN/CEFACT Standards. These key data standards include the United Nations Trade Data Element Directory (UN/TDED);

[38] Ibid.

the Buy-Ship-Pay Reference Data Model (BSP RDM) based on the United Nations Core Component Library (UN/CCL); UN/XML Schemas based on reference data models (RDM)s; globally applicable code lists for use with UN/EDIFACT, XML and other data exchange syntaxes, including APIs.

The UN/CCL is a core base of the role of UN/CEFACT as a semantic hub in the international standardization community. It provides common semantic definitions for components of data and is used to develop RDMs and business messages.

The reference data models provide a comprehensive subset of the UN/CCL and its associated code lists with the information pertinent to a sector of activity, such as supply chain or multi-modal transport.[39] An RDM organizes business information entities (BIEs) and standardizes how they relate to one another and to the real world. All relevant BIEs are identified within each RDM standardization area.

The reference data model contains the following:[40]

- Data descriptions (the data descriptions, such as BIEs, are taken from UN/CCL, which provides a means to uniformly describe data, thereby supporting its searchability, identification and sharing);

- Data context (this information is taken from the context subset of the UN/CCL, which provides formal descriptions of the specific business circumstances under which data are used based on a set of context categories, which allow different business circumstances to be uniquely distinguished);

- Data-sharing (the “rules” for data-sharing are established by the Master Data Exchange Structure (MDES).[41] and Business Data Exchange Structures (BDES).[42]. These structures support the access and exchange of data where “access” consists of ad hoc requests (such as a query to a data asset) and “exchange” consists of fixed, recurring transactions (standard data exchange structures) between parties.

The reference data model determines the structure of data by means of MDES and is complemented by business requirement specifications for a particular business context, such as invoicing. Each business transaction is carried out through an exchange of data following a standardized data exchange structure (also called documents, messages and snippets).

[39] United Nations, Economic Commission for Europe (ECE) UN/CEFACT, Reference Data Models (2019) Available from https://unece.org/fileadmin/DAM/cefact/GuidanceMaterials/ExecutiveGuides/RefDataModel-ExecGuide_Eng.pdf.

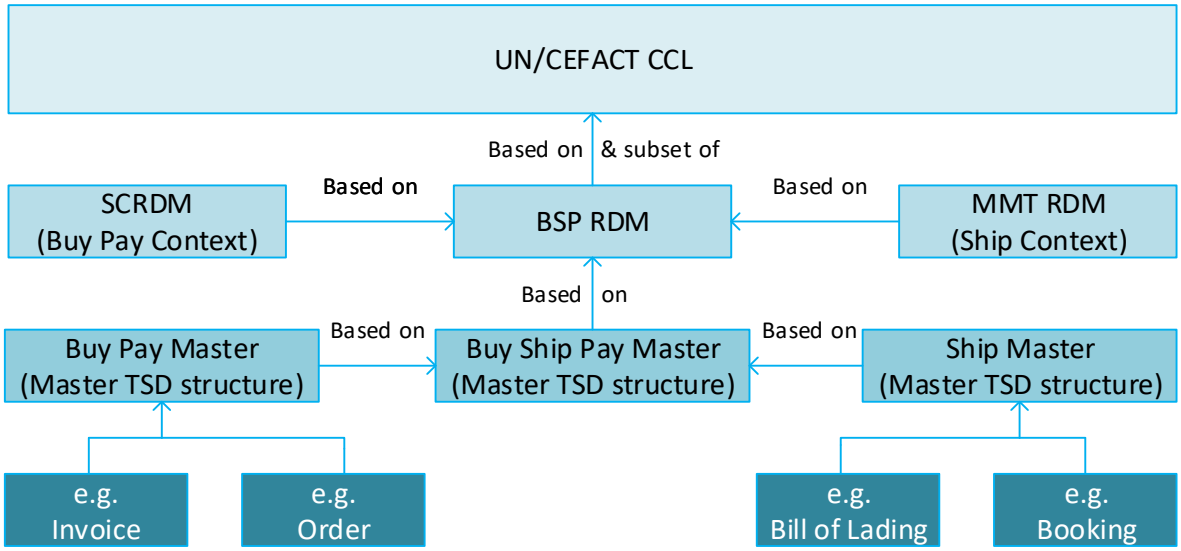
[40] United Nations, Economic Commission for Europe (ECE) UN/CEFACT (2018) [in Russian] Белая книга справочной модели данных. Available from https://unece.org/fileadmin/DAM/cefact/GuidanceMaterials/WhitePapers/WP-ReferenceDataModel_Rus.pdf.

[41] Master Data Exchange Structure is a collection of information structured in such a way that it covers the data exchange structures required by users within the reference data model domain, such as SCRDM. From MDES, different BDESs can be derived.

[42] Business Data Exchange Structures is a collection of information used within a particular business process and structured in such a way that it covers the business data exchange needs. These structures can be a complete business document, such as an invoice, or a mini document (snippet) as a result of a query, such as master data.

The shared aspects across the international supply chain and transport-logistics chains are collected in the BSP RDM, which generalizes the concepts of the Multi-Modal Transport Reference Data Model (MMT RDM) and the Supply Chain Reference Data Model (SCRDM). It provides the definitions of contextualized trade and transport-related data exchange structures mapping paper documents, which can be integrated into end-to-end software solutions for traders, carriers, freight forwarders, agents, banks, and customs, among others (see figure 4.3).[43]

Figure 4.3: UN/CEFACT semantic hub



Business information is shared and exchanged within a business community or between business communities. RDMs are harmonized within the business community and between RDMs. In addition, referencing exists between BIEs and other semantic data models, such as the WCO Data Model, the European Committee for Standardization (CEN) Semantic Data Model and the UN/TDED v2005.[44]

Following international practice, the Eurasian Economic Commission has developed and published the Eurasian Open Model of Integration (EOMI)[45]. EOMI includes the Eurasian Economic Union Data Model (EAEU Data Model), which is a regional analogue of UN/CEFACT RDMs (see table 4.3). It is based on the same principles used in UN/CEFACT in which there are semantic correspondences, links with the

[43] United Nations, Economic Commission for Europe (2019). UN/CEFACT. BUY – SHIP – PAY Reference Data Model. Available at https://unece.org/DAM/cefact/brs/BuyShipPay_BRS_v1.0.pdf .
[44] United Nations, Economic Commission for Europe (ECE) UN/CEFACT, Reference Data Model, white paper (2018). Available at https://unece.org/fileadmin/DAM/cefact/GuidanceMaterials/WhitePapers/WP-ReferenceDataModel_Eng.pdf.

[45] Eurasian Open Integration Model. Available at https://eomi.eaeunion.org/ru/#/.

UN/CCL (see summary on element and type analogs). This approach lays the foundation for the interoperability of RDMs for data mapping.

