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Preparatory work on enabling end-to-end trade digitalization and paperless trade

Note by the Secretariat

Contents

	<i>Page</i>
I. Introduction	2
II. UNCITRAL texts and paperless trade	3
III. Summary of the Colloquium on Digital Payments and Paperless Trade, Part II (21-22 January 2026)	5
A. Experiences in establishing an enabling legal framework for paperless trade	5
B. Cross-border recognition of electronic trade-related documents	6
C. Cross-border recognition of identity management and trust services	8
D. Paperless trade and its legal challenges - regional and national perspectives	10
E. Facilitating exchanges with public entities	13
F. Roundtable discussion and outcomes of the Colloquium	14
IV. Additional developments	18
V. Way forward	19

I. Introduction

1. At its fifty-seventh session, in 2024, the Commission requested the secretariat to conduct a stocktaking exercise to examine UNCITRAL texts on electronic commerce and other substantive law texts that include provisions on electronic aspects. The Commission also requested that the stocktaking exercise include a survey of the incorporation of UNCITRAL texts on electronic commerce into domestic legislation and the inclusion of such texts in international commitments concerning paperless trade. In the view of the Commission, the results of the stocktaking exercise would assist the Commission in deciding on the next steps with respect to the contribution of UNCITRAL texts on electronic commerce to paperless trade and on whether further work was needed to prepare a document consolidating UNCITRAL texts on electronic transactions, with a particular focus on supporting paperless trade.¹

2. At its fifty-eighth session, in 2025, the Commission had before it a note by the secretariat on the stocktaking of UNCITRAL texts referring to electronic aspects (A/CN.9/1226), which included an overview of the stocktaking exercise, an analysis of the responses to the survey and an initial examination of the role of UNCITRAL texts in facilitating paperless trade. The Commission also considered a proposal by the Government of the Russian Federation on possible future work on legal aspects of paperless trade (A/CN.9/1234), which suggested a two-tier approach: (a) examining how existing UNCITRAL texts could enable paperless trade; and (b) based on identified gaps and needs, preparing a harmonised text (A/CN.9/1234, paras. 20-24).

3. After discussion, the Commission requested the secretariat to continue its preparatory work on enabling end-to-end trade digitalization and paperless trade, emphasizing a step-by-step approach to the work, and agreed that a colloquium could be held to explore the use of UNCITRAL texts on electronic commerce for paperless trade with a view to presenting guidance text and possible model legislation on paperless trade to the Commission for its consideration.²

4. Based on that request, a Colloquium on Digital Payments and Paperless Trade (the “Colloquium”) was held in Vienna from 19 to 22 January 2026. It addressed the two respective topics, consistent with UNCITRAL’s efforts to provide an enabling legal framework and guidance supportive of end-to-end trade digitalization (i.e., the comprehensive transformation of international trade from paper-based, manual processes into a fully digitalised ecosystem including for contracting, logistics, customs clearance and finance, and involving the seamless exchange of documents and data across the supply chain), of which digital payments and paperless trade are two key components.³

¹ A/79/17, para. 299. Among other things, the Commission considered a proposal by the Russian Federation on possible future work on legal aspects of paperless trade (ibid. paras. 296-298).

² A/80/17, para. 245. The Commission also noted the utility of the stocktaking exercise and requested the secretariat to continue to compile and start to consolidate UNCITRAL texts on electronic commerce into a single legislative text, including by preparing guidance material on their consistent implementation, and to submit the outcome to a working group for review at a later stage (A/80/17, para. 242). For the note by the secretariat on the preparatory work on the compilation and consolidation of UNCITRAL texts addressing electronic aspects, see A/CN.9/1263.

³ Further information on the background and objectives of the preparatory work on paperless trade is contained in A/CN.9/1261, which was prepared for the Colloquium.

5. This note briefly considers the notion of paperless trade and the relevance of UNCITRAL texts to paperless trade (chapter II) and reports on the second part of the Colloquium which focused on paperless trade (chapter III), as well as additional developments in the preparatory work (chapter IV). It also proposes a way forward for consideration by the Commission (chapter V).

II. UNCITRAL texts and paperless trade

The notion of paperless trade⁴

6. As a general matter, the notion of paperless trade could be understood differently. In a narrow sense, paperless trade concerns trade-related exchanges involving private sector and government entities, particularly those involved in the import, export and transit of goods. For example, that approach underpins the World Trade Organization Trade Facilitation Agreement, which has as an aim, according to its preamble, “further expediting the movement, release and clearance of goods, including goods in transit”. That approach is also reflected in commitments in trade agreements – to develop systems for submission and exchange of trade-related documents and data in electronic form.

7. In a broad sense, paperless trade may be associated with electronic commerce or digital trade, where those terms are sometimes used interchangeably. For example, article 3(a) of the Framework Agreement on Facilitation of Cross-border Paperless Trade in Asia and the Pacific (CPTA) defines “cross-border paperless trade” as “trade in goods, including their import, export, transit and related services, taking place on the basis of electronic communications, including exchange of trade-related data and documents in electronic form” (see also para. 37 below).

8. In order to survey the applicable legal and regulatory landscape comprehensively and to identify relevant legal issues, gaps or obstacles on which it might be desirable and feasible for UNCITRAL to work, the Colloquium was organized with a broader understanding of paperless trade in mind.

Relevance of UNCITRAL texts to paperless trade⁵

9. The Commission may wish to recall that, for roughly 30 years, UNCITRAL texts have contributed to establishing an enabling legal framework for electronic commerce. These texts include:

- UNCITRAL Model Law on Electronic Commerce (1996) with Additional Article 5 bis adopted in 1998 (MLEC);
- UNCITRAL Model Law on Electronic Signatures (2001) (MLES);
- United Nations Convention on the Use of Electronic Communications in International Contracts (2005) (ECC);
- UNCITRAL Model Law on Electronic Transferable Records (2017) (MLETR);
- UNCITRAL Model Law on the Use and Cross-Border Recognition of Identity Management and Trust Services (2022) (MLIT); and
- UNCITRAL Model Law on Automated Contracting (2024) (MLAC).

⁴ On the notion of paperless trade, see also [A/CN.9/1226](#), paras. 67-70.

⁵ On how UNCITRAL texts support paperless trade, see also *ibid.*, paras. 71-86.

