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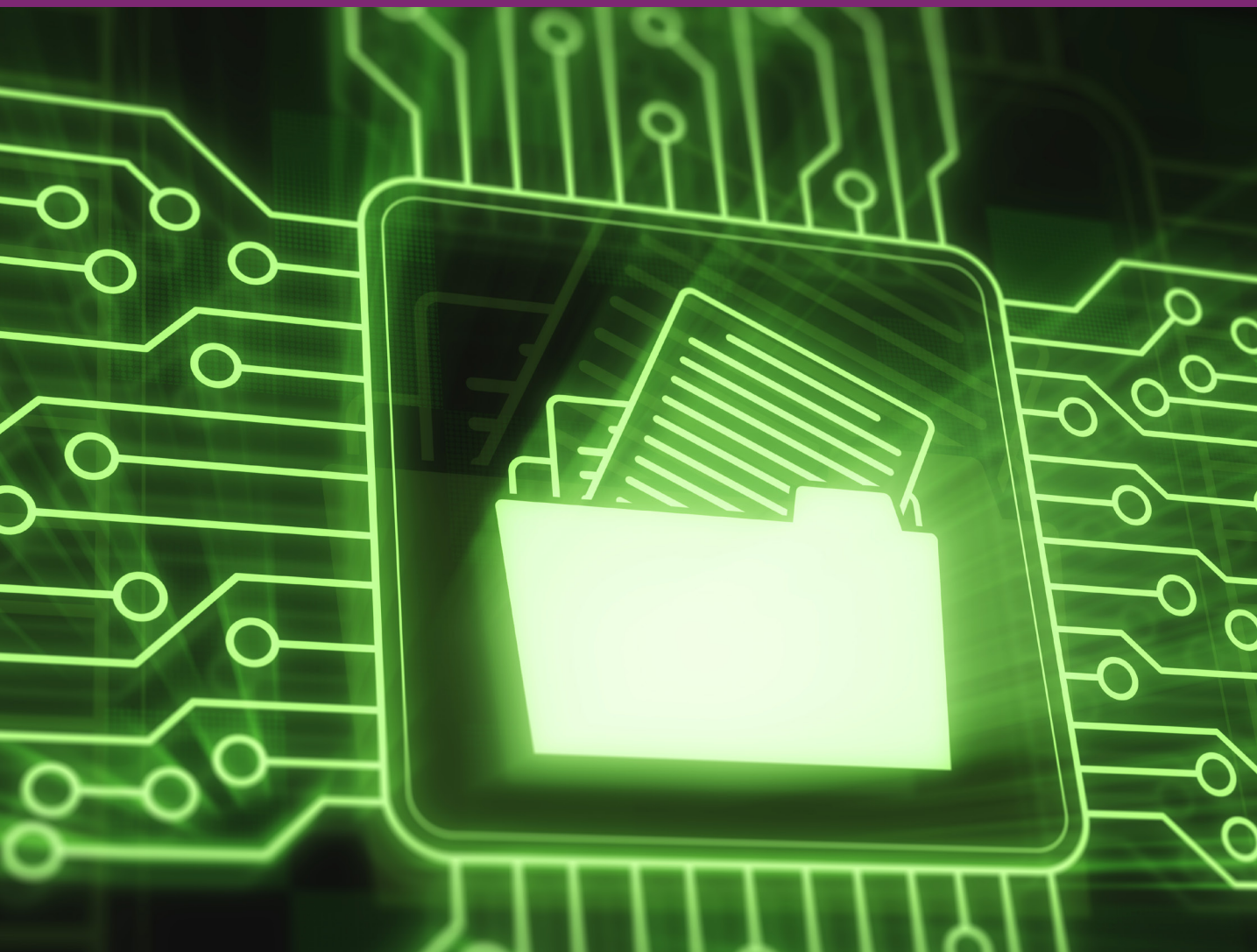
Cross-border Paperless Trade Toolkit



About the WTO

The World Trade Organization is the international body dealing with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible, with a level playing field for all its members.

About ESCAP

The United Nations Economic and Social Commission for Asia and the Pacific is the most inclusive intergovernmental platform in the Asia-Pacific region. It supports sustainable development through regional intergovernmental cooperation initiatives, action-oriented knowledge creation and technical assistance and capacity-building services.

About UNCITRAL

The United Nations Commission on International Trade Law is the core legal body of the United Nations system in the field of international trade law. Its focus is on the modernization and harmonization of rules on international business.

Acknowledgements

This publication is the result of a collaboration between ESCAP, UNCITRAL and the WTO. The contributors were Kian Cassehgari Posada and Emmanuelle Ganne from the WTO, Yann Duval and Soo Hyun Kim from ESCAP, and Luca Castellani from UNCITRAL.

Disclaimer

This publication has been prepared by the WTO Secretariat in collaboration with ESCAP and UNCITRAL, without prejudice to the position of United Nations and WTO members and to their rights and obligations under the United Nations and the WTO. The designations employed in this publication and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the United Nations and the WTO concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

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How to use this toolkit

This toolkit aims at raising awareness of the technical and legal tools to be called upon to adopt cross-border paperless trade systems and national single windows (NSWs). Key actions to develop paperless trade systems include:

- enabling a conducive legal framework;
- enabling a conducive technical framework;
- promoting efficient governance and engaging stakeholders;
- providing technical assistance.

This publication builds on the *Legal Readiness Assessment Guide*, the *Technical Readiness Assessment Guide* and the corresponding checklists for cross-border paperless trade. Developed by ESCAP as part of its support for the implementation of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific,[1] the guides contain explanatory notes, good practices, references and other relevant information to assist users to conduct self-assessments of their cross-border paperless trade systems using the checklists.

"This toolkit aims at raising awareness of the technical and legal tools to be called upon to adopt cross-border paperless trade systems and national single windows."

The toolkit does not intend to assess the status of a paperless trade system but rather to guide interested stakeholders in implementing such a system. In each chapter, the most relevant questions of the *Legal Readiness* and *Technical Readiness Checklists* for each section are listed.

The advantages of this approach are both its brevity and its focus on the selected elements. Users should, however, also refer to the full checklists and readiness assessment guides freely available online.

The *Legal Readiness Assessment Guide*, the *Technical Readiness Assessment Guide* and the corresponding checklists for cross-border paperless trade, available online:

https://readiness.digitalizetrade.org

Endnote

1 See UN document E/ESCAP/RES/72/4 and https://www.unescap.org/kp/cpta.

1 Introduction

Using electronic documents and transactions can speed up and increase trade. Electronic messages can eliminate the need to enter data into a computer manually at each supply chain checkpoint and can provide opportunities for the potential reuse of data.

There are various ways to digitize trade documents and transactions. One way is simply to take a visual snapshot of a paper document. Another possibility is an internet web portal where individual data elements can be keyed in – this is known as data-trader interface (DTI). Paperless transactions can also be conducted using computer-to-computer electronic messages in a standard format between business partners – known as electronic data interchange (EDI). Typically, these systems provide an application programming interface to facilitate interactions with the database (UNECE and UN/CEFACT, 2018).

A study focused on the Asia-Pacific region found that even partial implementation of cross-border paperless trade measures could see an export increase of US$ 36 billion annually or, under a more ambitious scenario of full implementation, an annual export gain of US$ 257 billion (ESCAP, 2014). The time required to export could also fall on average by 24 per cent for partial implementation and 44 per cent for full.

The use of electronic processes in international trade can also have significant environmental benefits, given that global supply chains usually involve the printing, dispatching, processing, exchanging and ultimately discarding of vast quantities of paper documents (Duval and Hardy, 2021): "At the global level, emissions saved through paperless trade implementation average 36 million tons, equivalent to planting over a billion trees."

To cut red tape at the border via simplification, modernization and harmonization of customs procedures, WTO members adopted the Trade Facilitation Agreement (TFA), which entered into force in 2017.

The TFA requires WTO members to provide for advance lodging of documents in electronic format for pre-arrival processing of trade administration documents, as appropriate. It also encourages customs authorities to accept paper or electronic copies of supporting documents required for import, export or transit formalities.

"Even partial implementation of cross-border paperless trade measures could see an export increase of US$ 36 billion annually."

The 2021 United Nations Global Survey on Digital and Sustainable Trade Facilitation[1] (United Nations, 2021) shows that TFA-related measures have been well implemented by improving transparency of regulations, streamlining the formalities and enhancing institutional arrangements and cooperation mechanisms. However, more work remains to be done in digitalizing trade processes, in particular on enabling the exchange

and legal recognition of trade-related data and documents in electronic form.

A recent joint study by the Asian Development Bank (ADB) and ESCAP finds that the average trade cost reduction in the Asia-Pacific would be more than 13 per cent in the case of full digital trade facilitation implementation, such as paperless trade measures, in addition to the binding and non-binding measures already under the TFA (ADB/ESCAP, 2021).

Several regional instruments and initiatives, such as the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific, have aimed at accelerating progress in this area (see Box 1). The relative urgency in enabling cross-border paperless trade became more apparent during the COVID-19 crisis, when physical distancing measures made the exchange of paper documents more challenging and the flow of small shipments and parcels through e-commerce platforms further accelerated.

"The average trade cost reduction in the Asia-Pacific would be more than 13 per cent in the case of full digital trade facilitation implementation."

1.1 Paperless trade systems

The main function of a paperless trade system is to generate, send, receive, store or otherwise process trade-related information electronically.[2] Different paperless trade systems exist (e.g. electronic customs declarations, electronic port management systems, electronic single windows).

Paperless trade refers to the digitalization of information flows required to support goods and services crossing borders (UNECE and UN/CEFACT, 2018). This notion is often used to refer to the electronic exchange of data in a purely national commercial and regulatory context; that is, business-to-government (B2G).

However, paperless trade systems can also be used among governments (G2G) and businesses (B2B). These levels of activity are not mutually exclusive, and a paperless trade system can cover several of them.[3] Table 1 lists some of the relevant sections on paperless trade systems in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*.

Table 1: Paperless trade systems – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Has your country implemented electronic customs (and other services that facilitate customs declarations in an electronic format)?	A2.1.1
Has your country implemented electronic port systems (including air, sea, road, rail and inland ports)?	A2.1.2
Has the country implemented a paperless customs declaration for national transit procedures (inbound transit, outbound transit, inland transit)?	B5.1

Box 1: Bilateral and regional agreements and initiatives for cross-border paperless trade

ASEAN Single Window Agreement*

The first regional agreement dedicated to cross-border paperless trade is arguably the Association of Southeast Asian Nations (ASEAN) Single Window Agreement, which was signed in 2005 by ten ASEAN members. Under the agreement, members aim to develop and interconnect NSWs, which enable parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export and transit-related regulatory requirements (UNECE and UN/CEFACT, 2020a).