Table 4.3: Summary on element and type analogs

EAEU Data Model objects	**Total count**	**UN/CEFACT CCL analogs (CCDT)**
Primitive type	16	8
Basic type	27	21
Simple type	164	16
Simple element	286	93
Complex type	94	–
Complex element	91	29
Summary	678	167

The Eurasian Information Model of Integration is a unified solution for EAEU member States. In addition to the EAEU Data Model, it includes a repository (repository) of document structures (information), and a registry of normative reference information (code lists).

However, the actual situation is complicated by the presence of another RDM - the Federal Customs Service Data Model (FCS Data Model). The Russian Federation Customs requires the submission of TSDs in accordance with the FCS Data Model. However, the FCS Data Model is not based on UN/CEFACT RDMs or the EAEU Data Model, which makes data mapping difficult. In addition, the FCS Data Model is used only in the Russian Federation. A comparative information about RDMs is presented in table 4.4.

Table 4.4: Characteristics of reference data models

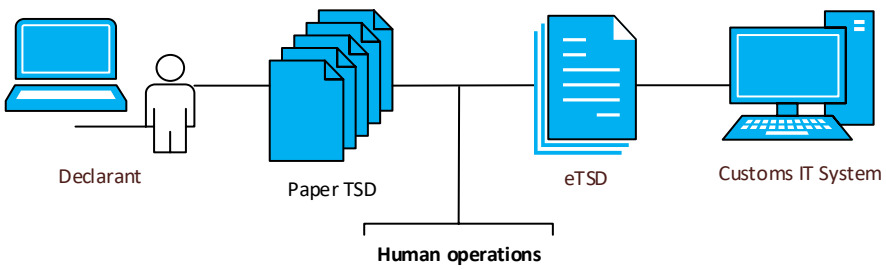
UN/CEFACT RDMs	EOMI (EAEU Data Model)	FCS Data Model
1	**2**	**3**
As a base model of TSD digitalization	Principles similar to 1 (links with UN/CCL)	Not harmonized with 1
		Uses 2 in part of a certain number of customs documents
	Does not contain structure for TSD	Contains structures for TSD

Obviously, data harmonization is not a big technical problem due to the presence of various semantic models and hubs that solve the need for TSD digitalization. The application of the different data models is an obstacle to the movement from paper documents to electronic data exchange in the supply chains. A solution for this may be to create an **e-data convertor,** a tool for the automated transformation of structured data from one source (document) to another based on different structural models. For instance, TSD to customs declaration or automated presentation of the same document (creation of an equivalent document) in structures of different models (for instance, TSD to TSD, when a B2B trade document becomes a quasi B2G document).

For a theoretical test of this alternative business model, the Russian Federation model (see paragraph 2 of the study) of submitting trade documents to Customs is considered for the import of goods into the Russian Federation.

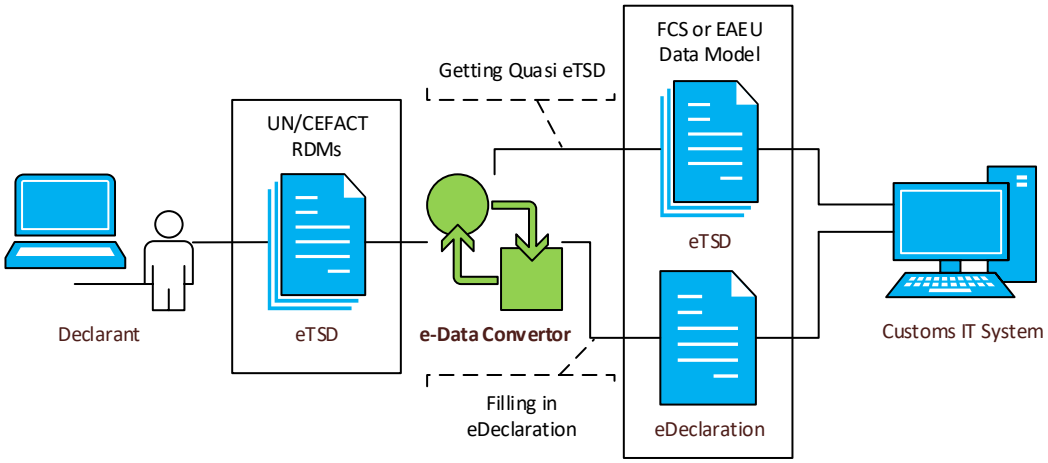
In the "as-Is" situation, the paper TSDs received from a foreign counterparty are "manually" converted by the Russian Federation declarant into an electronic form, formalized in accordance with the FCS Data Model, and sent to the customs information system (electronic archive) for use during the declaring of goods (see figure 4.4).

Figure 4.4: Transport supporting document transformation «manually» (as-Is)

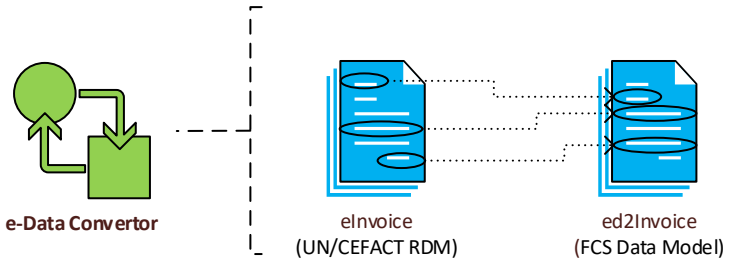


In a “to-be” situation, TSDs are initially prepared by a foreign counterparty in electronic form in accordance with UN/CEFACT standards. When declaring goods on the territory of the Russian Federation, these electronic TSDs are converted into equivalent documents in accordance with the FCS Data Model or the EAEU Data Model by means of an **electronic data converter** available at the disposal of the Russian declarant. In addition, the data, converted to electronic TSD, can be used to automatically generate an electronic customs declaration (see figure 4.5).

Figure 4.5: E-data convertor for trade supporting documents (To-Be)



E-data convertor functional schema



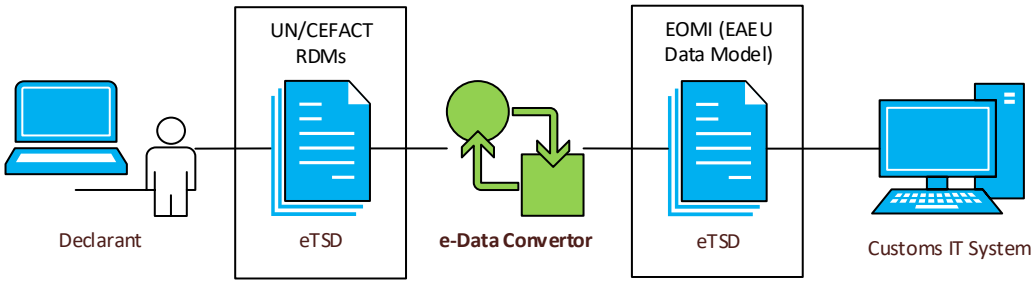
The E-data Convertor acts as an adapter, a bridge for differently structured data, while maintaining various RDMs to keep the proper pace of electronic TSD workflow in the supply chains of goods.