10. These texts are based on the fundamental principles of non-discrimination between paper and electronic means and technology neutrality and apply a functional equivalence approach to facilitating the use of electronic means to satisfy paper-based form requirements. They apply in commercial and non-commercial settings, whether by their terms alone (e.g., MLIT, art. 2(1)) or by extended application in their domestic enactment.⁶

11. In the context of trade-related exchanges, UNCITRAL texts can be seen to contribute to paperless trade on various levels, as outlined in [A/CN.9/1226](#) (paras. 73–76).

Legal recognition of electronic means

12. On one level, they give domestic legal recognition to electronic documents and data,⁷ including those submitted in the context of paperless trade. This is achieved on the basis of the principle of non-discrimination against the use of electronic means, which is contained in all texts. Documents submitted in the context of paperless trade include bills of lading, certificates of origin, commercial invoices, packing lists and insurance certificates, all of which are issued in electronic form (collectively “trade-related documents in electronic form” or “electronic trade-related documents”).

Data assurance

13. Rules on legal recognition are complemented by rules that allow electronic documents and data to satisfy paper-based requirements that would otherwise inhibit the use of electronic means. Those rules, which are contained in all texts except the MLAC, establish a legal framework for assuring certain basic “qualities” of data – notably its origin and integrity – that promote trust in the information contained in the data and facilitate acceptance of electronic documents that represent such data.⁸ While individual rules have their origins in the “functional equivalence” approach (see [A/CN.9/1226](#), para. 10), which calls attention to the basic functions of paper-based requirements, the framework is also relevant to “digitally native” transactions or information flows which have no paper-based equivalents, as demonstrated by the rule on website authentication in article 21 of the MLIT. It is also relevant to informing the development of form requirements for trade-related documents that are “medium-neutral” (i.e., that do not presuppose the use of any particular medium (paper or electronic)), as demonstrated by the UNCITRAL – UNIDROIT Model Law on Warehouse Receipts (2024). Recent UNCITRAL texts recognize the role of “trust services”, usually provided by third-party service providers, in providing assurance of data quality, and attach additional legal effect to the use of trust services that are designated as reliable by competent authorities in the enacting jurisdiction (see MLIT, arts. 22 and 23).

14. A fundamental principle of the framework established under UNCITRAL texts is technology neutrality, which provides that the law should not mandate or favour the use of any specific technology or method, ensuring that legal frameworks remain adaptable to evolving technologies.

⁶ See [A/CN.9/1226](#), paras. 30 and 71.

⁷ For a discussion about the use of the term “electronic documents” see [A/CN.9/1226](#), paras. 23–24.

⁸ As noted in [A/CN.9/1226](#), a document is a structured representation of data.

Cross-border recognition

15. With the exception of the ECC, UNCITRAL texts on electronic commerce apply to electronic transactions regardless of their international character (although even the provisions of the ECC have been given domestic application in several States). Yet end-to-end trade digitalization calls for legal recognition of electronic documents throughout their life cycle, which may be relied upon beyond the jurisdiction whence the document originates or indeed beyond the jurisdiction where a trust service assuring the qualities of the data it contains is provided.

16. Here, UNCITRAL texts can be seen to contribute to paperless trade on an additional level in that they provide legal mechanisms allowing electronic documents and data, whose qualities are assured in one jurisdiction, to enjoy the same legal effect – and ultimately the same level of trust and acceptance – in another jurisdiction. These mechanisms include non-discrimination against the geographic origin of trust services in determining the reliability of the methods they use or in designating the trust service as reliable, as well as rules incorporating the notion of “substantially equivalent level of reliability”, which facilitates the recognition of a foreign trust service notwithstanding variation in the levels of reliability applied in the relevant jurisdictions. These mechanisms are further enhanced by a rule authorizing the competent authority in the enacting jurisdiction to cooperate with counterparts in other jurisdictions, which is intended to facilitate agreement on common definitions of technical standards at an administrative level.

17. As discussed below, while UNCITRAL texts provide a robust legal foundation for paperless trade, legal obstacles continue to hinder their full and effective use in practice, particularly in cross-border contexts.

III. Summary of the Colloquium on Digital Payments and Paperless Trade, Part II (21-22 January 2026)

18. Part II of the Colloquium aimed to further explore and analyse the use of UNCITRAL texts on electronic commerce for paperless trade and to support the preparation of a draft guidance document or possible model legislation on paperless trade for consideration by the Commission. It consisted of six panel discussions structured around five themes: (a) experiences in establishing an enabling legal framework for paperless trade; (b) cross-border recognition of trade-related electronic documents; (c) cross-border recognition of identity management and trust services; (d) paperless trade and its legal challenges - regional and national perspectives; and (e) facilitating exchanges with public entities. The following summarizes those discussions, including the summary roundtable and outcomes of the Colloquium.

A. Experiences in establishing an enabling legal framework for paperless trade

19. The panel examined the experiences of international and regional organizations in developing legal and policy frameworks relevant to paperless trade.

Commonwealth Model Law on Digital Trade

20. The Commonwealth Model Law on Digital Trade (CMLDT) was presented, with particular emphasis on the economic potential of digital trade for developing countries and small island developing States.⁹ The CMLDT was built upon existing UNCITRAL texts on electronic commerce and reflected their underlying legal principles. Designed as a comprehensive and modular legislative framework for digital trade, the CMLDT enabled States to adapt its provisions to their domestic legal contexts, while preserving cross-border compatibility. Among other things, it was pointed out that the CMLDT acknowledged electronic communications involving government entities and placed emphasis on reliability as a legal standard when doing so.¹⁰

ASEAN Single Window and Digital Economy Framework Agreement

21. The panel then considered regional frameworks, through the experience of the Association of Southeast Asian Nations (ASEAN). Reference was made to the ASEAN Single Window,¹¹ which enabled the secure electronic exchange of trade-related documents between the competent custom authorities of ASEAN Member States, based on mutual legal recognition and harmonized operational standards.¹² Reference was made to the proposed ASEAN Digital Economy Framework Agreement (DEFA), which aimed to broaden digital economic integration by facilitating cross-border paperless trade through the integration of government-to-government (“G2G”), business-to-government (“B2G”) and business-to-business (“B2B”) exchanges. The DEFA was intended to align with internationally recognized standards and model laws, illustrating how regional frameworks could operationalize international legal standards.¹³

B. Cross-border recognition of electronic trade-related documents

22. The panel explored legal impediments to the use of electronic trade-related documents and considered which legislative or other measures could assist in clarifying and addressing those impediments.