Although progress has been made, this has proved more challenging than originally anticipated, with the first live exchange of a document – an ASEAN preferential certificate of origin – achieved among most members only in 2018.

Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific**

In part to answer the challenges faced with the ASEAN Single Window Agreement, ESCAP members, led by the Republic of Korea, initiated in 2012 the negotiation of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific. Adopted in 2016, the Framework provides an inclusive platform for the digitalization of trade processes based on a core set of principles and aims to foster the mutual recognition of trade-related data and documents in electronic form among 53 economies.

It entered into force in February 2021 and has been accompanied by less formal initiatives among member subgroups, such as the World Customs Organization (WCO) and ESCAP Joint Task Force on Cross-border Electronic Data Exchange between China, the Republic of Korea, Mongolia and the Russian Federation.

Bilateral and regional trade agreements

While paperless trade has been a long-standing focus in the Asia-Pacific, including under the Asia-Pacific Economic Cooperation (APEC) or as part of a growing number of bilateral and trilateral digital trade agreements between Singapore and other economies, the number of initiatives in this area has also been growing rapidly in other parts of the world.

The majority of bilateral and regional trade agreements recently concluded around the world now include one or more provisions on paperless trading, most often as part of a dedicated chapter on e-commerce or customs and trade facilitation. Sharing experiences at the regional and global level will be key to ensuring that these provisions are implemented effectively and inclusively.

The EU eIDAS Regulation on electronic identification and trust services for electronic transactions*** supports secure and seamless electronic interactions among public and private stakeholders, and the EU Customs Single Window Certificates Exchange (EU CSW-CERTEX) provides useful insights for further development of paperless trade.

* See https://asean.org/our-communities/economic-community/asean-single-window.

** UN document E/ESCAP/RES/72/4.

*** See *Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC*, 28 August 2014.

1.2 National single windows

All domestic paperless trade systems may ultimately (and ideally) connect to one NSW.[4] Efficient integration reduces compliance costs, as data are only submitted once. The establishment of NSWs is encouraged under the TFA. Table 2 lists some of the relevant sections on paperless trade systems in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*.

Table 2: National single windows – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Has a single window system been implemented in your country to expedite cargo movement/clearance and to facilitate the international trade supply chain?	A2.2
Are any of the systems mentioned in A2.1, "Electronic systems", connected via a common or single network?	A3.2

1.3 Establishing interoperable paperless trade systems

Creating a well-functioning paperless trade system is not without challenges, and this is all the more true when integrating a paperless trade system into an NSW. Various technical and legal methods are required (see Table 3).

Paperless trade systems and NSWs need to connect with their foreign counterparts to support the cross-border exchange of trade-related information. This requires interoperability within and between NSWs and other single windows, which international standards and technology-neutral laws can help to achieve.[5] Cross-border paperless trade measures had a global implementation rate of only 34 per cent in 2017,[6] so many economies are still to reap the benefits that paperless trade systems and NSWs can bring.

As recent regional and free trade agreements have revealed, state actors are becoming increasingly interested in the benefits of digital trade. Studies show that this interest has permeated both sides of the development spectrum, with both developed and developing countries increasingly including chapters dedicated to e-commerce and digital trade provisions (Monteiro and Teh, 2017). This is especially true for "digital-only" agreements in the Asia-Pacific region.[7] Table 4 lists the relevant section on establishing interoperable paperless trade systems in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*.

Table 3: Key actions for interoperable paperless trade systems and national single windows

Enabling a conducive legal framework	
▪ Legal recognition of e-transactions and documents ▪ Legal recognition of trust services	▪ Data governance rules ▪ Liability allocation and dispute management
Enabling a conducive technical framework	
▪ Digital identity ▪ Electronic payment ▪ Data models and semantics	▪ Communication protocols ▪ Connectivity ▪ Data security
Promoting efficient governance and engaging stakeholders	
▪ Governance rules and structures ▪ Capacity building for paperless trade system users	
Promoting technical assistance	
▪ International technical assistance and support programmes for paperless trade system implementers	

Table 4: Establishing interoperable paperless trade systems – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
If any of the systems mentioned in A2.1, "Electronic systems", have been implemented, what percentage support cross-border data exchange?	B1.1
If a single window system mentioned in A2.2 has been implemented, does it support cross-border data exchange?	B2.1
If yes, does it function as the national single window, which acts as the national single point of connectivity for any cross-border data exchange with other dialogue partners?	B2.2

Endnotes

1 For an interactive website, see https://www.untfsurvey.org.

2 Article 2(f) of the UNCITRAL Model Law on Electronic Commerce defines an information system (such as a paperless trade system) as "a system for generating, sending, receiving, storing or otherwise processing data messages."

3 For instance, the UNECE Integrated Services for MSMEs in International Trade (ISMIT) single submission portals for micro, small and medium-sized enterprises mainly cover B2B processes such as contracting for transport, logistics and financial services. They often also facilitate regulatory processes through B2G information exchange (see https://unece.org/fileadmin/DAM/cefact/cf_forums/2018_China/eCommerce_Bio-PPT/PPT_05_CramMartos.pdf).

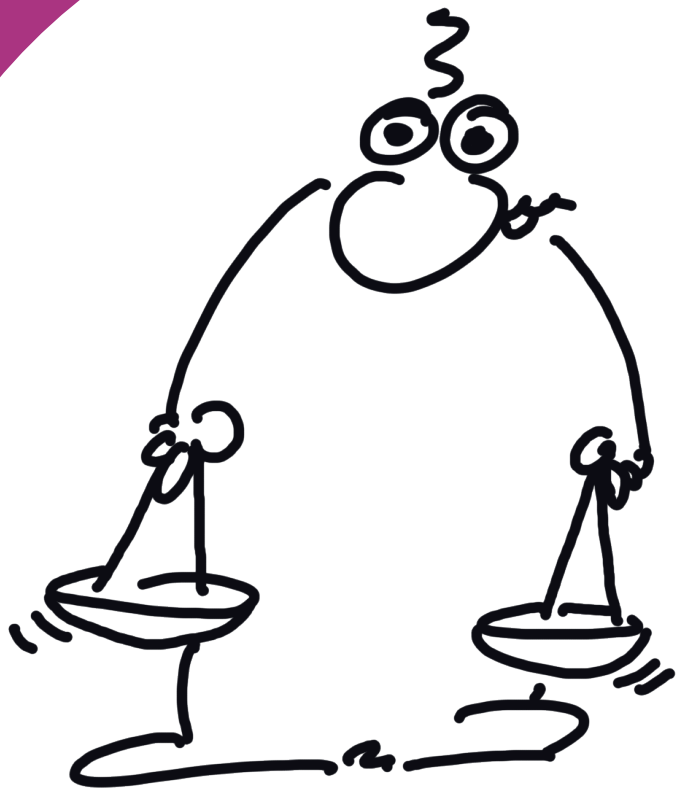
4 There are several case studies that can guide the interconnection between NSWs (see Box 1). The ASEAN Single Window Agreement connects the NSWs of ASEAN members into a regional network. The European Maritime Single Window environment connects maritime NSWs to facilitate data exchanges and to share resources and services, such as a unique user registration and access management and common data sets (e.g. location data, hazardous material data, ship sanitation data). Other regional initiatives have been launched to connect NSWs, including the EU Single Window Environment for Customs and the Eurasian Economic Community Single Window initiative.

5 Some initiatives provide general guidance on NSW interoperability, in particular *Single Window Interoperability: Recommendation No. 36* (UNECE and UN/CEFACT, 2017a) and *Cross-border Single Window Interoperability: A Managerial Guide* (UNNExT/ESCAP, 2018).

6 See https://www.unescap.org/news/good-progress-made-implementing-wto-trade-facilitation-agreement-still-long-road-paperless-and.

7 See the Singapore–Australia Digital Economy Agreement (SADEA) and the Digital Economy Partnership Agreement (DEPA) concluded between Singapore and other states.

2 Enabling a conducive legal framework



2.1 Legal recognition of electronic transactions and documents

Recognizing legally that electronic transactions and documents can be functionally equivalent to paper versions is essential to replace paper-based with paperless trade systems. Treating electronic transactions and documents as equivalent to their paper versions can facilitate the cross-border legal recognition of transactions and documents (see Table 5).

Key criteria to consider when establishing this equivalence include, *inter alia*, to provide that a document would remain unaltered over time and to establish the identity of the originator of an electronic message.[1] The advantage of this functional equivalence approach is that it obviates the need for a legal system to alter its traditional rules about paper-based documents. It also avoids a "dual regime" approach by creating a special legal regime for electronic communications.

Ideally, once electronic transactions are enabled based on the functional equivalence approach, special rules should not be necessary for trade documents or transactions. This will provide a clear and common legal regime for paperless trade and thus facilitate data exchange.

However, states may pass laws to stipulate how electronic communications are to be applied to different transactions or documents (e.g. electronic contracts, electronically transferable records). Moreover, special requirements may also arise for electronic transactions and documents, for example when public entities such as customs authorities and regulatory agencies are involved.

For commercial documents that are transferable, such as those incorporating the entitlement to a goods delivery (e.g. bills of lading, warehouse receipts) or the payment of money (e.g. checks, promissory notes), additional functional equivalence requirements may be needed for their use in electronic form.

Ideally, all legal regimes should be based on the principle of technology neutrality (i.e. they do not specify the technology needed to achieve legal results). Such neutrality helps paperless trade systems to communicate with each other – since they operate on principles not on technological prescriptions – and thereby facilitate the exchange of electronic documents and information without the need for additional intervention.