Table 4.5: Pros and cons of the model based on standards and e-data convertor

Pros	Cons
• Automation of data conversion, presented in various structural models (formation of formalized electronic TSD for customs, transfer of data from TSD to electronic customs declarations) • No rekeying of data required • Acceleration of the preparation of electronic documents • Remote submission of electronic documents • Ability to automatically process electronic documents, analyze data • Ability to reuse electronic documents • Reduced human involvement • Increasing the productivity of document exchange workflow • Better international electronic data interchange • Facilitating the integration of services through APIs • Greater involvement of regional supply chains in global supply chains • Electronic storage of documents • Positive eco-factor and no-impact on the environment	• Costs of tools for converting data • Difficulties in maintaining various RDMs • Training for working with converting tools

For the current Russian Federation model of TSD digitalization, a reasonable step in development and improvement would be to use an e-data convertor and a full connection to a unified solution within EAEU in the form of EOMI, and in particular the transition to the EAEU Data Model (see figure 4.6).

Figure 4.6: E-data Convertor and EOMI in FCS



In such a scenario, TSD structures should appear in EOMI. Consequently, the European Economic Community needs to exercise the right to determine uniform and unified requirements for the electronic form of documents (electronic documents) within EAEU, and provide economic operators with the necessary structures, preferably harmonized as much as possible with the UN/CEFACT standards.

A similar demand is ongoing. In particular, the exchange of information between the Russian Federation and Belarusian railways requires compliance with the internal standards of the Federal Customs Service. This is one of the main reasons why foreign forwarders serving EAEU transit cargo flows cannot use electronic TSD.

There are several reasons why countries would like to create and use their own of RDMs. Meanwhile the European Economic Community performs some of the government functions of EAEU member States, therefore it is expected that the customs authorities will use EOMI adopted by the European Economic Community. In this regard, the e-data convertor model is needed. This conclusion applies for the Russian Federation, where information technologies are the most advanced, and for other EAEU member States, where digitalization processes have just begun.

4.4 Data pipeline

An alternative model for digitalization of TSD involves the use of the so-called “data pipeline.” This model is not widely used but is described in detail in UN/CEFACT documents.[46]

The concept of a data pipeline allows data that originate at its source to be provided one time and used multiple times throughout the supply chain, regardless of the mode of transport, party or border agency that needs to access the data.

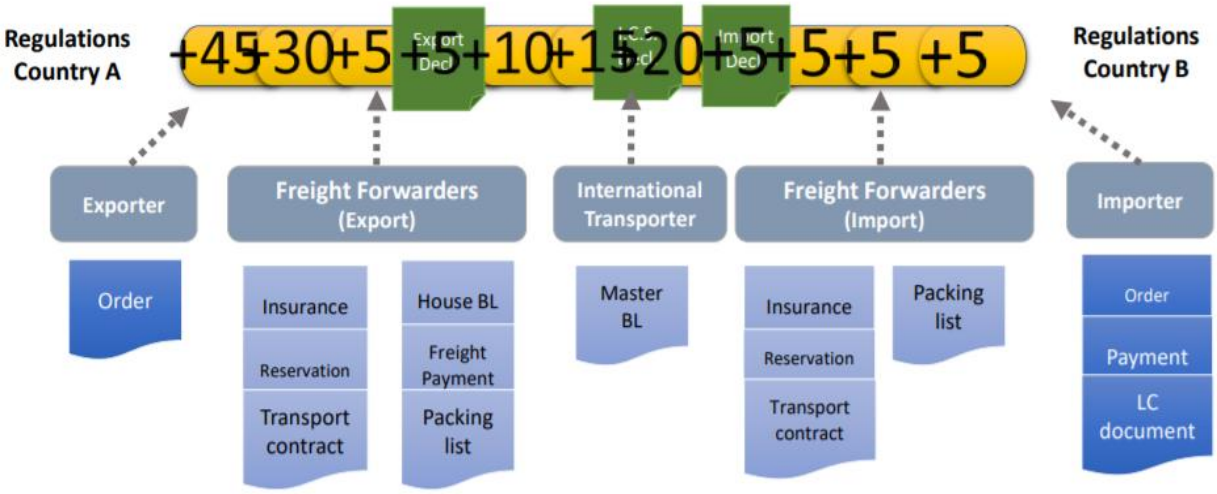
[46] United Nations, Economic Commission for Europe (ECE) UN/CEFACT, Reference Data Model, white paper. (2018). Available at https://unece.org/fileadmin/DAM/cefact/GuidanceMaterials/WhitePapers/WP-ReferenceDataModel_Eng.pdf.

Under the pipeline concept, information is structured around waypoints when is it is entered into the pipeline (“input waypoints”) or when it is extracted from the pipeline (“output waypoints”). Various events take place in the process and movement of goods, and these can potentially be “input waypoints” or “output waypoints” or both.

There is commonality of these waypoints across all modes of transport. For example, goods need to be loaded onto a means of transport and must be delivered to a location. Throughout the movement, there are many waypoints, which may trigger an important related event, such as payment for the goods or transportation service, and may result in a change of ownership or responsibility. These events can trigger a push of data or a pull of data for those that have the required access to this type of data.

During the Buy-Ship-Pay processes that takes place, various data are captured and logged for use in the sales contract, invoicing process, and the physical movement of goods. Rather than documents being passed through the supply chain on request or as a matter of course, the focus is on making the required data available to those who need it for a specific purpose. These data need to be captured upfront and made available using the pipeline where the security of the data is contained and restricted and available to those that require it. They also must be entered into the pipeline as close to the original source as possible, and preferably directly from the systems that generate the data to show compliance and remove the possibility of illegal or erroneous tampering. The consignor knows more about the goods than any other stakeholders; hence, they are the key actors in the pipeline concept.

Figure 4.7: Data pipeline



Source: (David Roff, Data Pipeline, UN/CEFACT. Available from https://unece.org/fileadmin/DAM/cefact/OtherMeetings/2017/Oct_Geneva_SWS/Day1_PPTs/4-3_DRoff_Data_Pipeline.ppsx)