France

23. The panel first discussed France’s enactment of legislation based on the MLETR, which sought to ensure consistency with relevant international rules and standards, including Regulation (EU) 2024/1183 on establishing the European Digital Identity Framework (eIDAS 2.0 Regulation)¹⁴ and existing international

⁹ CMLDT and Guide to Enactment, available at: <https://thecommonwealth.org/model-law-digital-trade>.

¹⁰ The Commission may wish to note that the Guide to Enactment to the CMLDT explains that, although the CMLDT does not expressly authorize government entities to impose specific requirements for documents and data submitted to them, it leaves room for such requirements to be adopted to support administrative and operational effectiveness.

¹¹ The ASEAN Single Window was established through a series of regional instruments: Agreement to Establish and Implement the ASEAN Single Window (2005); Protocol to Establish and Implement the ASEAN Single Window (2006); and Protocol on the Legal Framework to Implement the ASEAN Single Window (2015). The Commission may wish to note that this framework is used for certificates of origin issued by the authorities of the exporting State under the ASEAN Trade-in-Goods Agreement. Available at: <https://asean.org/wp-content/uploads/2020/12/ASEAN-Trade-in-Goods-Agreement.pdf>.

¹² Further information is available at: <https://asean.org/our-communities/economic-community/asean-single-window/>.

¹³ Further information is available at: <https://aseaneconomicforum.com/programs/DEFA.html>.

¹⁴ Regulation (EU) 2024/1183 of the European Parliament and of the Council of 11 April 2024 amending Regulation (EU) No 910/2014 as regards establishing the European Digital Identity Framework. Available at <https://eur-lex.europa.eu/legal->

conventions and UNCITRAL texts on electronic commerce. France sought to ensure cross-border and cross-technology interoperability by relying on appropriate domestic legal concepts, while maintaining minimal definitions, avoiding unnecessary legal qualifications, and leaving technical matters to standard-setting bodies.¹⁵ Limitations of private international law in determining the applicable law in digital environments and the need for reliable methods to ensure security were highlighted.¹⁶ Concerns were expressed regarding security risks in relation to crypto-assets, particularly in the identification of parties and assets. While progress had been made, challenges remained in relation to identification standards, including limitations on party autonomy in determining levels of identification, the applicable law governing authentication and identification, and the development of certification mechanisms.

China–Europe Land Corridor

24. In the context of the China–Europe Land Corridor,¹⁷ it was noted that, notwithstanding improvements in infrastructure and trade-related procedures, progress regarding recognition of foreign electronic documents remained inconsistent and fragmented, posing a number of coordination issues. Initiatives aimed at streamlining cross-border trade procedures and electronic trade documentation encountered significant obstacles due to complex data-regulation environments and stringent digital-sovereignty frameworks often driven by evolving regulatory frameworks. It was said that complex regulatory frameworks could impede international trade and cross-border recognition and interoperability for countries lacking the necessary legal and technical capacity. It was suggested to compile cross-jurisdictional best practices and deliver targeted technical assistance to promote broader and more equitable engagement in border and digital trade processes.

Transport Corridor Europe–Caucasus–Asia

25. Efforts were being made by the Transport Corridor Europe–Caucasus–Asia (TRACECA) to advance digitalization and cross-border data exchange in both B2B and G2G contexts along the corridor.¹⁸ It was noted that, while pilot initiatives had demonstrated the feasibility of the exchange of documents and data in electronic form, progress remained constrained by the absence of comprehensive legal frameworks. Substantial gaps in the mutual recognition of foreign electronic signatures and electronic documents were observed. The TRACECA secretariat was developing a multilateral agreement for the mutual recognition of electronic documents and data to support both G2G and B2G data exchanges, based on UNCITRAL texts on electronic commerce and their principles. It was further said that, while the agreement would support the recognition of qualified electronic signatures and the use of trust service

[content/EN/TXT/?uri=celex%3A32024R1183](https://www.uncitral.org/uncitral/en/content/EN/TXT/?uri=celex%3A32024R1183).

¹⁵ See, for example, <https://iccwbo.org/news-publications/policies-reports/standards-toolkit-for-cross-border-paperless-trade/>, which provides an overview of existing standards to support adoption, identify potential gaps and promote interoperability.

¹⁶ See, for example, Law Commission of England and Wales, Digital assets and electronic trade documents in private international law, illustrating the application of private international law in the context of electronic trade documents and digital assets, available at: <https://lawcom.gov.uk/project/digital-assets-and-electronic-trade-documents-in-private-international-law/>.

¹⁷ The China–Europe Land Corridor refers to a set of rail routes connecting the People’s Republic of China with European markets via Central Asia, the Russian Federation and Eastern Europe, which are used for the overland transport of goods between Asia and Europe.

¹⁸ Further information is available at: <https://traceca.org/en/home/>.

providers, interoperability among competent national authorities, and simplified customs procedures, TRACECA member States¹⁹ had called for more detailed provisions, including the specification of minimum data requirements and alignment with national frameworks.

Practical challenges in the cross-border recognition of trade-related documents

26. It was noted that many trade digitalization initiatives had not been adequately designed from the outset, often failing to take into consideration key elements, including legal frameworks, underlying processes, user requirements, and the requirements of neighbouring jurisdictions. Barriers to global data sharing were not attributable to the technical characteristics of trade-related documents, but rather arose from divergent domestic legal frameworks, inconsistencies in accreditation standards, and a continued reluctance among authorities to recognize foreign electronic trade-related documents. Additional barriers included non-interoperable information systems, insufficient coordination among border agencies, continued use of physical inspection procedures and the incomplete implementation of digitalization measures. It was suggested that a comprehensive approach to strengthen the acceptance of electronic trade-related documents should be taken, which would require improved process design, greater alignment of regulatory frameworks, the implementation of trusted trade environments, the adoption of interoperable technological solutions and sustained inter-agency cooperation.