Table 5: Trade documents that can be digitized

Type of document	Examples
Trade administration documents	
Product-related documents	Proof of origin documentation Universal certificate of origin Health certificate for live animal products Export/import sanitary and phytosanitary certificate CITES certificate for endangered species Certificate of inspection for organic products Dangerous goods documentation
Movement of products (export, import, transit)	Import/export declaration Export/import licence for controlled/dual-use goods, for agricultural products and any other products subject to a licence regime Safety and security declaration ATA Carnet (transit) TIR (transit) Union Transit Common Transit
Duties and excise documents	Binding tariff information Advance tariff ruling Excise guarantee Administrative documents used in the Excise Movement Control System
Commercial documents	
Finance and payment	Letters of credit Commercial invoices Order forms Insurance policy documents Payment confirmations
Transport and logistics	Weight/packing list Export cargo shipping instruction Standard shipping note CIM consignment note Road consignment (CMR) note Sea cargo manifest Air cargo manifest Airway bills Seaway bills
Documents of title (including the right to delivery of goods or payments of sums of money) which are usually used in finance, payment, transport and logistics	Bills of lading Bills of exchange Promissory notes Ship's delivery order Marine insurance policy Cargo insurance certificate Warehouse receipts

International guidance and good practices

Certain international instruments provide national lawmakers with guidance about cross-border alignment of the legal recognition of trade electronic transactions and documents to give legal validity and effect to electronic trade documents and transactions in different jurisdictions.

Some mechanisms are treaty-based and therefore may be directly legally binding. In other words, the legal status of electronic trade documents and transactions with respect to the states parties to the treaty is established in the treaty itself. Some of these treaties specify the criteria upon which this legal recognition depends. Treaties that do not, often delegate the definition of these criteria to technical bodies that operate under the umbrella of the framework agreement.

Obligation to accept the electronic form of certain documents

Some treaties contain obligations for states to accept certain documents in electronic form. Where it is not possible to reach agreement on establishing such an obligation, the treaty may contain a "best endeavour" clause, requiring states to make efforts towards that goal (e.g. to establish a single window in electronic form).

Treaties dealing with customs formalities

The TFA[2] requires WTO members to provide for advance lodging of documents in electronic format for pre-arrival processing. It also encourages members to accept paper or electronic copies of supporting documents required for import, export or transit formalities.

The International Convention on the Simplification and Harmonization of Customs Procedures (as amended) (Revised Kyoto Convention)[3] requires contracting parties to permit the lodging by electronic means of goods declarations and supporting documents. It also requires new or revised national legislation to provide for electronic commerce methods as an alternative to paper-based documentary requirements.

The International Convention on the Harmonization of Frontier Controls of Goods[4] encourages contracting parties to reduce reliance on paper documents and to simplify documentation procedures by using electronic systems for the exchange of information contained in railway consignment notes and customs declarations accompanying the goods.

Treaties dealing with transport of goods

The amendments to the Annex to the Convention on Facilitation of International Maritime Traffic, 1965[5] provide that shipping documents produced by electronic and other automatic data processing techniques, in legible and understandable form, shall be accepted.

The Customs Convention on the International Transport of Goods under Cover of TIR Carnets[6] ensures the secure exchange of data on the international transit of goods, vehicles or containers. It counts more than 30,000 authorized operators and is accepted at more than 3,500 customs offices worldwide. The legal framework for the full digitalization of the TIR system (the eTIR) entered into force on 21 May 2021.

The ATA Convention and the Istanbul Convention[7], which provide for the free movement of goods across frontiers and their temporary admission into a customs territory with relief from duties and taxes (ATA System), stipulate that all formalities necessary for implementing the ATA System may be carried out electronically by using data-processing techniques approved by the contracting parties. An eATA carnet project was launched in 2016 by the International Chamber of Commerce (ICC) with the support of the WCO.[8]

Obligation to give legal recognition to the use of electronic communications

Other treaties contain rules on the obligations of the parties to a contract, and, in doing so, give legal recognition to the use of electronic communications in international trade.

Treaties dealing with commercial contracts

The United Nations Convention on the Use of Electronic Communications in International Contracts[9] provides a uniform regime aimed at ensuring that commercial contracts and communications exchanged electronically are as valid and enforceable as their traditional paper-based equivalents. It sets out criteria for establishing the functional equivalence between electronic communications and paper documents, as well as between electronic authentication methods and handwritten signatures among business parties. The Convention requires that the legal validity or enforceability of an electronic contract is not to be denied on the sole ground that it is in the form of an electronic communication. However, it requires neither the use nor acceptance of electronic communications.

The United Nations Convention on Contracts for the International Sale of Goods[10] provides rules for contracts for international sales. Based on the principle of freedom of form, its language is media neutral and its rules can apply to both electronic communications and more traditional media.

Treaties dealing with the transport of goods

The United Nations Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (Rotterdam Rules)[11], which is not yet in force, aims to modernize the legal regime governing the international carriage of goods by sea and establishes rules for shippers, carriers and consignees on maritime (and possibly multimodal) shipping. It includes several provisions on the use of electronic transport records and documents (namely on the authenticity of negotiable electronic transport records) and revises the responsibilities and applicable limits of liability for carriers in cases of loss or damage to goods as a result of negligence.

The United Nations Convention on the Carriage of Goods by Sea (Hamburg Rules)[12] establishes a legal regime governing the rights and obligations of shippers, carriers and consignees under a contract of carriage of goods by sea. It allows the signature on the bill of lading in different formats (i.e. handwritten, printed in facsimile, perforated, stamped, in symbols, or by any other mechanical or electronic means).

The Convention on the Contract for the International Carriage of Goods by Road (CMR)[13] and the Additional Protocol concerning the electronic consignment note (eCMR)[14] standardize the conditions governing the contract for the international carriage of goods by road, particularly with respect to the documents used for such international carriage and to the carrier's liability. The additional protocol provides conditions under which electronic consignment notes are considered equivalent to paper-based versions and therefore have the same evidentiary value and produce the same effects.

Uniform models to harmonize the law

Yet another technique relies on the adoption at the national level of uniform models to harmonize the law across jurisdictions. The uniform model laws can be either sector-specific or general. Their adoption may be called for in bilateral or regional agreements and, again, may be in terms of mandatory obligation or best endeavours.

Model laws on the use of electronic transactions

The UNCITRAL Model Law on Electronic Commerce[15] provides national legislators with a set of internationally acceptable rules for the formation and validity of contracts concluded by electronic means. It also provides for the attribution of data messages, for the acknowledgement of receipt and for determining the time and place of dispatch and receipt of data messages, with a view to removing legal obstacles and increasing legal predictability for electronic commerce. It applies to both commercial and non-commercial electronic transactions.

The UNCITRAL Model Law on Electronic Transferable Records[16] aims at facilitating the use of electronic transferable records by providing a common definition of electronic transferable records that can be deemed as valid and enforceable as their paper-based equivalents:

> "Transferable documents or instruments are paper-based documents or instruments that entitle the holder to claim the performance of the obligation indicated therein and that allow the transfer of the

claim to that performance by transferring possession of the document or instrument. Transferable documents or instruments typically include bills of lading, bills of exchange, promissory notes and warehouse receipts."

Guidelines for the transport of goods

The International Maritime Organization Guidelines for the Use of Electronic Certificates[17] introduces common validity criteria to facilitate the use and acceptance of electronic certificates to show compliance with IMO requirements and to describe operating conditions, crewing requirements and ship equipment carriage requirements. Table 6 lists the relevant sections on electronic transactions and documents in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*.

Table 6: Electronic transactions and documents – relevant sections in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
What is the legal status of electronic transactions?	I.A.1
If an electronic transactions law exists, is it based on uniform models?	I.A.2
What are the conditions, if any, for the legal recognition of electronic transactions?	I.A.3
Does the law establish functional equivalence between paper documents and electronic communications?	I.A.4
What is the legal status of electronic contracts?	I.A.5
Are there special rules for the use of electronic communications in paperless trade?	I.A.6
In particular, are there special rules for the use of trade-related data and documents in electronic form, such as certificates of origin, invoices and phytosanitary certificates?	I.A.7
Are there special rules for the use of electronic transferable records such as bills of lading?	I.A.8

2.2 Trust services

Trust services are electronic services that provide assurance of the quality of data (i.e. their trustworthiness). This assurance is often required in order to provide electronic documents and transactions with legal effects, as a notary's stamp can be necessary to support the legal validity of some types of document.

According to UNCITRAL texts, the requirements for an electronic signature to be functionally equivalent to a handwritten one are to identify[18] a signatory in relation to a data message and to indicate the signatory's intent with respect to the information contained in the data message. Trust service providers may be able to certify these elements of an electronic signature and thus support its validity.

Electronic signatures may themselves be thought of as one type of trust service as they are considered, for instance, under the EU eIDAS Regulation on electronic identification and trust services for electronic transactions[19]. They may serve to guarantee the origin and integrity of data messages, which may include trade documents exchanged by businesses.

It may be noted that proof of origin is perhaps the first and most important function of a signature of any kind. Many of the rules about the validity of electronic signatures affect this function. In this way, they can improve the security of the signed documents against error and malicious attacks. Different technologies can be used to provide trust services, and therefore their level of reliability might differ.

Some types of electronic signature (i.e. digital signature, electronic digital signature) may provide greater assurance of its origins and confirm the integrity of the signed document. These electronic signatures are predicated on a public key infrastructure or on a set of requirements needed to authenticate the signature.

A digital signature based on public key infrastructure relies on the use of a private and a public key, and usually involves a certification authority. Third-party certification service providers (e.g. qualified electronic signature providers) may need to comply with further requirements to associate their services with additional legal effects. Organizations and regions (i.e. the European Union) rely on particular certificate authority to ensure authenticity and prevent forgery. Digital signatures have been legally binding and enforceable through legislation such as the EU Directive on a community framework for electronic signatures[20] and, more recently, the eIDAS Regulation.

The increased use of electronic trust services as substitutes for paper-based processes may result in uncertainty as to their legal effect in the absence of an adequate legal framework. The law may contain general rules on the legal status of some or all trust services. It may also mandate the use of certain trust services for certain types of transaction or document.

Specific legal regimes can be established for a particular sector (e.g. banks) or among particular participants (e.g. public agencies). On a voluntary basis, through co-regulation or parties' agreement, the use of a specific technology may be agreed upon for certain trust services, spelling out how these trust services should be provided and supported (certified) in order to be legally valid.

International guidance and good practices

Paperless trade systems need to rely on mechanisms guaranteeing an international alignment on what constitutes a valid trust service across borders. Various mechanisms exist. Some are treaty-based and therefore may be directly legally binding. Others favour the harmonization of legal systems through the adoption of model laws, while others are based on bilateral or regional agreements.

Moreover, trade agreements may contain provisions requiring states to give legal recognition to electronic signatures in a manner that is technology neutral and favours interoperability (see Box 2).