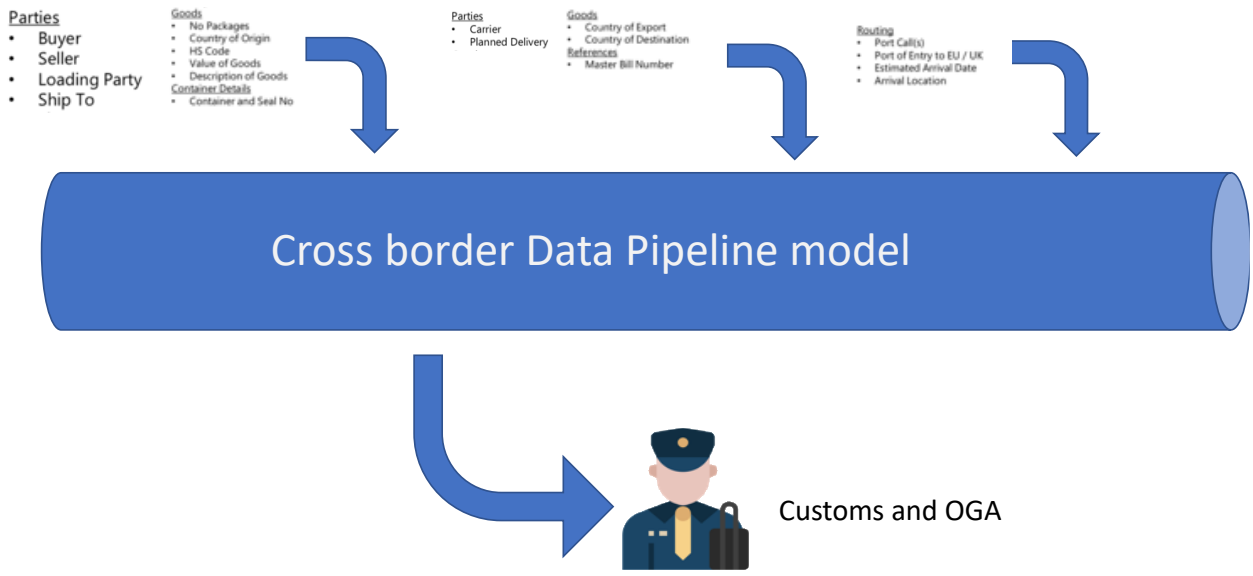
Accordingly, the data pipeline, enables a business to exchange accurate information in real time and avoid duplication of actions and errors when transferring information from one system to another. For convenience, the data stored in the pipeline can be presented in any human-readable form (already familiar and long-used forms for TSD).

Will government agencies receive TSD in this model?

The data pipeline operates by the push and pull principle. Some participants send information (push), while others have the ability to upload the necessary information (pull).

Government agencies are connected to the data pipeline and can download the information required for control. At the same time, this model provides a high level of transparency and reliability of information for government agencies. Government bodies become as "invisible" as possible for business, and control is carried out in real time.

Figure 4.8: Data pipeline model for transport supporting document digitalization



The data pipeline model is intended to be accessible to anyone and eventually enable the exchange from one data pipeline to another. To do this, the use of internationally recognized standards is essential. Information must be unambiguously understood between the sender and any party that is authorized to receive the information. Accordingly, it is necessary to apply for recognized international standards, such as the UN/CEFACT standards described above.

Table 4.6: Pros and cons of the data pipeline model

Pros	Cons
• Assumes the rejection of the established forms of electronic documents and the transition to the exchange of data between participants in the supply chain • Automatic provision of data for government control • Data entered only once but can be used many times • No rekeying of data required • Ability to automatically process electronic documents, analyze data • Reduced human involvement • Increases the productivity of the document exchange workflow • Improves international electronic data interchange • Facilitates the integration of services through APIs • Greater involvement of regional supply chains in global supply chains • Electronic storage of data • Positive eco-factor and no-impact on the environment	• Costs of tools for data pipeline • Necessary to change the legal basis and the model of submission of documents for State control • Training for working with converting tools

4.5 Electronic data interchange based on artificial intelligence solutions

Modern artificial intelligence systems are being actively implemented in various areas of human life, including in international trade. It is impossible to imagine a modern e-commerce platform that does not use expert and recommendation systems based on artificial intelligence at its core.

One of the areas of using artificial intelligence technologies is associated with documentary support of foreign trade formalities from the conclusion of a contract (so-

called “smart contracts”) to the submission of documents and data for the post-clearance audit.

Modern technologies of artificial intelligence do not completely replace humans, but they significantly simplify and speed up their work. At the same time, several classes of artificial intelligence technologies are distinguished, depending on the technological basis and the degree of "intelligence" of the systems.

The most common are expert systems that act as an assistant in human activities. Such technologies can be widely used in international trade, including for digitalization of TSDs.

The simplest example is to use OCR technologies to recognize TSD scanned images to translate them into a machine-readable format.

For example, Samsung is offering to automate manual work of processing for unstructured and undigitized documents by introducing a series of processes called “intelligent document processing” by combining the advanced OCR and artificial intelligence technologies to improve accuracy and deciding the processing methods through machine learning. The artificial intelligence-based OCR can be used for handwriting recognition and data extraction from unstructured templates by installing self-learning functions based on the neural network (human-brain-like function). Accordingly, the intelligent document processing can show owner error rates and high recognition rates.[47]

These solutions are well suited for most small and medium-sized international traders to digitize TSD. After receiving a scanned copy of the document from its counterparty, an economic operator can easily format this document to any formats, including formats requested by Customs and other government agencies.

This technology is well suited for the first and second models described above, as often counterparties exchange scanned copies of documents and the task is to transmit them into a machine-readable format for submission to government agencies.

The next class of artificial intelligence systems is associated with machine learning technologies. These systems can make analytics and forecasts without human participation and take on routine human actions.

These technologies are very promising for international trade and the related documentation. Chatbots based on machine learning will largely replace account managers, collect the right information and present this information in the right format.

In addition to chatbots, systems will be actively implemented to automate the work with documents and data in international trade. Modern systems allow automatic analysis ("computer reading") of incoming documents and data, structuring data and making

[47] Samsung SDS, “Era of Automation, future of work” (12 June 2020). Available at https://www.samsungsds.com/in/insights/1244329_6122.html.

automatic decisions based on these data, preparing, and sending a response. These systems can extract data from documents received in PDF, MS Office, XML, and other formats. These documents and data can then be restructured in the formats required for submission to government agencies. At the same time, the very process of submitting documents and data to government agencies can also be entrusted to the information system (figure 4.9).

Figure 4.9: Artificial intelligence-based model for trade supporting document digitalization

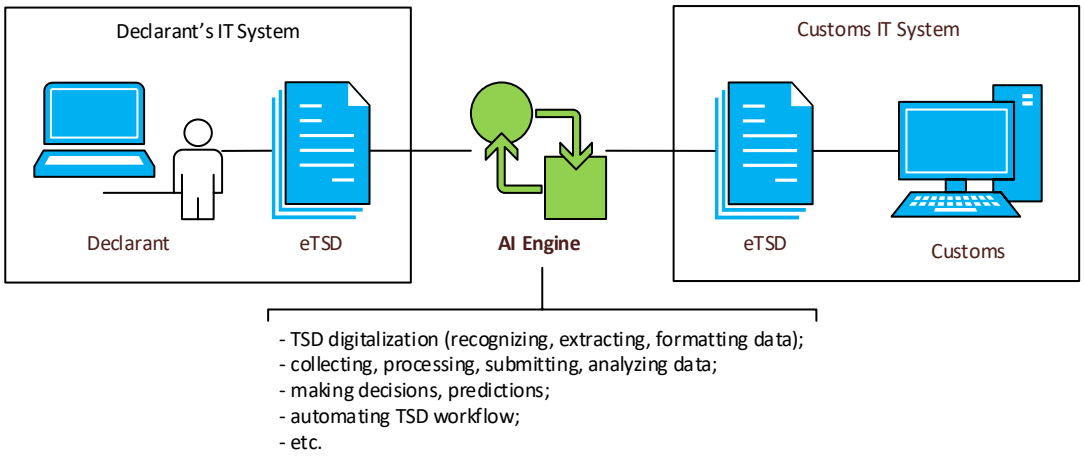


Table 4.7: Pros and cons of artificial intelligence-based model

Pros	Cons
• Automatic data recognition and conversion to formats required by government agencies • Easy to work with scanned copies of documents • Independence from the formats in which documents and data enter the organization • No routine workflow or rekeying of data required • Accelerates the preparation of electronic documents • Ability to automatically process electronic documents, analyze data • Ability to reuse electronic documents	• Costs of tools for artificial intelligence solutions • Machine learning systems need information for learning • Long implementation process • Legal base needs to be adjusted • Training for working with converting tools