C. Cross-border recognition of identity management and trust services

27. The panel underscored that cross-border recognition of identity management and trust services was a legal, governance and coordination challenge which, in order to be addressed, would entail enhancing or supplementing national trust frameworks with an international, common regime, based on interoperability and mutual recognition.

Common obstacles

28. Experience across regions indicated common obstacles—that electronic identification, electronic signatures and trust frameworks functioned effectively at the national level but “stopped at the border” due to the absence of legal mechanisms for recognizing foreign credentials. This resulted in duplicative procedures, including repeated know-your-customer (KYC) checks, parallel onboarding processes and, in some cases, a reversion to paper-based documentation, even where all parties operated within advanced digital environments. Experiences from the Eurasian region illustrated this gap, where the regulatory landscape remained fragmented with differing national laws and reforms. Similar challenges were identified in the Middle East and North Africa, where progress had been made in electronic identification, trust services, and KYC infrastructures, but challenges still arose from the lack of cross-border recognition, uncertainty regarding the reliability of foreign identity credentials, fragmented approaches to the treatment of legal persons (as opposed to natural persons), and reliance on bilateral or sector-specific solutions. In the Latin American and Caribbean region, these constraints were further compounded by the fact that cross-border transactions required varying levels of legal assurance,

¹⁹ Further information on TRACECA member States (Armenia, Azerbaijan, Bulgaria, Georgia, Iran, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Türkiye, Turkmenistan, Ukraine, and Uzbekistan) is available at: <https://traceca-org.org/en/countries/>.

yet cross-border recognition remained limited, exacerbating inefficiencies and legal uncertainty.

29. It was emphasized that interoperability did not necessarily require uniform legal or technical systems. Instead, it could be achieved through mutual recognition based on functional equivalence. On that basis, practical pathways were identified, including the development of mutual recognition agreements, the use of level of assurance systems supported by trusted third parties, and the mapping of assurance levels across systems. Progress could be effectively achieved through pilot projects and regional initiatives, which allowed for the testing of interoperability in practice and the gradual building of trust among stakeholders. Regional experiences illustrated both the diversity of legal and institutional models and the emergence of common principles, such as user-centric, risk-based approaches and the need for predictable legal effects across borders. At the same time, the importance of robust governance frameworks was stressed, including clear rules on liability, supervision and data protection, as well as close cooperation between public authorities and the private sector, recognizing digital identity as a core infrastructure for the digital economy.

eIDAS 2.0 framework

30. The panel then considered the centralized electronic identification and trust services framework of the European Union, as established under the eIDAS 2.0 Regulation, as well as for comparison purposes the voluntary and collaborative digital identification system in Canada. Despite structural differences, both approaches were found to be based on core principles, including privacy, user control, transparency and functional equivalence, demonstrating that interoperability depended on mutual recognition of reliability and legal effects rather than on identical legal frameworks. The absence of formal cross-border recognition mechanisms between Canada and the EU was identified as a key gap, highlighting the need for arrangements to acknowledge electronic identification systems and trust services.

31. The panel also noted that the revised eIDAS 2.0 framework introduced mandatory digital identity wallets for natural and legal persons, along with additional trust services aimed at enhancing reliability and interoperability. At the same time, challenges remained regarding legal characterization as well as the framework's extraterritorial application, particularly as recognition of foreign electronic identification continued to be limited. Experiences in integrated regions, such as the Nordic States, suggested that legal and conceptual misalignments continued to hinder cross-border use. The importance of developing a global trust framework based on shared supervisory, liability and security principles, supported by technical interoperability and tested through pilot initiatives, was emphasised.

32. The panel also discussed the Regulation (EU) 2020/1056 on electronic freight transport information (eFTI Regulation)²⁰ as an example of a regional legal framework enabling paperless trade.²¹ It was noted that the regulation combined binding legal obligations for the acceptance of electronic data by public

²⁰ Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information, which establishes a legal framework for the electronic exchange of freight transport information and requires competent authorities to accept such information in electronic form, available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32020R1056>.

²¹ Further information is available at: https://transport.ec.europa.eu/transport-themes/logistics-and-multimodal-transport/efti-regulation_en.

authorities, common technical specifications for data exchange, certification requirements for trust service providers, and cybersecurity measures. The EU experience underscored the importance of a three-tier regulatory approach, comprising primary legislation, implementing measures and technical guidance.

OECD

33. The panel discussed the legal aspects of digital identity systems from the OECD perspective, including the need for coherent national frameworks and cross-sector governance. It was noted that aligning legal and technical standards across jurisdictions remained challenging and that the absence of harmonized rules affected the cross-border recognition of digital identities, credentials and electronic signatures. Particular reference was made to the 2023 OECD Digital Government Index²² and the OECD Recommendation on the Governance of Digital Identity.²³ The findings of the OECD Digital Government Index indicated significant variation across legal frameworks and trust models, highlighting the need for legal alignment to support interoperability. Trade agreements increasingly referred to digital identity but rarely provided for operational implementation.

D. Paperless trade and its legal challenges - regional and national perspectives

34. The Colloquium considered perspectives of regional commissions of the United Nations and a multilateral development bank on the needs, policies and legal infrastructure required to establish an enabling legal framework for cross-border paperless trade. National experiences in establishing legal environments conducive to paperless trade were shared, which reflected varying levels of economic and technological development as well as different legal traditions.

United Nations Economic Commission for Europe (UNECE)

35. The contributions of UNECE as an international standards body in operationalizing legal frameworks for digital trade were presented. Technical standards, policy recommendations, and implementation tools were key enablers in bridging the gap between legislative frameworks and their practical implementation. Emphasis was placed on soft infrastructure – understood as institutional, regulatory, and governance arrangements – in ensuring cross-border compatibility, security and trust within digital trade corridors.

United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)

36. The panel considered the findings of a global survey on trade digitalization conducted by ESCAP.²⁴ The findings reaffirmed that, while significant progress had been made in the digitalization of domestic trade processes globally, the cross-border exchange of electronic trade-related documents continued to be

²² Organisation for Economic Co-operation and Development, 2023 OECD Digital Government Index: Results and Key Findings, which benchmarks government efforts to establish the foundations for a coherent and human-centred digital transformation of the public sector, available at:

https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/01/2023-oecd-digital-government-index_b11e8e8e/1a89ed5e-en.pdf.

²³ Available at: <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0491/>.