Conventions and treaties

Conventions and treaties provide substantive law to guarantee legal harmonization in states parties. The provisions they contain are either best endeavours or mandatory requirements. Legal recognition of foreign signatures may be provided by treaty (e.g. United Nations Convention on the Use of Electronic Communications in International Contracts for electronic signatures used in commercial exchanges).

"Paperless trade systems need to rely on mechanisms guaranteeing an international alignment on what constitutes a valid trust service across borders."

Box 2: Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)

The parties to the CPTPP include Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore and Viet Nam.

In Article 14.6, on electronic authentication and electronic signatures, the CPTPP recognizes electronic signatures in a manner that is technology neutral and favours interoperability:

"1. Except in circumstances otherwise provided for under its law, a Party shall not deny the legal validity of a signature solely on the basis that the signature is in electronic form.

2. No Party shall adopt or maintain measures for electronic authentication that would:

(a) prohibit parties to an electronic transaction from mutually determining the appropriate authentication methods for that transaction; or

(b) prevent parties to an electronic transaction from having the opportunity to establish before judicial or administrative authorities that their transaction complies with any legal requirements with respect to authentication.

3. Notwithstanding paragraph 2, a Party may require that, for a particular category of transactions, the method of authentication meets certain performance standards or is certified by an authority accredited in accordance with its law.

4. The Parties shall encourage the use of interoperable electronic authentication."

Regional and international mutual recognition schemes

Mutual recognition schemes provide an international or regional accreditation system based on agreed legal principles with regard to the conditions for the recognition of foreign electronic communications and related matters such as electronic signatures. They usually rely upon special entities with the responsibility to issue the certification or accreditation to business entities. For example, the EU eIDAS Regulation provides legal recognition of foreign signatures within the European Union.

Model laws and guidelines

Model laws and guidelines provide lawmakers with uniform laws that support legal harmonization when drafting new laws or amending existing ones. They can be sector-specific or general.

Laws can apply the same standards to validate the use of domestic and foreign electronic signatures. When based on the UNCITRAL Model Law on Electronic Signatures, laws provide for a test of substantial equivalence between the signatures offered in different jurisdictions. UNCITRAL is also working towards the development of a model law on identity management and trust services, which could guide national legislation.

Contractual frameworks

Commercial operators may conclude cross-recognition or cross-certification agreements for the mutual recognition of the legal effects of the electronic communications exchanged and any related service provided. Such agreements may contain a choice of applicable law. However, they also need to respect any mandatory rule of the jurisdictions where they are intended to take effect. The Pan Asian E-Commerce Alliance Mutual Recognition Framework is an example of such a scheme.

Table 7 lists the relevant sections on trust services in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*.

Table 7: Trust services – relevant sections in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Does the law address how electronic signatures, including for identification, authorization and authentication, are added in an electronic environment? Does it require the use of a specific technology or method for electronic signatures or is it technology neutral?	I.B.1
Does the law adopt a functional equivalence approach for electronic signatures?	I.B.2
Is the law based on international standards?	I.B.3
Does the law recognize foreign electronic signatures?	I.B.4
Are there special rules for the use of electronic signatures in paperless trade?	I.B.5
Does the law deal with trust services?	I.B.6
Does the law establish general requirements for data retention, including a minimum and maximum retention period? Do they apply to electronically stored data?	I.E.1
Does the law require or favour the use of specific trust services or service providers for data retention?	I.E.2
Is electronic evidence admissible in judicial and other proceedings?	I.E.4
Is electronic evidence that is generated, stored or collected abroad admissible? If so, under which conditions?	I.E.5

2.3 Data governance

When documents and information are exchanged between users using electronic systems or between electronic systems, the system must ensure confidentiality (i.e. information is private to only designated parties to the communications) and data integrity (i.e. the accuracy and consistency of data are maintained and assured over their entire life cycle).

Information submitted to complete border formalities can be confidential and personal. To ensure that traders submit data only once, government entities should be able to share collected or submitted information among themselves. Clear legislative and contractual rules governing the use and redistribution or sharing of information submitted to a paperless trade system are therefore important for its operation.

It is expected that the information and communications technology (ICT) system will be robust enough to safeguard it from being compromised. As the volume of data managed in paperless trade systems increases exponentially, these systems become a more tempting target for hackers. The willingness of users to replace paper-based documents with electronic information depends on their confidence in the security, confidentiality and privacy of personal and business information.

The need for data privacy and confidentiality may inspire conditions on data transfer between parties, and thereby influence the functioning of paperless trade systems. Cross-border exchange of trade-related data should be smooth but not compromise data confidentiality, privacy and security.

Moreover, at the national level, cybersecurity (the protection of the integrity of data against intentional or negligent compromise) requires coordinated action for prevention, preparation, response and incident recovery on the part of government authorities, the private sector and civil society. Protecting computer systems and networks from the theft of or damage to their hardware, software, or electronic data, as well as from the disruption or misdirection of the services they provide, is essential to ensure the adoption of paperless trade systems.

There are international instruments that facilitate cybersecurity cooperation, given that cyberthreats are generally borderless. These cooperation schemes, among other things, enable cross-border information exchange for regulatory oversight or law enforcement purposes.

Technical measures to ensure security and availability of computer systems and networks are discussed in Section 3.6 of the Toolkit. Similarly, data governance involves issues relating to liability, which is discussed in Section 2.4.

International guidance and good practices

General data laws governing collection, access to, use and sharing of data might already apply to operators managing paperless trade systems. For instance, section I.C.7 of the *Legal Readiness Assessment Guide* states that many countries have established general penalties against abusive access or alteration and other misuse of the information stored, communicated, or processed by a computer system, which covers, among others, entities managing paperless trade systems (see Articles 30-33 of the Electronic Trade Facilitation Act 2015 of the Republic of Korea).

The Customs Act (1960) and the Electronic Transactions Act (2010) of Singapore, respectively, prohibit information collected for a specified and lawful purpose from being shared for another purpose without prior consent of the supplier of the information, and specify the conditions under which information collected in the performance of duty can be used and disclosed.[21] The application of criminal laws to incorrect or false declarations to customs in an electronic environment is discussed in Section 2.4.

International instruments can provide national lawmakers with guidance, which may take the form of treaties or model laws, to help foster international alignment on data governance. Examples of these types of instrument are given in Table 8. Trade agreements may also contain dedicated provisions on cross-border information transfer (see Box 3).

Box 3: Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)

In Article 14.11, on cross-border transfer of information by electronic means, the CPTPP states:

"1. The Parties recognise that each Party may have its own regulatory requirements concerning the transfer of information by electronic means.

2. Each Party shall allow the cross-border transfer of information by electronic means, including personal information, when this activity is for the conduct of the business of a covered person.

3. Nothing in this Article shall prevent a Party from adopting or maintaining measures inconsistent with paragraph 2 to achieve a legitimate public policy objective, provided that the measure:

(a) is not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade; and

(b) does not impose restrictions on transfers of information greater than are required to achieve the objective.

Table 8: Example international instruments providing data governance guidance

Data governance area	Example instruments
Privacy	OECD 1980 Guidelines on the Protection of Privacy and Transborder Flows of Personal Data (revised in 2013) EU General Data Protection Regulation APEC Privacy Framework Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (Convention 108) of the Council of Europe ASEAN Framework on Personal Data Protection African Union Convention on Cyber Security and Personal Data Protection (Malabo Convention) Supplementary Act A/SA.1/01/10 on Personal Data Protection within ECOWAS Standards for Personal Data Protection for Ibero-American States Madrid Resolution: International Standards on the Protection of Personal Data and Privacy adopted by the International Conference of Data Protection and Privacy Commissioners Technical standards on privacy protection in ISO/IEC 27701:2019, *Security Techniques: Extension to ISO/IEC 27001 and ISO/IEC 27002 for Privacy Information Management — Requirements and Guidelines*
Cybersecurity	Budapest Convention on Cybercrime of the Council of Europe Directive C/DIR/1/08/11 on Fighting Cyber Crime within ECOWAS African Union Convention on Cyber Security and Personal Data Protection (Malabo Convention) ESCWA *Cyber Legislation Directives* OECD recommendations in *Digital Security Risk Management for Economic and Social Prosperity* OECD *Recommendation of the Council on Digital Security of Critical Activities*
Intellectual property rights	Paris Convention for the Protection of Industrial Property WTO Agreement on Trade-Related Aspects of Intellectual Property Rights
Government access to data	Currently under discussion at the OECD Committee on Digital Economy Policy*

* See https://www.oecd.org/sti/ieconomy/trusted-government-access-personal-data-private-sector.htm.

Note: APEC — Asia-Pacific Economic Cooperation; ASEAN — Association of Southeast Asian Nations; ECOWAS — Economic Community of West African States; ESCWA — Economic and Social Commission for West Asia; IEC — International Electrotechnical Commission; ISO — International Organization for Standardization; OECD — Organisation for Economic Co-operation and Development.

With respect to personal information protection, exporting data might be allowed on the condition that the destination jurisdiction provides data protection equal to that in the exporting state. Various international instruments aim at facilitating cross-border data flow by ensuring equal data privacy and protection between two or more territories:

- contractual safeguards defined by companies without approval or review from a public authority (e.g. consent, transmission of privacy notice);
- internal rules defined by a group or company and submitted for approval to a public authority (e.g. binding corporate rules);
- certification schemes and codes of conduct that are submitted for approval to a public authority or third-party agent;
- a public entity's decision recognizing the equivalent level of data protection in a given foreign territory (i.e. public adequacy decisions[22]);
- pre-defined safeguards defined by a public authority (e.g. standard contractual clauses);
- certification schemes and codes of conduct approved by public authority (e.g. Cross-Border Privacy Rules certification system[23]).

Digital economy agreements are a more recent and broader cooperation model than traditional free trade agreements, with a strong focus on digital communications. For example, a memorandum of understanding with regard to the Singapore–Australia Digital Economy Agreement provides additional detailed guidance on cooperation in personal data protection.[24]

"When documents and information are exchanged between users using electronic systems or between electronic systems, the system must ensure confidentiality and data integrity."

Lastly, international cybersecurity cooperation schemes can help to exchange information with a view to mitigating cyberthreats across borders:

- Title III of the Budapest Convention on Cybercrime of the Council of Europe.
- Some bilateral and regional trade agreements, such as the Digital Economy Partnership Agreement and the Regional Comprehensive Economic Partnership,[25] encourage capacity building of national entities responsible for computer security incident response and workforce development through mutual recognition of qualifications, as well as the cross-border exchange of information to identify and mitigate malicious intrusions or dissemination of malicious code that affect electronic networks globally.
- Mutual legal assistance treaties enable authorities to request access to data for law enforcement purposes. However, securing evidence through such processes takes time.