• Reduced human involvement • increases the productivity of document exchange workflow • Improved international electronic data interchange • Facilitates the integration of services through APIs • Greater involvement of regional supply chains in global supply chains • Electronic storage of documents • Positive eco-factor and no-impact on the environment	

4.6 Electronic data exchange-based on trade blockchain data

The current trends clearly point to the prospects of blockchain technologies for documentary support of international trade. More than 10 companies around the world are implementing information systems based on distributed ledger technology, which boosts the transparency and reliability of cross-border information exchange.[48]

In all likelihood, one of the models for digitalization of TSDs will be a blockchain-based model. The features and capabilities of this model can be considered.

Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be either a physical entity or a digital record of value. In international trade, a blockchain network can be used to exchange data and documents as digital assets, or it can also be used to exchange value, such as duty payments, fees, and charges.[49].

The blockchain-based EDI model assumes that all participants in the information exchange use one information system. The sender uploads documents and data to this system and then receives a unique hash that encrypts the documents and data and ensures that the sent data is invariable. The rest of the participants in the information system receive and store data on hashes of documents and transactions loaded into the system, thus achieving a high level of reliability that documents and data have not been changed. Any participant logging into the trade platform gets the same view (version, updates, and history) of the document as any other member of

1. [48] Patel, Deepash, and Emanuelle Ganne (2020). Blockchain and DLT. Where Do We Stand? London: Trade Finance Global.

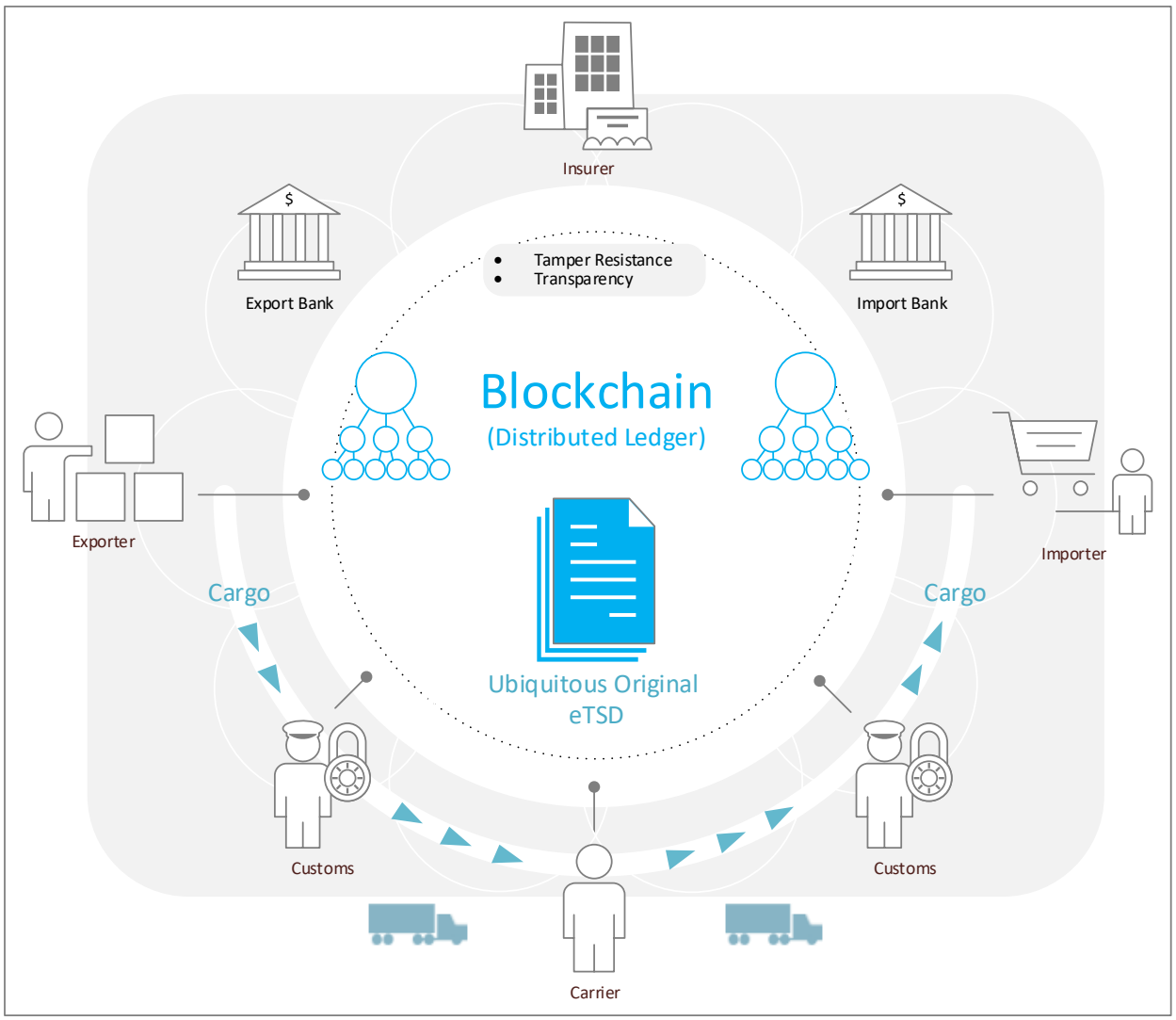
[49] IBM, What is blockchain technology? Available at https://www.ibm.com/my-en/blockchain/what-is-blockchain.

the network. The recipient of documents and data can use them in their processes. The reliability and invariability of the data are confirmed in the system.

Moreover, blockchain technologies allow for the implementation of point-to-point information exchange between network members and encompass all network members simultaneously. A blockchain solution allows for a single workflow, with seamless integration end points across network members. This leads to frictionless interactions among various participants and an overall improvement in efficiency.

One of the urgent tasks that hinders the development of these technologies and systems is the connection to the information systems of State bodies. If State bodies are connected to the system and able to confirm the legal significance and reliability of electronic documents received from economic operators, the value of these systems will increase significantly. Government agencies do not need to have access to all documents and data exchanged by participants. Being able to automatically compare the hash of the document provided by the economic operator with the hash of the document that was received in the information system from a foreign counterparty is sufficient (see figure 4.10).