²⁴ United Nations Global Digital and Sustainable Trade Facilitation Survey, available at: <https://www.untsurvey.org/>.

constrained. Many countries had implemented electronic customs systems and national single windows, but cross-border interoperability among those systems remained limited. It was said that the legal recognition of electronic documents and data was not consistent across jurisdictions and that capacity constraints, particularly in developing regions, persisted.

37. The panel further examined the CPTA, which was developed under the auspices of ESCAP, to address persistent challenges in electronic trade facilitation.²⁵ It was noted that the CPTA sought to promote harmonized standards and the cross-border recognition of trade-related documents and data in electronic form and was guided by the principles underlying UNCITRAL texts on electronic commerce. In its initial phase of implementation, activities focused on the development of guidance materials, trust-service frameworks, and pilot projects facilitating data exchange.²⁶

United Nations Economic Commission for Latin America and the Caribbean (ECLAC)

38. Regional experiences in Latin America and the Caribbean were also considered, where fragmentation of digital trade systems was identified as a significant challenge. It was observed that, although many countries had introduced such systems, the quality of implementation was not consistent and interoperability was limited. Legal uncertainty regarding the recognition of electronic documents discouraged businesses from adopting digital tools. In addition, capacity constraints, limited technical expertise, and insufficient funding, were identified as obstacles. Possible measures included readiness assessments, targeted capacity-building, and scaling successful pilot projects.

European Bank for Reconstruction and Development (EBRD)

39. It was emphasized, from the EBRD perspective, that the transition to paperless trade required a coordinated approach encompassing investment, legal reform, infrastructure development, and capacity building. Drawing on case studies from various jurisdictions, the persistence of legal barriers, including statutory requirements for paper-based documentation, unclear legal frameworks governing electronic signatures, and a lack of detailed implementing provisions were noted. It was said that pilot initiatives had been effective in fostering stakeholder confidence and testing interoperability prior to large-scale implementation.

Russian Federation

40. Recent developments in the Russian Federation towards cross-border paperless trade were presented. These included the 2020 amendments to the law of the Russian Federation on electronic signatures, which introduced the concept of trusted third parties and provided for mutual recognition based on international agreements, as well as the 2024 agreement between the Russian Federation and Belarus on the mutual recognition of electronic signatures. Reference was made to a number of initiatives, including pilot projects for cross-border electronic document exchange with multiple jurisdictions, the expansion of the cross-border recognition of electronic signatures in documents of title through private arrangements, and the development of draft agreements and regulatory

²⁵ United Nations Economic and Social Commission for Asia and the Pacific, Framework Agreement on Facilitation of Cross-Border Paperless Trade in Asia and the Pacific, which aims to enable the cross-border exchange of trade-related data and documents in electronic form, available at: <https://www.unescap.org/projects/cpta>.

²⁶ See the examples in A/CN.9/1226, para. 71.

frameworks for the exchange of electronic data and documents.²⁷ It was said that, regardless of national and regional arrangements, global comprehensive legal frameworks and harmonized standards for the mutual recognition of electronic trade-related documents remained lacking. The need for consolidation of UNCITRAL texts on electronic commerce within a single international legal framework for paperless trade was emphasised as both necessary and beneficial.

Austria

41. An Austrian perspective on the European Union's transition to electronic freight documents under the eFTI Regulation was presented. The implementation of the Regulation across EU member States was seen as uneven. The eFTI Regulation covered only freight data, and authorities were required to accept electronic documents from 2027 while the use of eFTI by economic operators would remain voluntary. It was said that analogue and digital systems, such as the electronic consignment note under the Convention on the Contract for the International Carriage of Goods by Road, would continue to operate in parallel. Concerns were expressed regarding the level of investment required and the lack of integration between the eFTI framework and other EU digital transport initiatives, such as smart tachographs. Ensuring consistent implementation of electronic freight document systems across EU member States was deemed essential, as mismatching in datasets and systems hindered efficiency.

Republic of Korea

42. In the Republic of Korea, the centralized electronic bill of lading (eBL) registry was subject to a number of operational and legal constraints. It was observed that interoperability remained limited, that restrictive approaches were taken to the recognition of foreign-issued eBLs, and that the system appeared technologically rigid in comparison with emerging peer-to-peer and blockchain-based models. The existing system required improvement as it might not be consistent with international standards, including article 19(1) of the MLETR. Specific challenges arising under the existing system were emphasized, including the lack of interoperability between paper-based and eBLs, rigid procedural requirements in legislation that impeded the adoption of new technologies, and that the statutory model vested issuance authority in registry agencies rather than carriers. These challenges prompted the development of pilot projects aimed at improving the use of electronic transferable records, including legislative reforms to enable the recognition of foreign eBLs and the consideration of instruments such as the MLETR and the United Nations Convention on Negotiable Cargo Documents (NCD Convention) for adoption.²⁸

Singapore

43. In Singapore, challenges associated with scaling cross-border digital trade arose primarily from fragmentation, interoperability gaps, and legal uncertainty stemming from closed trade platforms operating under distinct rules, standards

²⁷ The Commission may also wish to take note of recent legislative developments in the region, including (a) the adoption in 2025 of the Digital Code of the Kyrgyz Republic, which established a mixed recognition system combining *ex-ante* and *ex-post* approaches and introduced trusted third parties and trusted service lists (see <https://cbd.minjust.gov.kg/3-48/edition/35412/ru>); and (b) the adoption in 2026 of the Digital Code of the Republic of Kazakhstan, which relies on trusted third parties for the mutual recognition of digital signatures and enables the international use of identifiers (see <https://adilet.zan.kz/eng/docs/K2600000255>).

²⁸ Further information on the NCD Convention is available at: <https://uncitral.un.org/en/ncdconvention>.

and contractual governance models, rather than from the absence of an enabling legal framework. Notwithstanding the longstanding legal validity of eBLs, their use remained minimal. In this context, it was highlighted that the adoption of eBLs had been constrained by the requirement for all transacting parties to participate within the same platform-specific contractual framework. An emerging initiative designed to reconcile the structural and contractual rules of private platforms with cross-ecosystem openness was presented. Recognition of electronic transferable records as legally valid instruments based on the MLETR shifted the basis of trust from platform-specific arrangements to a harmonized legal foundation, thereby reducing reliance on proprietary systems.