Table 9 lists some of the relevant sections on data governance in the *Legal Readiness Assessment Guide* and *Checklist*.

Table 9: Data governance – relevant sections in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Is there a law on privacy and data protection? If so, what are its features? Is it based on international standards?	I.C.1
Are there any special rules on privacy and data protection for paperless trade?	I.C.5
Does the law protect the confidentiality of commercial information in electronic form?	I.C.6
Are there provisions on cybercrimes that are applicable to paperless trade?	I.C.7
Are there agreements or policies for collecting, accessing, using and sharing data among government agencies participating in a paperless trade system?	I.D.1
What defines rights regarding information exchanged in the paperless trade system, the law or contractual agreements?	IV.A.1

2.4 Liability and dispute settlement

Trading parties and other concerned entities may suffer losses from the incorrect transmission or improper reuse of information and may seek compensation for those losses. Guaranteeing access to civil remedies for such losses and dispute settlement opportunities can help to enhance trust in paperless trade systems, and thereby support their adoption.

Most legal systems require people (legal entities) whose fault (i.e. failure to live up to accepted standards of conduct) causes harm to others to repair the harm or to make up their losses. This principle should normally apply to the participants in cross-border paperless trade, in the same way as to offline traders.

However, a number of issues relevant to paperless trade are of an administrative nature (i.e. they affect matters of public policy and not only of the allocation of private rights and remedies). Often public entities such as customs authorities are involved.

As a consequence, the law may limit or exclude liability of some actors, usually in order to encourage their activity or to lower obstacles to market entry. Different liability rules may therefore be applicable to the principal participants in a paperless trading system:

- The operators of the system itself (e.g. a single window) should provide accurate and timely information exchange. If the performance standards for information exchange are not met, the system operator may be held liable (subject, as noted, to limitation or exemption because of their public status).

- Other governmental entities provide and process trade-related data for several purposes (e.g. goods control and taxes), where accuracy and speed of interaction will affect the efficiency of the system and ultimately of trading operations. Liability rules for not providing or processing trade-related data correctly may be spelled out in legislation or in contracts. The general law may provide for the liability of government agencies or for their exemption from liability when performing public functions.

- Communications intermediaries such as internet service providers provide transmission or trust services, but they do not originate the information. Their failure can cause harm to trading parties.

- Providers of trust services (e.g. certification authorities) support electronic signatures, timestamping, the integrity of documents, registered delivery and other services guaranteeing the quality of data and electronic messages. Their liability is usually defined in contractual agreements, but a law may establish mandatory liability terms. If they are public agencies, a different liability regime may apply.

- Other participants in the system (e.g. customs brokers) may commit acts or omissions during customs clearance or other trade-related operations that might result in damages. Participants who intentionally submit incorrect or false information may face criminal, administrative and civil sanctions both in the paper-based and in the paperless environment. That said, a law may limit or exclude liability of selected service intermediaries where lawmakers want to encourage their activity.

"Cross-border paperless trade may be subject to special dispute resolution mechanisms that consider the public nature of the parties and interests involved."

Most if not all jurisdictions have legal rules to decide who hears a dispute (choice of forum) and under which legal regime (choice of law). These rules often support the autonomy of parties involved in a transaction (i.e. they may agree themselves on the choice of law and of forum in their international contracts). Sometimes the law specifies criteria for such choices or restricts them to local forums or laws where the national interests are considered to require local treatment, especially when a public entity is involved.

The law may also encourage or require parties to attempt to resolve their disputes through alternative dispute resolution mechanisms such as mediation or arbitration. These processes are increasingly being conducted online, notably by videoconference.

Cross-border paperless trade may be subject to special dispute resolution mechanisms that consider the public nature of the parties and interests involved. Automated online dispute resolution is developing for simple and routine disputes, but so far not for non-standard disputes over matters of high value.

International guidance and good practices

Treaties, model laws and model contractual provisions can help to provide dispute resolution mechanisms in a cross-border context. These instruments are generally designed for civil or commercial matters because of state privileges and immunities and will normally apply to B2B transactions – but not usually to B2G or G2G transactions.

The Hague Conference on Private International Law has adopted a number of texts on the choice of forum and the recognition and enforcement of foreign judgments. For instance, the Convention on Choice of Court Agreements[26] gives conditional effect to party autonomy in choosing the forum for international litigation. If parties do not decide otherwise, the convention provides criteria to establish the competent court.

The Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters[27] also facilitates the effective international application of judgments – and thus the trade creating the adjudicated rights – by setting forth commonly accepted conditions for recognition and enforcement and agreed grounds for refusal.

With respect to international commercial arbitration, the UNCITRAL Model Law on International Commercial Arbitration[28] assists states in reforming their law on arbitral procedures and reflects worldwide consensus on key aspects of international arbitration practice in view of fostering legal harmonization.

The UNCITRAL Arbitration Rules[29] provide paperless trade operators and users with procedural rules for the conduct of arbitral proceedings arising out of their commercial relationship.

A state may also be a party to the Convention on the Recognition and Enforcement of Foreign Arbitral Awards[30] to enforce the results of the arbitration across borders. Commonly known as the New York Convention, it is the worldwide standard on such matters and has reached near-universal acceptance.

Table 10 lists the relevant sections on liability and dispute settlement in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*.

Table 10: Liability and dispute settlement – relevant sections in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Do data custodians, such as data centres, assume liability for loss or damage to electronically stored information? Is such liability contractual, statutory or both?	I.E.3
May the operator of the paperless trade system be held liable for providing its services?	IV.B.1
May government agencies participating in the paperless trade system be held liable for their interaction with the system?	IV.B.2
May service providers, such as internet service providers and trust services providers, be held liable for interacting with the paperless trade system?	IV.B.3
May other participants in the paperless trade system (e.g. customs brokers) be held liable for their interaction with the system or their role in the passage of information or data passing through their systems?	IV.B.4
Do national laws deal with choice-of-forum and choice-of-law issues relevant to paperless trade facilitation?	IV.C.1
Does the law contemplate alternative means of resolving disputes in international trade, such as arbitration and mediation? Are the results of any such means clearly enforceable across borders?	IV.C.2
Are online dispute resolution mechanisms used in paperless trade facilitation?	IV.C.3

Endnotes

1 UNCITRAL Model Law on Electronic Commerce.

2 See https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm.

3 See http://www.wcoomd.org/zh-cn/topics/facilitation/instrument-and-tools/conventions/pf_revised_kyoto_conv.aspx.

4 See https://unece.org/transport/documents/2021/03/working-documents/international-convention-harmonization-frontier.

5 See https://www.imo.org/en/OurWork/Facilitation/Pages/FALConvention-Default.aspx.

6 See https://unece.org/transport/tir.

7 See http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/conventions/pf_ata_system_conven.aspx.

8 See https://iccwbo.org/resources-for-business/ata-carnet/e-ata-carnet-project.

9 See https://uncitral.un.org/en/texts/ecommerce.

10 See https://uncitral.un.org/en/texts/salegoods/conventions/sale_of_goods/cisg.

11 See https://uncitral.un.org/en/texts/transportgoods.

12 *Ibid.*

13 See https://treaties.un.org/doc/Treaties/1961/07/19610702%2001-56%20AM/Ch_XI_B_11.pdf.

14 See https://treaties.un.org/doc/Treaties/2008/03/20080303%2006-53%20PM/CTC-xi-B-11b.pdf.

15 See https://uncitral.un.org/en/texts/ecommerce.

16 See https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_transferable_records.

17 See https://wwwcdn.imo.org/localresources/en/OurWork/IIIS/Documents/FAL.5-Circ.39-Rev.2%20-%20Guidelines%20For%20The%20Use%20Of%20Electronic%20Certificates.pdf.

18 This identification function can also be complemented by digital identity systems (see Section 3.1).

19 See *Regulation (EU) No. 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC*, 28 August 2014.

20 See *Directive 1999/93/EC of the European Parliament and of the Council of 13 December 1999 on a Community framework for electronic signatures,*19 January 2000.

21 For case studies of national cybersecurity policies in Thailand and the United States, see https://thainetizen.org/wp-content/uploads/2019/11/thailand-cybersecrutiy-act-2019-en.pdf and https://trumpwhitehouse.archives.gov/wp-content/uploads/2018/09/National-Cyber-Strategy.pdf. For an example of national laws aiming at ensuring privacy and confidentiality in electronic communications, see https://www.cr-online.de/17-06-29_vzbv-amendments_eprivacy-regulation.pdf.

22 Examples of adequacy decisions include the European Union with Andorra, Argentina, Canada (commercial organizations), the Faroe Islands, Guernsey, the Isle of Man, Israel, Japan, Jersey, New Zealand, Switzerland and Uruguay (see https://ec.europa.eu/info/law/law-topic/data-protection/international-dimension-data-protection/adequacy-decisions_en).

23 See https://www.apec.org/about-us/about-apec/fact-sheets/what-is-the-cross-border-privacy-rules-system.

24 See https://www.mti.gov.sg/-/media/MTI/Microsites/DEAs/Singapore-Australia-Digital-Economy-Agreement/MOUs/MOU-on-Cooperation-in-Personal-Data-Protection.pdf.

25 Singapore has entered multiple free trade agreements and economic partnership agreements over e-commerce and cybersecurity to build up their cyber capabilities in responding to computer security incidents. These agreements also encourage bilateral or multilateral cooperation in identifying and mitigating malicious intrusions or dissemination of malicious code that may affect the networks of involved parties.

26 See https://www.hcch.net/en/instruments/conventions/full-text/?cid=98.

27 See https://www.hcch.net/en/instruments/conventions/full-text/?cid=137.

28 See https://uncitral.un.org/en/texts/arbitration/modellaw/commercial_arbitration.

29 See https://uncitral.un.org/en/texts/arbitration/contractualtexts/arbitration.

30 See https://www.newyorkconvention.org.

3 Enabling a conducive technical framework

3.1 Digital identity

Establishing the identity of users electronically is necessary to promote confidence in interactions with and transactions within a paperless trade system. Electronic identification and authentication ascertain who is sending data to whom.

Identities that remain uncertain could compromise all actions taken based on that data. Few people will take actions with legal effect if they do not know who they are dealing with.