Figure 4.10: Blockchain model for trade supporting document digitalization



Blockchain technologies allow the exchange of documents and data in any format. In this regard, these technologies provide an envelope in which documents and data for exchange are stored rather than an EDI solution. There is enough flexibility in this approach to attract business. At the same time, when scaling the system, the question arises of using the received documents and data, as well as their unambiguous understanding in the information systems of many participants in the supply chain. In this regard, without a single semantic basis, blockchain-based solutions will only be an analogue of emails with a high level of reliability. Accordingly, it is necessary to initially build such systems using recognized international standards.

Blockchain technologies are widely used to create smart contracts. Blockchain smart contracts coupled with an immutable ledger system can securely and transparently manage ownership transfers and facilitate online digital payments more efficiently. A smart contract is stored on the blockchain and executed automatically. Among its many

functions, it can define conditions for corporate bond transfers and include terms for travel insurance to be paid.[50]

Thanks to the algorithms used in smart contracts, it is possible to automate various operations, including informing participants in the supply chain and government agencies. Smart contracts can contain all the necessary information about the delivery, so the algorithms can be programmed to extract the information at a given time and send it to a specific recipient in the form required by the recipient. This method can greatly simplify and automate many processes, such as PAI or GD.

Table 4.8: Pros and cons of electronic data interchange based on the trade blockchain model

Pros	Cons
• Secure information exchange of documents and data in any format • Information exchange possible with an unlimited number of participants in the supply chain • All participants in the supply chain have the same view (version, updates, and history) of the document • Smart contracts make it possible to automate and simplify information exchange • No routine workflow or rekeying of data required • Can accelerate preparation of electronic documents for government agencies • Able to certify the relevance and invariability of documents for government agencies • Reduced human involvement • Increased productivity of document exchange workflow	• Costs of blockchain systems implementation • Long implementation process • Legal base needs to be adjusted • Technology challenges, such as performance of the blockchain, size limitation of data/files to be stored in the decentralized nodes, and scalability of the blockchain platform. • Training for working with blockchain solutions

2. [50] Ibid.

• Improved international electronic data interchange • Electronic storage of documents • Positive eco-factor and no-impact on the environment	

4.7 Electronic data interchange based on Internet of Things solutions

The introduction and widespread use of the Internet of Things (IoT) will create a new EDI model in international trade. The paper-based documents era may become a thing of the past, replaced by sensors and Internet-connected devices that store, collect and transmit information in real time.

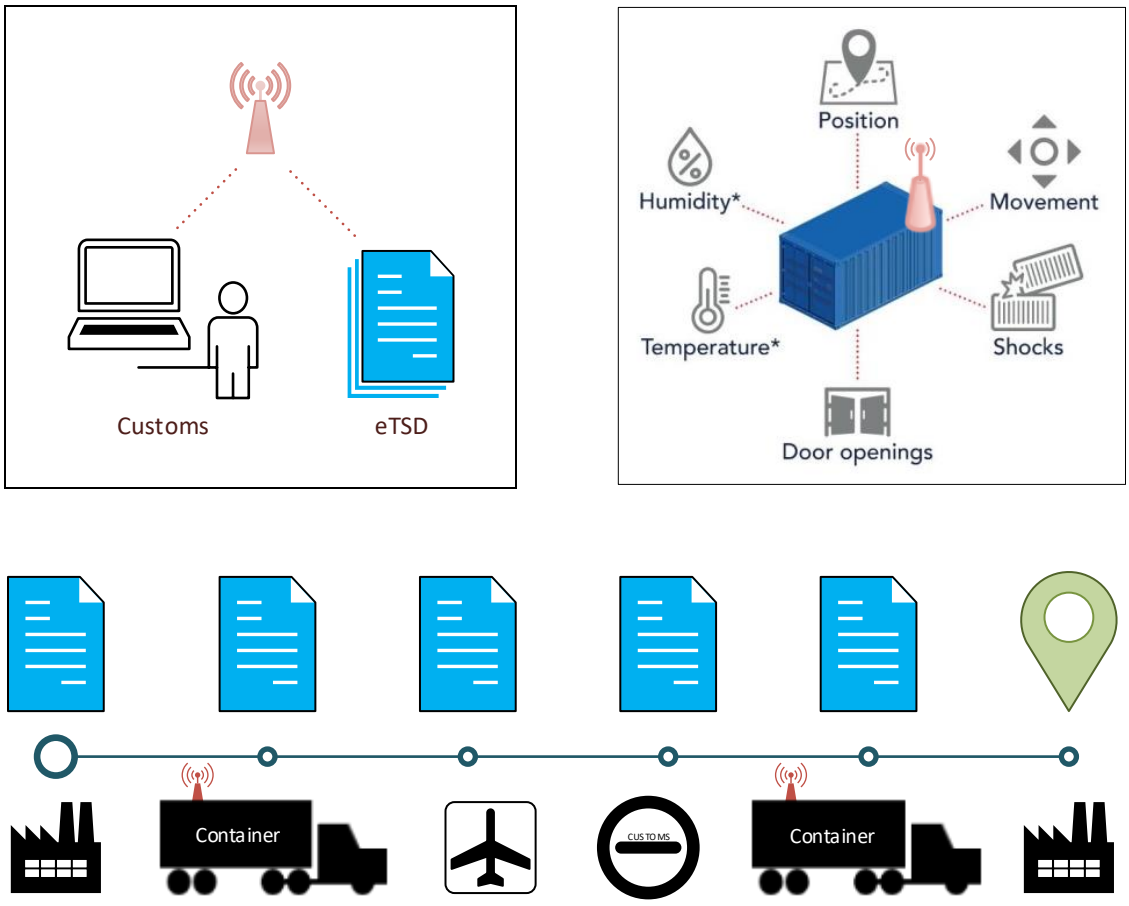
Already in place are smart-container technologies that can not only geo-position the delivery, but also, for example, measure temperature, humidity and fix the opening of the container. Electronic seals can store all shipping information and transfer this information to government agencies at their request.

Consequently, IoT devices are an additional source of information that cannot be obtained from current TSDs.

Government bodies are also actively involved in equipping checkpoints with modern IoT technologies (smart checkpoints), and installing video cameras, sensors and reading devices. When crossing a checkpoint, a government agency may initiate a request for information from devices on the container (electronic seal). At the same moment, it can receive all the shipping documentation for control and decision-making.

As in the case of blockchain technologies, the main question arises concerning an unambiguous understanding of the data obtained. Accordingly, it is necessary to initially build such systems using recognized international EDI standards.

Figure 4.11: Internet of Things model for trade supporting document digitalization



Internet of Things technologies will be greatly beneficial for international trade. They will significantly simplify, accelerate, and supplement the information exchange between participants in the supply chain and government agencies with the necessary data. It should also be noted that IoT technologies are compatible with any EDI model discussed in this chapter.