United Kingdom

44. A perspective from the United Kingdom on establishing an enabling legal framework for cross-border digital trade was presented. It outlined how the Electronic Trade Documents Act 2023 was implemented, which was aligned with the MLETR, to ensure functional equivalence between paper and electronic trade documents. This reform had facilitated measurable gains in efficiency, cost reduction, and supply chain performance, as demonstrated through multiple pilot projects and international trade corridors. At the same time, the presentation underscored persistent challenges that resonated across jurisdictions, including limited business awareness, especially among small and medium-sized enterprises (SMEs), and uncertainty regarding cross-border legal recognition, as well as private international law issues in cross-border paperless trade.

E. Facilitating exchanges with public entities

45. The panel examined practical experiences in digitalizing interactions between private actors and public authorities and identified challenges and opportunities for establishing digital trade ecosystems at various levels.

China

46. The China Customs' digital regulatory framework for cross-border e-commerce, supported by domestic legislation and international standards, was presented. Innovations included single-window data exchange, electronic identity verification, big-data risk analysis, intelligent inspection systems, and electronic tax payment. Case studies showed the effectiveness of these tools in detecting counterfeit goods and identifying invasive species. It was emphasized that digitalization could enhance trade efficiency and strengthen regulatory oversight.

El Salvador

47. The comprehensive customs modernization program of El Salvador was presented. Reforms began with institutional restructuring and legislative changes to enable the legal recognition of electronic documents and electronic signatures. The administration introduced automated declarations, a one-stop platform for government agencies, electronic seals for shipment tracking and online authorization procedures. It was said that over sixty administrative processes had been digitalized, reducing processing times and increasing transparency. Future priorities included regional cooperation and expansion of advance declaration systems. The accumulated experience highlighted the importance of combining legal reform, digital infrastructure, and institutional restructuring.

Georgia

48. The approach of Georgia, which integrated customs, tax administration, and border agencies into a unified system enabling real-time data sharing, was presented. It was noted that, under national legislation, electronic customs

declarations were mandatory, and that regulatory permits and licences were exchanged electronically among the competent authorities. The implementation of a maritime single window streamlined the submission of shipping documentation. Cooperation with financial institutions facilitated the electronic processing of customs payments. However, challenges arose when electronic documents were used across jurisdictions. Questions relating to liability and responsibility in AI-assisted decision-making remained to be addressed.

Private-sector initiative

49. It was emphasized, from the perspective of private sector stakeholders engaging with public authorities, that targeted regulatory reform could facilitate technological innovation. It was observed that the use of AI tools and systems to automate customs declarations could enhance accuracy compared with manual filing. Initial legal impediments to the use of automated systems arose from statutory language requiring submission by a “person”, institutional resistance to automation, and uncertainty regarding liability frameworks for fully automated systems. It was said that regulatory caution and outdated legal terminology could impede the adoption of technological innovation.

F. Roundtable discussion and outcomes of the Colloquium

50. The roundtable discussion that followed the panels offered an opportunity to distil and discuss the issues and obstacles identified during the Colloquium. As a general matter, it was widely felt that UNCITRAL texts could serve as the necessary legal infrastructure for paperless trade, but that various interrelated legal, regulatory, operational and technical issues and obstacles hindered the development and implementation of paperless trade.

51. These issues and obstacles included: (a) limited adoption and lack of awareness of UNCITRAL texts; (b) gaps, inconsistencies and lack of coherence in legal frameworks; (c) cross-border recognition and operationalization challenges; (d) data governance and regulatory constraints on cross-border data flows; and (e) constraints of contract-based trust frameworks.

52. It was also widely felt that consolidation of existing UNCITRAL texts relevant to paperless trade could be useful, echoing the view expressed at the Commission regarding the utility of such an exercise ([A/80/17](#), para. 241). It was added that a consolidated text could be complemented by additional provisions or guidance to address some of the issues and obstacles distilled and discussed in the roundtable. It was suggested that the end product should be flexible to cater for regional diversity while strengthening global legal coherence and supporting the practical uptake of electronic documents and data.

53. The following summarizes the next steps on possible future work on the topic of paperless trade, as identified at the Colloquium.

1. Issues and obstacles to paperless trade

Limited adoption and lack of awareness of UNCITRAL texts

54. A key obstacle identified during the Colloquium was the limited adoption of UNCITRAL texts in the context of paperless trade, despite being widely referenced as an international benchmark for legally enabling paperless trade.²⁹

²⁹ See also [A/CN.9/1226](#), para. 72 (noting that “the use of UNCITRAL texts in paperless trade is still limited. Even in jurisdictions enacting UNCITRAL texts and applying them to all types

In that context, it was indicated that this might, in part, reflect a lack of awareness as to the scope and applicability of UNCITRAL texts, especially in B2G and G2G exchanges, as well as their application in paperless trade.

Gaps, inconsistencies and lack of coherence in legal frameworks

55. A closely related issue was the partial and uneven implementation in enacting jurisdictions of the principles underlying UNCITRAL texts, in particular technology neutrality. It was emphasized that mandating the use of a specific technology or method for electronic documents and data created obstacles to developing coherent and comprehensive legislative frameworks for paperless trade.

56. It was noted that UNCITRAL texts on electronic commerce had evolved over time and had often been implemented sequentially by States, rather than as part of a single, coordinated legislative reform. Different UNCITRAL texts had been enacted at different points of time, with varying degrees of alignment among electronic commerce legislation and other legislation.

57. For example, the persistence of statutory requirements mandating the submission of paper documentation for particular sectors undermined the principles of UNCITRAL texts. Misalignment was noted between legal regimes governing negotiable instruments and broader frameworks on electronic commerce or trust services. It was also noted that the submission of electronic trade-related documents to public authorities was often subject to additional formal, technical requirements. This fragmentation, both within domestic legal frameworks and with respect to submissions to public authorities, resulted in inconsistencies within national systems.

Cross-border recognition and operationalization challenges

58. Another significant legal obstacle to paperless trade related to the lack of widely adopted and operational legal frameworks or provisions for the cross-border recognition of services supporting electronic signatures and other trust services. In that context, various issues were discussed, including the ongoing reluctance of many public authorities to accept electronic trade-related documents in cross-border contexts and uncertainty as to the evidentiary value of such documents that were issued in foreign jurisdictions.