Identity is the ability to distinguish an entity in a context. Natural and legal persons may have both foundational and functional digital identities.

Foundational identities are unique identifiers, such as the name and date of birth of a natural person, or the registration number of a company issued by the business register of the country involved. Those identifiers are persistent and irreplaceable and may apply in many distinct contexts. Those identifiers are mainly a result of the country's history and designed for public law purposes and are not specifically meant for supporting the B2G and B2B processes of the international supply chain.

Functional identities are identifiers (issued by the public or private sector) that are used in specific contexts and they may acquire credibility by repeated use. Each entity may have multiple functional identities but should have only one foundational identity based on the national legislation of the country of origin.

In practice, information from foundational digital identity providers such as civil records and vital statistics offices, and company registries, is used by trust services to provide the identity attribute of clients for whom they offer assurance as to identification.

"Establishing the identity of users electronically is necessary to establish confidence in user identities in interactions and transactions with a paperless trade system."

Several methods can be used to identify a legal or natural person in information systems, ranging from a password and higher levels of security that utilize multi-factor authentication to possession of a certificate from a third-party certificate authority (i.e. trust service provider) that attests to its identity. Electronic identification and authentication may be a function of certain trust services, such as electronic signatures, to provide evidence whether a document or message may be attributed to a particular legal entity.

Along with digital identities of legal entities and natural persons, identification of physical and digital objects[1] is equally important. Digital identities of objects permit one to identify and trace the history, distribution,

location and use of containers, consignments, shipments, bills of lading, insurance certificates – not only physical products but also digital assets. Traceability and greater transparency of supply chain operations can play a key role in improving the ability to recall products, mitigating counterfeiting activities, and providing consumers with greater insights into the environmental footprint and social impacts of final and intermediate goods in global supply chains.

International guidance and good practices

Identification of legal entities

Identifiers play a key role as "data connectors" between systems (i.e. B2G, B2B, G2G). Both public and industry actors have developed identifiers to help to identify supply chain actors and to gain insights into who originated data messages (see Box 4).

Box 4: Examples of identifiers

WCO's trade identification number

The WCO, in collaboration with customs authorities and industry stakeholders, has developed technical standards and guidance for a trade identification number (TIN) to identify authorized economic operators (AEOs), which is now commonly used for reporting to customs authorities. The TIN is for B2G reporting only.

Legal entity identifier

The Financial Stability Board, established by the G20 in 2011, was mandated to develop the Global Legal Entity Identifier. Now administered by the Global Legal Entity Identifier Foundation, the legal entity identifier (LEI) is a 20-digit code to uniquely identify public and private-sector participants in financial transactions (B2G, B2B).

Each LEI contains business register data on the entity as registered in the country involved and mandatory information about the entity's ownership structure. It thus answers the questions of "who is who" and "who owns whom" with regard to corporate affiliation.

All the data are made available as a broad public good free of charge for any user on the Global Legal Entity Identifier Foundation website. The Foundation is subject to oversight by the LEI Regulatory Oversight Committee.

Proprietary systems

Proprietary systems, such as the Data Universal Numbering System (DUNS), developed and managed by Dun & Bradstreet, assign a unique numeric identifier (a DUNS number) to a single business entity.

Decentralized Identifiers

The Decentralized Identifiers (DIDs) protocol is a type of identifier that enables a verifiable, decentralized digital identity. A DID acts as a unique identifier. Verifiable credentials are then used to store and represent machine-readable credentials that are tied to that cryptographic identity. The World Wide Web Consortium (W3C) has developed the Verifiable Credentials Data Model, which provides a standard way to express identity credentials on the internet for any subject (i.e. a person, a company, a physical or digital good, or even a document). The United States Department of Homeland Security, for example, is funding the development of DID-based identity credentials as a standard that the United States Customs and Border Protection service can use for supply chain verification.

The UNCITRAL Model Law on Identity Management and Trust Services (expected to be adopted in 2022) will introduce a common model legal regime for identity management services to support their use and cross-border recognition.

Identification of objects

In relation to objects, identifiers include product identifiers and asset identifiers for containers, ships and planes. A presentation of identifiers standards for objects is available in the *Standards Toolkit for Cross-border Paperless Trade* (ICC/WTO, 2022).

Tables 11 and 12 list some of the relevant sections on digital identity in the *Legal Readiness Assessment Guide*, the *Technical Readiness Assessment Guide* and the corresponding checklists.

Table 11: Digital identity – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Has your country implemented electronic customs (and other services that facilitate customs declarations in an electronic format)? If yes…, Does it have the ability to authenticate users electronically?	A2.1.1 A2.1.1.3
Has your country implemented electronic port systems (including air, sea, road, rail and inland ports)? If yes…, Does it have the ability to authenticate users electronically?	A2.1.2 A2.1.2.3
Has your country implemented any cross-border trade systems other than those specified above? If yes…, Does it have the capability to authenticate users electronically?	A2.1.4 A2.1.4.3

Table 12: Digital identity – relevant sections in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Does the law address how electronic signatures, including for identification, authorization and authentication, are added in an electronic environment? Does it require the use of a specific technology or method for electronic signatures or is it technology neutral?	I.B.1
Does the law recognize foreign electronic signatures?	I.B.4
Does the law deal with trust services?	I.B.6

3.2 Electronic payments

The ability to make payments electronically can facilitate and accelerate trade. Electronic payments may be used within a paperless trade system for various purposes, such as the payment of customs duties and fees (B2G payment) and the settling of the purchase price of goods and services (B2B and C2B payments).

There are different types of electronic payment system and an increasing number of licensed third-party payment providers and platforms (i.e. independent of traditional banks). The types of system that can be used by a paperless trade system depends on the national payment system architecture.

The national bank or an association of domestic banks and financial institutions generally establish the rules and standards for electronic payment and settlement in domestic and cross-border funds transfers, for example by ordering a bank to transfer money (wire transfer) or through credit or debit cards.

Alternatively, or complementarily, certain commercial documents may be used to perform payment or give guarantee of payment. These documents include, for instance, bills of exchange, cheques, promissory notes and letters of credit, which can, in some jurisdictions, be used in electronic form.

Limitations often apply to the types of electronic payment accepted, for example by requiring the exclusive use of a payment service method or provider. In some jurisdictions, the use of electronic payments may be restricted to domestic transactions.

Moreover, diverging legal and technical standards have made it more difficult to connect different payment systems. The World Economic Forum (WEF, 2020) reports that domestic infrastructure requirements, forced data localization, and licensing and equity requirements on foreign firms have hindered the electronic payments service providers, thereby limiting services available to the domestic market and vice-versa. Divergent regulatory systems and infrastructures have created challenges for domestic firms.

International guidance and good practices

When introducing a national legal framework for electronic payments, instruments such as model laws, treaties and guidelines can be used (see Box 5).

Payment should not present an unnecessary burden to users. Interoperability of payment systems is necessary to support all electronic payment transactions.

Electronic payment systems should use international standards to be able to communicate with different payment systems within and across borders, thereby providing traders fulfilling border formalities with a payment system that connects with their chosen payment method and financial institution. International standards (e.g. payment messaging standards such as SWIFT) play an important role in facilitating cross-border payment systems.

Many payment card networks use a common messaging standard.[2] Similarly, cross-border payments sent between banking customers (issuers) also use international standards and standardized messages between banks with instructions for payment transfers.[3]

Tables 13 and 14 list some of the relevant sections on integrating electronic payments in the *Legal Readiness Assessment Guide,* the *Technical Readiness Assessment Guide* and the corresponding checklists.

Box 5: Examples of instruments

WTO's Trade Facilitation Agreement

Article 7.2 of the WTO's Trade Facilitation Agreement deals specifically with e-payment in the form of a 'best-efforts' provision and states that members "to the extent practicable, adopt or maintain procedures allowing the option of electronic payment for duties, taxes, fees, and charges collected by customs".

International Convention on the Simplification and Harmonization of Customs Procedures (as amended) (Revised Kyoto Convention)

Standard 4.6 of the Revised Kyoto Convention requires national legislation to "specify the methods that may be used to pay the duties and taxes."* The Revised Kyoto Convention was developed by the WCO and is the main trade facilitation customs convention.

The guidelines to Standard 4.6 recommend that customs authorities "should accept payment of duties and taxes in forms other than cash, such as travellers cheques, money orders, certified cheques, uncertified cheques (in specified circumstances), bonds, credit cards, securities, etc."**

The guidelines encourage the use of electronic funds transfer, "allowing for quick and efficient payment." The WCO also provides practical implementation guidance on e-payment systems applied to single windows.+

International Chamber of Commerce

The ICC Customs Guidelines provides relevant business perspectives on electronic payments (ICC, 2012).

Financial Stability Board

The Financial Stability Board developed, in coordination with the Bank for International Settlements Committee on Payments and Market Infrastructures, the G20 Roadmap for Enhancing Cross-border Payments: First Consolidated Progress Report, which was endorsed by the G20 leaders at their November 2020 Summit.++

* See http://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/conventions/pf_revised_kyoto_conv/~/link.aspx?_id=7D65110194D24C01AC00508F0CC4A329&_z=z.

** See http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/wto-atf/dev/rkc-guidelines-ch4.pdf?la=en.

+ See http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/instruments-and-tools/tools/single-window/compendium/swcompendiumvol2partiv.pdf.

++ See https://www.fsb.org/wp-content/uploads/P131021-1.pdf.

Table 13: Integrating electronic payments – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Question in the *Guide* and *Checklist*	Section
Are the paperless trade systems integrated with an electronic payment system?	A2.1.1.2, A2.1.2.2, A2.1.4.2

Table 14: Integrating electronic payments – relevant sections in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Does the paperless trade system accept or initiate electronic payments?	IV.D.1
Does the paperless trade system accept electronic transferable records?	IV.D.2

3.3 Data models and semantics

For parties to exchange and reuse fully electronic messages, all information needs to be clearly defined and unambiguous, both from a semantic and a syntax perspective. Data compatibility is one of the main issues that needs to be addressed in various connectivity projects.

A standardized data library is useful. For example, packaging material that is palletized can be described as slab, board and honeycomb slate, among others, before even taking into account differences between languages. In the context of paperless trade systems, data semantic and syntax standardization based on international standards can help to enable seamless data exchange without compatibility issues.

International guidance and good practices

Streamlining documentary and data requirements relating to import, export and transit can facilitate data standardization. The United Nations Economic Commission for Europe (UNECE) and United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) suggest "an iterative process of capturing, defining, analyzing, and reconciling government information requirements … to eliminate redundancies and duplication" (UNECE and UN/CEFACT, 2013a).