Table 4.9: Pros and cons of electronic data interchange based on the Internet of Things solutions model

Pros	Cons
• IoT devices store information about the supply chain, collect additional data and send it to all participants in the supply chain • Information exchange can be done with an unlimited number of participants in the supply chain	• Costs of IoT solutions • Costs of IoT devices • Stable Internet connection needed (5G preferably) • Long implementation process • Legal base needs to be adjusted

• Automation of information exchange with government agencies • No routine workflow or rekeying of data required • Acceleration of preparation of electronic documents for government agencies • Reduced human involvement • Increased productivity of document exchange workflow • Improved international electronic data interchange • Electronic storage of documents • Positive eco-factor and no-impact on the environment	• Training for working with blockchain solutions

5. Way forward for advancing trade supporting digitalization in the Eurasian Economic Union and beyond

This study shows that information technologies are well entrenched and have changed most of the business processes. Modern technologies help to improve the efficiency of trade and supply chains and avoid the barriers caused by the Covid-19 pandemic. Accordingly, it is necessary to advance digitalization of TSDs.

Paperless trade supporting documents, one of the areas of digitalization of business processes, is a consistent and progressive component of improving procedures for goods flows. This study shows that there is asynchronous digitization of the business environment in international trade. Moreover, there is a lack of interoperability between different IT systems revealed in the study. This may be due to the loss of real benefits and profits of economic operators in the supply chains.

This study offers the following lessons from TSD digitalization in the context of EAEU countries and countries beyond.

All EAEU countries work on introducing IT for the electronic exchange of documents in B2B, B2G and G2G segments. Customs of the EAEU states traditionally lead other authorities in terms of the level of automation, which undoubtedly has a positive effect

on the speed of execution of trade formalities. There are services for electronic interaction between business and government implemented in all EAEU member States. Most of the EAEU countries have in place the Single Window facility and use interagency information exchange to execute government control. At the same time, paper document circulation is almost widely used, and electronic documents have yet to replace paper documents and at this point, only supplement a paper legally significant document. This does not meet the needs of business and government.

The Eurasian Economic Union is involved in the development (at various stages of implementation) of the following initiatives:[51]:

- Goods traceability (in particular, the pilot project on using electronic TSDs is being introduced, which is primarily using an invoice):[52]
- Development of electronic commerce (in particular, regulatory provisions will appear in the EAEU Customs Code, including a new type of customs declarations);
- Tracking goods placed under the customs procedure of customs transit using electronic navigation seals (the draft international treaty provides, in particular, the content in the seal of electronic TSDs, permits, customs declarations and customs documents drawn up as a result of customs control or information from such documents);
- Development of a common system of transit of goods (including the possibility of interaction with transit systems of countries that are not members of EAEU);
- Transition to electronic forms of permits in the field of conformity assessment;
- Ensuring the possibility of using the electronic form of the international bill of lading (for rail and road transport);[53]
- Development of a cross-border space of trust;
- Elaboration of an international agreement on the circulation of electronic data;
- Interfacing with the Chinese initiative One Belt - One Road (including the transition to an integrated networked paperless technology for railway transportation of goods, which involves not only carriers, but also economic operators and regulatory authorities).

3. [51] Decision of the Supreme Eurasian Economic Council of 11 December 2020, No. 12 on strategic directions for the development of Eurasian Economic Integration until 2025.

[52] Agreement on the mechanism of traceability of goods imported into the customs territory of the Eurasian Economic Union dated 29 May 2019.

[53] Order of the Council of the Eurasian Economic Commission of 23 November 2020 No. 29 on the list of services and digital infrastructure implemented in order to form an ecosystem of digital transport corridors of the Eurasian Economic Union.

It should be noted that the processes of digitalization are ongoing in different areas at the same time. The example of EAEU also demonstrates this. Such processes are developing in the area of customs, technical regulation, transport, e-commerce, and others. This requires interconnection, as the supply chain of goods by its nature is a continuous network of interacting elements. The solution could be an integrated approach to the design, regulation, and practical implementation of TSD digitalization.

The experience of the other countries also shows that using paperless TSD can greatly simplify trade procedures and save costs. Meanwhile, used models still require a paper copy of the TSD for the control purposes. In addition, these models are not fully based on the international EDI standards, which lead to the lack of interoperability.

The study explores various models for TSD digitalization. These models are promoted by international organizations and government agencies, as well as by private IT companies offering services in the digital market. Pilot projects, experiments and business initiatives of trading partners were also investigated. Among them, this study highlights standard-based and alternative innovative business models, such as the UN/CEFACT data model and e-data convertor, data pipeline, artificial intelligence solutions, trade data blockchain, and IoT solutions.

Summarizing the pros and cons of different models of TSD digitalization in the EAEU and beyond, the following can be concluded:

There are different approaches for implementing TSD digitalization in many countries. The simplest models for implementation are based on the use of electronic scans (PDF) of paper TSDs, or not providing TSDs to government agencies if the consignment is not identified as high-risk. These two models can be successfully applied in developing countries that have just started to transition to paperless cross-border trade.

Although these models have their advantages, they cannot cover all the needs of businesses and government authorities in the transition to cross-border paperless trade, as they still assume the use of paper TSDs as a basis.

Accordingly, a more advanced model of TSD digitalization assumes the transition to full EDI. The big advantage of this model is that paper documents are no longer needed, traders and the government can exchange electronic messages based on international standards. This model makes it possible to achieve transparency of information exchange, reduce the number of errors and increase confidence in information. At the same time, the countries reviewed in this study may apply solutions that make it possible to achieve the legal significance of electronic messages. This model is well suited for countries where IT solutions are widely used by business and government. However, the implementation of this model requires financial expenses and entails a long process of aligning requirements between traders and government.

The transition to the TSD digitalization model, which implies full-fledged EDI, opens up the possibility of applying other more advanced models. Such models involve not only the rejection of paper TSD, but also the removal many tasks involving data processing

and submission to government agencies. These models involve the use of automatic data converters, data pipelines, artificial technologies, and the Internet of Things. They are suitable for developed countries that have switched to full EDI and implemented Single Window, interagency information exchange, and adopted legal acts and standards for the use of the Internet of Things and artificial intelligence technologies.

The varieties of models offer a wide range of possibilities, but a significant part of the positive effect is to be able to carry out a practical implementation.

The following are some suggested practical steps for advancing the digitalization of TSDs:

- Use a "regulatory sandbox" approach (in parallel to the ongoing paper processes) as a mode for developing and piloting solutions in order to determine an effective model. The benefits of this approach are that it enables users to gain competencies working off regulatory models, supports project approbation processes at early stages, testing and forming joint solutions, and reduces risks;
- Adopt the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific and develop legal acts at the national level, which would comprehensively regulate the digitalization of the supply chain of goods in the region and reflect the political will and obligations of the parties. The legislative base should conceptually regulate the circulation of electronic documents (data), their legal value, the timing of the project and the technical support of digitalization processes;
- Adopt an action plan for the development of an international treaty that includes the introduction of a Single Window system;
- Test and operationalize a digitized supply chain of goods, taking into account the results of the action plan and the decisions obtained while using the "regulatory sandbox approach".
- The above-mentioned steps can be extrapolated for use in any countries or regional associations, with adjustments for local specifics.
- The main objective at the legislative level and in practice (government agencies and business) is to achieve the conversion of the paper TSD to digital TSD. The proposed models of digitalization of TSD described in the study will become a theoretical basis or practical tools for working with electronic documents (or data).