59. It was noted that national trust frameworks, while functioning effectively at the domestic level, were not readily recognized or could not be relied upon in cross-border contexts. Divergences in assurance levels and certification requirements, in the absence of commonly accepted international standards, were identified as contributing to legal uncertainty. A lack of clarity was also observed regarding the legal recognition of foreign digital identities.

60. Emphasis was placed on challenges relating to the operationalisation of existing international legal standards contained in laws enabling the cross-border recognition of services supporting electronic signatures and other trust services. It was noted that, in the absence of implementing regulations, technical frameworks, institutional arrangements and practical guidance, such laws might not be effective in practice. As a result, electronic communications, signatures and data that were legally recognized for domestic purposes might not retain their legal effectiveness in cross-border use.

of electronic transactions, the legal recognition of electronic documents and data submitted to public authorities may be subject to additional requirements.”).

61. It was noted that UNCITRAL texts, including article 12 of the MLES or articles 25 and 26 of the MLIT, provided legal mechanisms for the cross-border recognition of foreign certificates and electronic signatures and for identity management and trust services respectively. Yet uncertainty remained as to the implementation and application of the notion of a substantially equivalent level of reliability of electronic methods reflected in those texts, particularly in the absence of commonly understood criteria or practical guidance for making such determinations across jurisdictions. In that regard, the need for technical assistance and the development of practical guidance to support consistent implementation was noted.

Data governance and regulatory constraints on cross-border data flows

62. Another key obstacle related to the tension between private law instruments designed to facilitate digital trade and public law regulatory frameworks regarding data governance and digital sovereignty. It was observed that the latter frameworks often hindered the effectiveness of the former (including UNCITRAL texts), which were designed to provide an enabling legal framework, with a view to reducing legal barriers and supporting interoperability across jurisdictions.

63. There had been significant developments with respect to regulatory measures on cross-border data flows, including data localization requirements, data protection and privacy laws, cybersecurity requirements, and the regulation of AI systems. Such measures often imposed restrictions on cross-border data flows, introduced heightened identity and assurance requirements, limited the recognition of foreign electronic documents or trust services and resulted in transaction delays and increased costs.

64. These developments reflected the growing complexity of the legal landscape as jurisdictions sought to address the challenges and opportunities presented by data flows and paperless trade. The need for greater coherence between these complementary yet sometimes competing legal regimes was underscored.

Constraints of contract-based trust frameworks

65. The increasing dependence on closed platforms whether or not developed for pilot projects as the primary means of establishing trust and governing transactions was identified as another obstacle to paperless trade. In these environments, legal relationships were defined by private contractual arrangements within closed ecosystems rather than by generally applicable legal frameworks and common standards.

66. It was observed that, while reliance on closed platforms governed by contractual arrangements might enhance operational efficiency, various legal and commercial risks arose from using such platforms. Platform-based contractual trust could create barriers to cross-platform transactions and to the cross-border recognition of electronic trade-related documents. Contractual frameworks within such platforms might also reallocate risks in ways which diverged from established trade law principles. SMEs might further face structural disadvantages in accessing or participating in dominant ecosystems.

67. In the absence of legal interoperability, such developments risked fragmenting international trade into isolated proprietary silos. It was said that the adoption of enabling legal frameworks could support cross-platform recognition of electronic trade-related documents and mitigate the risk of being locked into a closed platform.

2. Possible next steps in the preparation of a text on paperless trade

68. With regard to the identified obstacles to paperless trade, participants generally highlighted the value of an incremental and system-building approach. In that context, various possible forms of texts that could be prepared by UNCITRAL, building on UNCITRAL texts on electronic commerce, were suggested.

A guidance text on paperless trade

69. The preparation of a guidance text was supported. Such a text would aim at clarifying how existing UNCITRAL texts on electronic commerce apply, individually and collectively, to paperless trade. Such guidance could, *inter alia*:

- Systematize the relationship and interaction between the MLEC, MLES, ECC, MLETR, MLIT and MLAC, as relevant to paperless trade;
- Clarify key concepts relevant to implementation, such as recognition, reliability, control and interoperability;
- Provide examples for both B2B and B2G use cases; and
- Offer concrete and practical implementation pathways for States and other stakeholders, without necessarily reopening or revising the UNCITRAL texts.

70. A guidance text could also address interoperability in single window and related environments and help bridge gaps between legal frameworks, contractual arrangements, insurance practices and operational realities.

71. Coupled with technical assistance and capacity-building activities carried out by the secretariat in close cooperation with regional commissions of the United Nations and other organizations, a guidance text could respond to the uneven implementation and interpretation of existing UNCITRAL texts and facilitate their more effective use in support of paperless trade. It could also further clarify how UNCITRAL texts provide the necessary legal infrastructure and otherwise support other international or regional instruments relevant to paperless trade.

Model provisions or a legislative guide on cross-border mutual recognition

72. Another form discussed was model provisions, or alternatively a legislative guide focusing mainly on cross-border recognition. Such work could build on: (a) the MLETR and cover the recognition of electronic transferable records and other electronic trade-related documents that generally fall outside the MLETR's scope (such as certificates of origin, insurance certificates, commercial invoices, packing lists); and (b) the MLIT and cover relevant digital identity and trust services aspects. It could be based on outcome-based equivalence and consider risk-based and use-case-driven approaches to cross-border recognition.

73. The importance of compatibility with international and regional frameworks and sector-specific arrangements was emphasized. It was suggested that the model provisions or legislative guide should be supportive of not only bilateral approaches but also plurilateral and multilateral approaches to mutual recognition, which could be potentially more effective.

Model law on paperless trade

74. The preparation of a model law on paperless trade or of a paperless trade component to be incorporated into a broader model law, was discussed.³⁰ Such a model law could consolidate and systematize relevant provisions contained in UNCITRAL texts into a single, coherent framework, address negotiable and non-negotiable trade documents and cover issues related to data standards, automation and interoperability. It could also preserve technology neutrality, while reflecting contemporary trade and supply-chain architectures, and take into account the specific roles and needs of public authorities, including customs and other relevant authorities.

75. It was suggested that such an instrument would not necessarily replace existing UNCITRAL texts, but could build upon and, where appropriate, supplement or update them. It was also suggested that the model law could be aligned with relevant provisions in digital trade agreements, with a view to promoting consistency and coherence in paperless trade.