Similarly, the United Nations Network of Experts for Paperless Trade and Transport in Asia and the Pacific (UNNExT), ESCAP and UNECE have developed the *Data Harmonization and Modelling Guide for Single Window Environment* (UNNExT *et al.*, 2012) "to assist governments and businesses in harmonizing and standardizing the international trade data required in fulfilling all import, export, and transit-related regulatory requirements." Both UN/CEFACT and the WCO have developed libraries of semantics and data models to standardize semantics and processes.

An overview of existing data standards (i.e. standards that define the core elements of an electronic record representing a trade document) and data format/exchange standards (i.e. standards that facilitate the exchange of data between different systems) is provided in the *Standards Toolkit for Cross-border Paperless Trade* (ICC/WTO, 2022), which maps existing standards, including:

- foundational and identifier standards;
- standards for commercial transaction documents;
- standards for transport, forwarding and cargo handling documents;
- standards for payment documents;
- standards for port and airport clearance documents;
- standards for real-time shipment tracking data;
- standards for official control documents at customs and other cross-border regulatory agencies;
- interoperable digitalization frameworks.

Table 15 lists the relevant sections on data models and semantics in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*.

Table 15: Data models and semantics – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Has data harmonization and standardization been conducted for the data elements for paperless trade at the agency level? At the national level?	A6.1, A6.1.1, A6.1.2
If yes, has a data model been adopted and is it based on international standards/guidelines?	A6.1.3, B4.1

3.4 Communication protocols

To enable the exchange of information within and across borders, IT networks underlying paperless trade systems should integrate various communication protocols. Protocols are rules (i.e. for e-communications purposes, languages implemented in the form of networking algorithms) that govern the way a particular system functions for communication. These rules define the syntax and semantics of communication to exchange information between two electronic devices.

Multiple communication protocols exist, including:

- multi-protocol label switching (MLPS)
- internet protocol (IP)
- virtual private network (VPN)
- secure hypertext transfer protocol (HTTPS)

The network infrastructure for paperless environment should support those communication protocols to enable connectivity with and interoperability between heterogeneous platforms. Otherwise, paperless trade systems will exist in silos unable to exchange information among themselves, thereby hindering the potential of cross-border exchange of electronic messages.

International guidance and good practices

According to the ISO Open Systems Interconnection Model, data transmission (i.e. how data are sent and received) over a network can be described through seven layers or levels:[4]

- physical
- data link
- network
- transport
- session
- presentation
- application

A communication protocol should cover these layers and should be open (i.e. not proprietary) (see Box 6).

A mapping of data formats and exchange standards commonly used to facilitate the exchange of trade data between different systems is available in the *Standards Toolkit for Cross-border Paperless Trade* (ICC/WTO, 2022).

Table 16 lists the relevant sections on communication protocols in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*.

Box 6: Examples of protocols

International well-known and open protocols include, *inter alia*:

Internet protocol (IP) is a communications protocol for routing packets of data over a network. IP does not handle packet ordering or error checking. Such functionality requires another protocol, typically the transmission control protocol (TCP).

Hypertext transfer protocol (HTTP) is used to request and transmit files, especially web pages and web page components, over the internet or other computer networks. HTTP can be implemented on top of any other protocol on the internet, or on other networks. Combined with the secure socket layer/transport layer security (SSL/TLS) protocol, the hypertext transfer protocol secure (HTTPS) provides encryption and secure identification.

Extensible markup language (XML), developed by UN/CEFACT and the Organization for the Advancement of Structured Information Standards (OASIS), is a communication protocol supporting the exchange of electronic business data.

Simple object access protocol (SOAP), maintained by the World Wide Web Consortium (W3C), provides a way to communicate between applications running on different operating systems, with different technologies and programming languages.

JavaScript object notation (JSON) is a standard file format designed for data interchange that is both human and machine-readable. It is commonly used for transmitting data in web applications.

Table 16: Communication protocols – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
How does the single window system receive data electronically, i.e., what kind of user interface and communication channel is used (Internet-based network or dedicated/secured private network)?	A2.2.1
Is the ICT network able to support various communication protocols?	A3.2.3
Is the ICT network designed to take into account future requirements such as device and technology upgrades?	A3.2.5
Is the single window system, if implemented, interoperable with other systems?	A3.3
Is it able to integrate, interface and/or interoperate with other existing heterogeneous systems (i.e., with systems on a different platform)?	A3.3.1
If it does support (i.e. is interoperable with) heterogeneous systems, what is the method of integration/ interfacing?	A3.3.2
What kind of communication protocol is used for electronic data exchange currently?	A.4.4

3.5 Connectivity

Telecom infrastructure and network services should be available at all stations (communications points) supporting paperless trade systems. The lack of secure internet with proper speed or its cost when present can impede implementation of a paperless trade system.

Different network infrastructure options that are financially and technologically appropriate for different areas could be deployed (e.g. using fibre optics, wireless devices and satellites).

Moreover, the ICT infrastructure should be designed with possible future device and technology upgrades in mind. The potential future expansions that should be considered include, for example, increased numbers of users of the systems, increased number of ICT nodes of connectivity, and future requirements of higher performance and throughput of electronic services.

International guidance and good practices

Connectivity can be improved by international commitments made (or that could be made) by governments, such as commitments under WTO agreements, for example:

- market access commitments in the telecommunications services sector;
- WTO Reference Paper[5] laying out key regulatory principles in the telecommunications services sector;
- WTO's Information Technology Agreement, eliminating tariff and non-tariff barriers applicable to IT products.

Technical standards have also been established in multiple international forums. The International Telecommunication Union (ITU) has developed international standards known as ITU-T Recommendations, which serve as defining elements in the global infrastructure of ICTs. The ITU also publishes case studies highlighting national practices (e.g. see ITU/UPU (2009) for the satellite strategy in Bhutan).

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) also deal with technical issues of telecommunication. The subcommittee which works on standardization in the field of telecommunications has published over 280 ISO/IEC standards. For instance, the quality characteristics in ISO/IEC 25010:2011 provide criteria to evaluate the properties of a software product, including, *inter alia*, functionality, performance, reliability, security and scalability.

Industry associations, such as the Telecommunication Industry Association, the European Telecommunications Standards Institute and the Internet Engineering Task Force have also developed telecommunications and internet standards.

Table 17 lists one relevant section on connectivity in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*.

Table 17: Connectivity – relevant section in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Question in the *Guide* and *Checklist*	Section
Is network service available at all border posts, including ports, airports and cargo clearance facilities, in your country?	A3.1

3.6 Data security

As discussed in Section 2.3, the confidence of users to replace paper-based documents with electronic information depends on the security, confidentiality and the privacy of personal and business information.

There are technical measures that should be adopted by the IT system underlying a paperless trade system to deserve this confidence.

International guidance and good practices

The ISO/IEC 27000 family of standards provides requirements for an information security management system (ISMS), which describes and demonstrates an organization's approach to information security and privacy. There are several measures that can ensure such security, such as:

- dedicated network infrastructure separated from the open public network for some sensitive connectivity (e.g. G2G network connection);
- VPN to enable users to send and receive data over a public network as if their computing devices were directly connected to the private network;
- encryption protocols (e.g. SSL) and hardware and software keeping users' digital identities to provide additional encryption and authentication services;
- ring-based network zones.

"The confidence of users to replace paper-based documents with electronic information depends on the security, confidentiality and the privacy of personal and business information."

For the successful design and implementation of an ISMS in accordance with ISO/IEC 27001:2013, *Information Technology: Security Techniques – Information Security Management Systems – Requirements*, there are critical steps to follow. These steps are also detailed in ISO/IEC 27003:2017, *Information Technology: Security Techniques – Information Security Management Systems – Guidance*, with ISO/IEC 27001 being "what" and ISO/IEC 27003 "how".

The IEC 62443[6] series of standards was developed to secure industrial automation and control systems throughout their lifecycles. The Institute of Electrical and Electronics Engineers (IEEE) has also established standards on cybersecurity, such as IEEE 1686-2013, *IEEE Standard for Intelligent Electronic Devices Cyber Security Capabilities*. At the national level, the US National Institute of Standards and Technology has published the *Guide for Developing Security Plans for Federal Information Systems* (Swanson *et al*., 2006).

Table 18 lists some of the relevant sections on data security in the ESCAP *Technical Readiness Assessment Guide* and *Checklist*.

Table 18: Data security – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Do the paperless trade systems have the ability to authenticate users electronically?	A2.1.1.3, A2.1.2.3, A2.1.4.3
Do the paperless trade systems ensure data/document security?	A2.1.1.4, A2.1.2.4, A2.1.4.4
Is the ICT network able to provide secure information exchanges that ensure confidentiality and data integrity?	A3.2.4
Is there a policy for the establishment of a disaster recovery plan at the agency level?	A3.5.1
Is there a policy for the establishment of a disaster recovery plan at the national level?	A3.5.2
Does your country have a business continuity plan for paperless trade systems?	A3.6
Is there an information technology security policy for your country?	A4.1
If any of the systems mentioned in A2.1, "Electronic systems", have been implemented, what kind of security measures are in place to protect them from unauthorized access?	A4.2
What kind of authentication mechanism is used to ensure security of information transmitted electronically?	A4.3

Endnotes

1 Unlike subjects, objects do not have rights nor obligations.

2 See ISO 8583-1:2003, *Financial Transaction Card Originated Messages: Interchange Message Specifications, Part 1. Messages, Data Elements and Code Values.*

3 See the ISO 20022:2013 set of standards,

4 See https://www.iso.org/cms/%20render/live/en/sites/isoorg/contents/data/ics/35.100/x/.

5 See https://www.wto.org/english/tratop_e/serv_e/telecom_e/tel23_e.htm.

6 See https://www.iec.ch/blog/understanding-iec-62443.

4 Promoting efficient governance and engaging stakeholders

4.1 Governance rules and structures

One of the critical factors for successful implementation of paperless trade systems is a strong commitment from the government, without which many projects of this magnitude tend to stall. When top political and administrative management is committed, issues of financial support and access to resources may be addressed more readily.

Coordination among government agencies is essential, given that digital trade typically cuts across many government departments (e.g. economics, business, trade, technology, customs, justice, food, transport, finance). Similarly, a wide range of industry groupings (finance, insurance, technology, exporters, shippers, logistics and transport, legal) work towards digitizing trade-related documents, with no single sector grouping easily positioned to take the lead.