The authors of the study recommend that EAEU countries use the TSD model based on the e-data convertor as a practical step towards paperless trade supporting documents. This conclusion was made by taking into account the relevance and applied benefits for EAEU member States and an assessment of the current state and prospects of TSD digitalization. An important transformation factor, which was also

taken into account, is the need to maintain the achieved developments and functioning EAEU member States systems and consider the minimization of costs and the simplicity of technical and technological re-equipment. In this sense, the recommended model is more preferable than other models, such as at data pipeline or blockchain technologies.

To transition to the TSD model based on the e-data convertor, EAEU member States should take the following measures:

- In the Treaty on the Eurasian Economic Union of 29 May 2014, clarify the definition of a cross-border space of trust to make it possible to connect economic operators to the Eurasian platform of interstate interaction (B2G, B2B interaction);
- In the EAEU Customs Code, specify the use of the term "information required for the performance of customs operations", which will regulate the parallel use of terms as "information" and "data";
- Also, in the EAEU Customs Code, strengthen the emphasis on using the advanced information technologies and electronic devices when performing customs operations (for example, provide for the possibility of submitting information to customs authorities not only by persons, but by information systems and electronic devices automatically);
- Instruct the Eurasian Economic Commission to define unified electronic TSDs within EAEU, preferably in way that is harmonized as much as possible with the UN/CEFACT standards;
- Stress the need for the Federal Customs Service of the Russian Federation to fully switch to EOMI, which will accelerate the transition to deploying the Eurasian Economic Union Data Model (EAEU Data Model);
- Encourage EAEU member States to use the basic software components of interstate interaction services developed by the European Economic Community, which saves resources and accelerates the digitalization of business processes.

Globally, the use of e-data convertor, which operates on the basis of international standards, will accelerate trading by increasing automation and reducing transaction time, and also increase the synchronization of electronic data circulation.

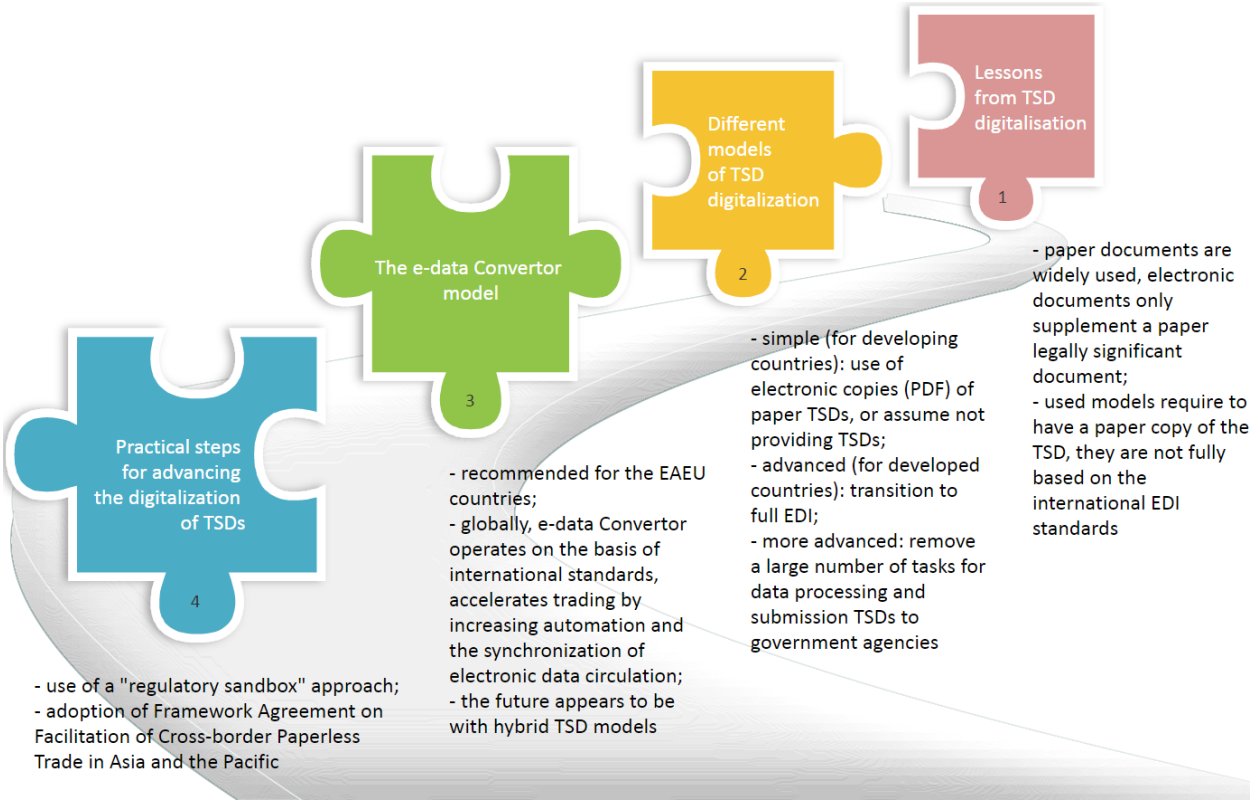
The rest of the TSD models will also be actively developed and be useful for optimizing B2B interactions in EAEU countries. To implement these models, the legal framework must be made more sophisticated through the inclusion of artificial intelligence technologies, IoT and distributed ledgers technology. Among the main tasks is to determine which government agencies will participate in the operation of these models, if government bodies will be full-fledged participants in the processes and will government bodies only limit themselves to obtaining the information necessary to control.

Overall, the future appears to be with hybrid TSD models. That is, for different cases and for different countries, the described models will be applied simultaneously and complement each other. For example, the development of the IoT Internet of Things will result in the abolishment of the standard based model, but on the contrary, it would complement the standard based model due to the possibility of obtaining additional information from a network of devices. The use of hybrid models requires further research.

All in all, it can be concluded that TSD digitization is an important and necessary step towards cross-border paperless trade. Currently, there are several models for the transition to electronic documents and data in the course of B2B and B2G interactions. Trends indicate that some countries have already made significant progress towards achieving this transition and even made changes to the related legal framework.

The question remains regarding the popularization of TSD models among the business community and government agencies. In this regard, the accession of countries to the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific will contribute towards the promotion of the TSD digitalization approaches described in the study.

Figure 4.12: Way forward for advancing trade supporting document digitalization in the Eurasian Economic Union and beyond



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