Convention on paperless trade

76. Lastly, it was suggested that the work on paperless trade could take the form of a convention in order to address the cross-border context of paperless trade. Such a convention could systematize and consolidate core rules and principles relevant to a legal framework for paperless trade, building on existing UNCITRAL texts and supplementing them as necessary to reflect current practices and technological developments. This could further be done in a manner complementary of regional frameworks, such as the CPTA. In this regard it was recalled that the proposal by the Government of the Russian Federation had indicated several possibilities for work on paperless trade, which included among them, a convention: (a) on paperless trade, with a narrow scope, addressing issues of trade automation, electronic data exchange and an adequate level of reliability and mutual recognition; or (b) on digital trade, with a broader scope, addressing issues of trade reengineering, data sources and data flows, AI-powered trading, use of distributed ledgers in trading, trading on platforms and ecosystems (see [A/CN.9/1234](#), para. 24 and table 1). It was, however, recognized that the development of a convention on digital trade would be an ambitious undertaking.

IV. Additional developments

77. The secretariat also organized or contributed to various events aimed at furthering the preparatory work, both before and after the Colloquium. The Commission may wish to take note of the following activities.

78. On 9 August 2025, during the third Senior Officials Meeting of the Asia-Pacific Economic Cooperation, the Hong Kong Legal Talents Training Academy and the UNCITRAL Regional Centre for Asia and the Pacific co-organized in Incheon, Republic of Korea, a workshop on the topic of “Use of International Instruments to Legally Enable End-To-End Digitalization of Trade.” The activity showcased the significance and practical application of UNCITRAL texts on electronic commerce among others in the areas of cross-border recognition of business identity, paperless trade and electronic records.

79. On 19 November 2025, the secretariat held a webinar entitled “Paperless trade and trade digitalization: state of the art”, which addressed the report “The

³⁰ See also [A/CN.9/1263](#) on the compilation and consolidation of UNCITRAL texts addressing electronic aspects.

Digitalisation of Trade Documents and Processes: Going Paperless Today, Going Paperless Tomorrow” prepared by OECD,³¹ as well as the Digital Trade Regulatory Readiness database developed by the World Bank Group.³²

80. On 17 December 2025, the secretariat held a side event entitled “Uniform standards for reliability assessment” during the forty-seventh session of UNCITRAL Working Group VI (15–19 December 2025, Vienna). The event took stock of current trends, as well as policy and legal issues relating to paperless trade, including significant developments and insights from relevant entities and stakeholders.

81. From 10 to 13 February 2026, the secretariat organized a colloquium on “Harmonizing law in the age of digital trade and finance – digital assets and platforms” in New York. One part of the colloquium was dedicated to private law aspects of platform operations, in particular the legal and governance considerations arising from the use of proprietary platforms governed by contractual arrangements, as reflected in [A/CN.9/1259](#).³³

82. On 26 March 2026, during the seventieth session of Working Group IV, the secretariat organized, jointly with the Russian Federation, a side event entitled “Shaping the UNCITRAL Agenda on the Legal Aspects of Paperless Trade: Potential Way Forward”. The event briefed participants on the outcomes of the Colloquium and provided an opportunity for experts to share views on possible avenues for future work by UNCITRAL. In that regard, participants heard of the persistent need to explore the interface between UNCITRAL texts on cross-border recognition (e.g. in MLES and MLIT) and technical standards developed in work at ESCAP on the cross-border recognition of electronic trade-related documents under the CPTA, as well as in work at UNECE.

83. The secretariat also contributed to a capacity-building session held on 3 April 2026, in Bangkok (hybrid format), in the context of the paperless trade meetings of ESCAP, entitled “UNCITRAL e-commerce standards and the United Nations Convention on Negotiable Cargo Documents”. The session was co-organized with ESCAP and aimed at supporting the implementation of UNCITRAL electronic commerce standards adopted by the Paperless Trade Council, while also introducing the NCD Convention.

V. Way forward

84. In light of the preparatory work, the Commission may wish to consider, as a general matter, the scope of future work on paperless trade, including how the notion of paperless trade should be understood. While the different aspects of end-to-end trade digitalization or digital trade should be taken into account, it could be difficult to address all such aspects in a comprehensive manner. As a starting point, the Commission may wish to focus on identified gaps and obstacles, for example, the application of UNCITRAL texts to documents submitted to public authorities, particularly those involved in the import, export and transit of goods. This could draw attention in particular to the MLIT, which is designed to facilitate the cross-border recognition of trust services – including certification services

³¹ Available at https://www.oecd.org/en/publications/the-digitalisation-of-trade-documents-and-processes_64872f25-en/full-report.html.

³² Available at <https://www.worldbank.org/en/data/interactive/2025/09/10/digital-trade-regulatory-readiness-dtrr-database>.

³³ See [A/CN.9/1259](#), paras. 35-46.

supporting electronic signatures – that assure the origin and integrity of data contained in such documents. Such work could also examine how those mechanisms might be adapted for jurisdictions that do not maintain a MLIT-consistent legal framework, and whether a legal text establishing a supplementary regime for cross-border recognition is possible.

85. With respect to the form (see paras. 68-76 above), the Commission may wish to consider how the work on paperless trade could benefit from the possible work on the compilation and consolidation of UNCITRAL texts addressing electronic aspects (see [A/CN.9/1263](#)). It is foreseen that the consolidated text could be considered by Working Group IV along with its continued work on data provisions contracts, which would inform the Commission at the next session. It may be possible that work on paperless trade could form a component of the consolidated text. A draft text could be prepared by the secretariat, with a view to mandating a working group to review and further develop such text, for instance Working Group IV following completion of its work on data provision contracts.

86. The Commission may also wish to consider requesting the secretariat to prepare a guidance document addressing all relevant UNCITRAL texts on electronic commerce, identifying key legal elements required to establish a favourable environment for paperless trade and clarifying the manner in which those texts may be applied in that context. Such guidance could be developed in a manner similar to existing UNCITRAL explanatory texts, with a view to promoting coherence, enhancing understanding among States and supporting effective implementation, and could be submitted to the Commission for consideration and approval prior to publication or to a working group for review and further preparation.