Coordination can be carried out more efficiently and effectively with one government department taking the lead together with a cross-cutting industry body. This inclusive approach can help to set a shared vision of a national trade facilitation strategy.

National trade facilitation committees can play an important role as multi-stakeholder coordination bodies established to advance trade facilitation. Recognizing the critical importance of close coordination among government entities and between government entities and the business community to facilitate cross-border trade, the WTO's TFA made the establishment of such committees mandatory.

In each paperless trade system, an entity should manage the rights and obligations of the participants. These rights and obligations are generally defined in bylaws and policies, service-level agreements, memoranda of understanding, end-user agreements and other contractual arrangements.

These instruments cover multiple areas, including, *inter alia*, liability, dispute settlement and data ownership, and thereby provide a predictable environment in which information can be exchanged and used. They also define the obligations of the service provider with respect to the availability of the paperless trade system, its response time, processing time and other technical requirements that are critical to ensure the smooth operation of the system.

Finally, this coordinating body should have the appropriate political support, legal authority, human and financial resources, and links to the business community.

International guidance and good practices

The UNECE and UN/CEFACT have published five recommendations[1] on how to establish single windows, two papers[2] on managing risks and on terminology and several case studies[3] on national coordination of trade facilitation measures. ESCAP and UNNExT (2018) also report on four best practice cases of NSWs in: Hong Kong, China; Japan; the Republic of Korea; and Singapore.

Tables 19 and 20 list some of the relevant sections on governance and on rights and obligations in the *Legal Readiness Assessment Guide*, the *Technical Readiness Assessment Guide* and the corresponding checklists.

Table 19: Governance and rights and obligations – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Is there a governance structure established for paperless trade (e.g. national trade facilitation council)?	A1.1
Does it include all the community partners/stakeholders (government and private sector)?	A1.2
Who chairs this governance structure?	A1.3

Table 20: Governance and rights and obligations – relevant sections in the *ESCAP Legal Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Does a dedicated paperless trade system, such as a single window, exist? If so, what legal instruments are used to establish and operate it? How do these instruments define the rights and obligations of the participants?	II.A.1
Which government agencies participate in the paperless trade system? On what legal basis?	II.A.2
Is there a central body tasked with setting up and managing the paperless trade system?	II.A.3
Are there service-level agreements or memoranda of understanding governing paperless trade operations? If so, who are the parties and what is the legal authority for concluding these agreements?	II.C.1

4.2 Capacity building for paperless trade system users

Preparing stakeholders for the changes is key to their support of the adoption of paperless trade systems. Business community stakeholders should understand and recognize the benefits of paperless trade systems. They should be trained and equipped with the capability to connect to and utilize paperless trade systems effectively.

Awareness programmes and workshops can ensure that stakeholders, including government agencies and traders, have a common understanding on paperless trade systems. They are important for stakeholders to understand how data can be exchanged across borders, to manage their concerns and to prepare them to address any issues that may arise.

This work should proceed in tandem with the scoping and identification of legal and technical barriers. Active participation in the design of paperless trade systems promotes familiarity with these systems and thereby greatly facilitates their adoption.

International guidance and good practices

The WCO has developed a capacity building strategy based on key principles relating to ownership, accountability and empowerment to enable members to reform and modernize customs operations effectively.[4]

ESCAP has conducted national studies on readiness assessment for cross-border paperless trade in the Asia-Pacific. These national studies can serve as case studies on how the readiness assessment could be conducted, as well as highlighting good practices and barriers for cross-border paperless trade.[5]

The UNECE has conducted national studies on regulatory and procedural barriers to trade[6] and has published a guide to help countries to prepare a national trade facilitation roadmap.[7]

Table 21 lists some of the relevant sections on capacity building in the *ESCAP Technical Readiness Assessment Guide* and Checklist.

Table 21: Capacity building – relevant sections in the *ESCAP Technical Readiness Assessment Guide* and *Checklist*

Questions in the *Guide* and *Checklist*	Section
Has your country conducted any awareness programme and/or workshop to ensure the stakeholders, including government agencies and traders, have a common understanding on paperless trade as well as their respective roles to help realize cross-border paperless trade data exchange?	A7.1
Do the stakeholders of cross-border trade in your country fully understand the single window approach?	A7.2
Has your country conducted any awareness programme or workshop on single window?	A7.3
What is your country's future plan and timeline to enhance capacity-building for cross-border paperless trade data exchange?	A7.4
Does your country have an awareness programme (for example, capacity-building, training, workshops) for stakeholders to have a better understanding of the following issues?	B6.1
How could cross-border data exchange be implemented?	B6.1.1
Potential business transactions and documents for cross-border data exchange?	B6.1.2
Methods of identifying inhibitors that need to be addressed?	B6.1.3

Endnotes

1 See UNECE and UN/CEFACT (2013a, 2013b, 2017a, 2019, 2020a).

2 See UNECE and UN/CEFACT (2017b, 2020b).

3 See https://tfig.unece.org/case-stories.html.

4 See http://www.wcoomd.org/en/topics/capacity-building/overview/cb_strategy.aspx.

5 A list of national studies (both completed and ongoing) is available at https://www.unescap.org/resources/readiness-assessments-cross-border-paperless-trade.

6 See https://unece.org/trade/studies-regulatory-and-procedural-barriers-trade.

7 See UNECE (2015). For information on the support UNECE provides to countries develop their roadmap, see https://unece.org/trade/support-transition-countries.

5 Providing technical assistance

5.1 Project coordination

Governance

International and regional organizations providing technical assistance and support programmes include:

- Asian Development Bank (ADB)
- Australian Agency for International Development (AusAID)
- Commercial Law Development Program (CLDP)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Enhanced Integrated Framework (EIF)
- Economic and Social Commission for Asia and the Pacific (ESCAP)
- United Nations Commission on International Trade Law (UNCITRAL)
- United Nations Conference on Trade and Development (UNCTAD)
- United Nations Economic Commission for Europe (UNECE)

National single windows

International and regional organizations providing technical assistance and support programmes include:

- Association of Southeast Asian Nations – ASEAN Single Window (ASW)
- EIF
- ESCAP
- United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)
- UNCTAD Automated System for Customs Data (ASYCUDA)
- UNECE
- World Bank
- World Customs Organization (WCO)
- Korea Trade Network
- Pan Asian E-Commerce Alliance (PAA)

5.2 Removing legal barriers

Legal effects of e-transactions and documents

International and regional organizations providing technical assistance and support programmes include:

- ESCAP
- UN/CEFACT
- UNCITRAL
- UNCTAD
- UNECE

Data governance

International and regional organizations providing technical assistance and support programmes include:

- Council of Europe
- Global Privacy Assembly
- Council of Europe
- United Nations Office on Drugs and Crime

Liability and dispute management

International and regional organizations providing technical assistance and support programmes include:

- EIF
- ESCAP
- Hague Conference on Private International Law (HCCH)
- International Chamber of Commerce (ICC)
- UNCITRAL

Trust services

International and regional organizations providing technical assistance and support programmes include:

- European Union (eIDAS Regulation)
- PAA
- UNCITRAL
- Eurasian Economic Union

5.3 Removing technical barriers

Digital identity of persons and objects

International and regional organizations providing technical assistance and support programmes include:

- European Commission (eID)
- International Civil Aviation Organization (ICAO) for natural persons
- Legal Entity Identifier Regulatory Oversight Committee for legal entities
- UNCTAD
- World Bank ID4D
- GS1
- World Wide Web Consortium (W3C)

Electronic payments

International and regional organizations providing technical assistance and support programmes include:

- Bank for International Settlements (BIS) Committee on Payments and Market Infrastructures
- World Bank
- WCO for government payments
- SWIFT

Data models

International and regional organizations providing data standards, technical assistance and support programmes include:

- ESCAP
- UN/CEFACT
- UNCTAD ASYCUDA
- WCO

Communication protocols

International and regional organizations providing technical assistance and support programmes include:

- W3C

Connectivity

International and regional organizations providing technical assistance and support programmes include:

- ESCAP Toolkit for ICT Infrastructure Co-Deployment with Road Transport and Energy Infrastructure
- ITU Infrastructure and Connectivity Development Frameworks

  UNECE NEXUS: Sustainable Mobility and Smart Connectivity (UNECE, 2021)
- World Bank Information and Communications Infrastructure Development Project
- W3C

5.4 Promoting an efficient governance and engaging stakeholders

Governance

International and regional organizations providing technical assistance and support programmes include:

- ASEAN
- ESCAP
- GIZ
- UN/CEFACT
- UNCITRAL
- UNCTAD
- UNECE
- WCO
- WTO (including EIF)

Capacity building of paperless trade system users

International and regional organizations providing technical assistance and support programmes include:

- ASEAN
- ESCAP
- FIATA International Federation of Freight Forwarders Associations
- GIZ
- UN/CEFACT
- UNCTAD
- UNECE (eTIR)
- WCO
- WTO (including EIF)

Abbreviations

ADB	Asian Development Bank
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
ASYCUDA	Automated System for Customs Data
B2B	business-to-business
B2G	business-to-government
C2B	customer-to-business
EIF	Enhanced Integrated Framework
ESCAP	Economic and Social Commission for Asia and the Pacific
G2G	government-to-government
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICC	International Chamber of Commerce
ICT	information and communications technology
IEC	International Electrotechnical Commission
ISMS	information security management system
ISO	International Organization for Standardization
ITU	International Telecommunication Union
LEI	legal entity identifier
NSW	national single window
PAA	Pan Asian E-Commerce Alliance
SSL	secure socket layer
TFA	Trade Facilitation Agreement
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UNNExT	United Nations Network of Experts for Paperless Trade and Transport in Asia and the Pacific
VPN	virtual private network
WCO	World Customs Organization
W3C	World Wide Web Consortium

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WTO Online Bookshop
http://onlinebookshop.wto.org

© World Trade Organization 2022
Print ISBN: 978-92-870-7170-5
Web ISBN: 978-92-870-7171-2

Report designed by Simplecom Graphics, Pierre Gudel.

Printed by the World Trade Organization.

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Using electronic documents and transactions can speed up and increase trade. Electronic messages can eliminate the need to enter data into a computer manually at each supply chain checkpoint and can provide opportunities for the potential reuse of data.

This toolkit aims at raising awareness of the technical and legal tools to be called upon to adopt cross-border paperless trade systems and national single windows.