

2 GLOBAL LEGAL RECOGNITION OF ELECTRONIC TRANSACTIONS AND DOCUMENTS

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On average, a cross-border transaction requires the exchange of 36 documents and 240 copies (Fletcher, 2019). A shipment of roses from Kenya to Rotterdam can generate a pile of paper 25 cm high, and the cost of handling it can be higher than the cost of moving the containers (Allison, 2016).

A paper-based trade environment incurs inefficiencies. Goods can arrive at their port of destination while the documents are still making their way through the supply chain, leading to delays in cargo delivery. Payments can lag or be mismatched to documents. Cargo vessels spend between 60 per cent and 70 per cent of their port time at a berth (Lind *et al.*, 2019). This typically leads to additional costs to hold the cargo or to indemnify the carrier for delivering the cargo without a bill of lading. The Digital Container Shipping Association estimates that the industry could save more than US\$ 4 billion per year if 50 per cent of bills of lading were digitalized.¹ In addition, a considerable amount of time and costly effort is spent for the transportation and administration of documents. According to Maersk, the cost of processing trade documents could be as much as 20 per cent of the physical transportation costs of a shipment (WTO, 2018).

In the field of trade finance, more than 20 parties are usually involved in a single transaction throughout the process, with data captured in 10 to 20 documents, creating approximately 5,000 data field interactions, the majority of which comprises simple actions, such as ignore/transmit to the next party (BCG, 2017). The COVID-19 pandemic has revealed the significant risk to supply chains of relying on physical documents. The ability of traders to import and export goods and services operating within traditional paper-based systems was hindered by lockdowns, health and safety procedures, and teleworking measures (Renard *et al.*, 2021).

Paper-based documents can easily be forged. Trust services guaranteeing the origin and integrity of paper-based documents, such as notary services, exist but they are generally not time and cost efficient.

Substituting paper with digital means has many benefits. First, it reduces processing time and enables companies to leverage data. AI, machine learning and natural language processing can optimize document processes and generate insights of how to facilitate and accelerate customs clearance by improving risk management processes. AI can also be used to auto-detect fraud patterns and to fight trade-based money laundering. The more data are available, the

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better the training results of an AI will become. The COVID-19 pandemic has also revealed the sanitary effects of digitalization, which minimizes physical contacts.

Second, it enables supply chain stakeholders to receive the same quality and consistency of information digitally and in real-time. Blockchain and DLT can guarantee the integrity and authenticity of information exchanged on a blockchain, thus adding an additional layer of trust among supply chain stakeholders and solving the double-spending problem that has been at the origin of various fraud scandals.² Last, but not least, TradeTech contributes to the automation of trade transactions, thereby minimizing contract management and enforcement costs as well as the likelihood of document errors.

According to the International Chamber of Commerce (ICC) United Kingdom and Coriolis Technologies³, digitizing transferrable trade documents could:

- generate £25 billion in new economic growth in the United Kingdom alone and 25 per cent more small business trade by 2024;
- reduce the number of days needed to process documents by up to 75 per cent;
- generate up to £224 billion in efficiency savings;
- result in up to £1 billion to tackle the trade finance gap (estimated at £2.3 billion for 2020).

The sheer number of trade documents places a heavy burden on small business seeking to trade internationally. Hence, they are expected to benefit the most from the digitization of trade documents, which could lead to a 35 per cent improvement in small business efficiency savings and a 13 per cent increase in international business revenues.⁴

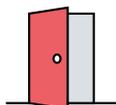
Despite these benefits, not all trade-related sectors have been able to integrate electronic transactions and documents into their practices. In maritime shipping,

despite more than two decades of digitalization efforts, e-bills of lading are rarely issued (fewer than 100 per year). In aviation, however, digital processes are now the norm and paper the exception. Electronic Air Waybill became the default contract of carriage for all air cargo shipments since the adoption of International Air Transport Association (IATA) Resolution 672, which removes the requirement for a paper Air Waybill.⁵

To support the global use of electronic transactions and documents in international trade, governments could:

- establish legal frameworks recognizing the legal validity and enforceability of electronic transactions and documents in a jurisdiction, including electronic transferable documents, as well as of trust services, such as e-signatures;
- align these frameworks with global standards to support cross-border recognition and use of electronic transactions and documents, such as electronic transferable documents, and of trust services.
- address in a coordinated manner the legal implications of different types of algorithm, which are increasingly used in conjunction with TradeTech, and which would avoid regulatory fragmentation.

A | E-SIGNATURES AND TRUST SERVICES

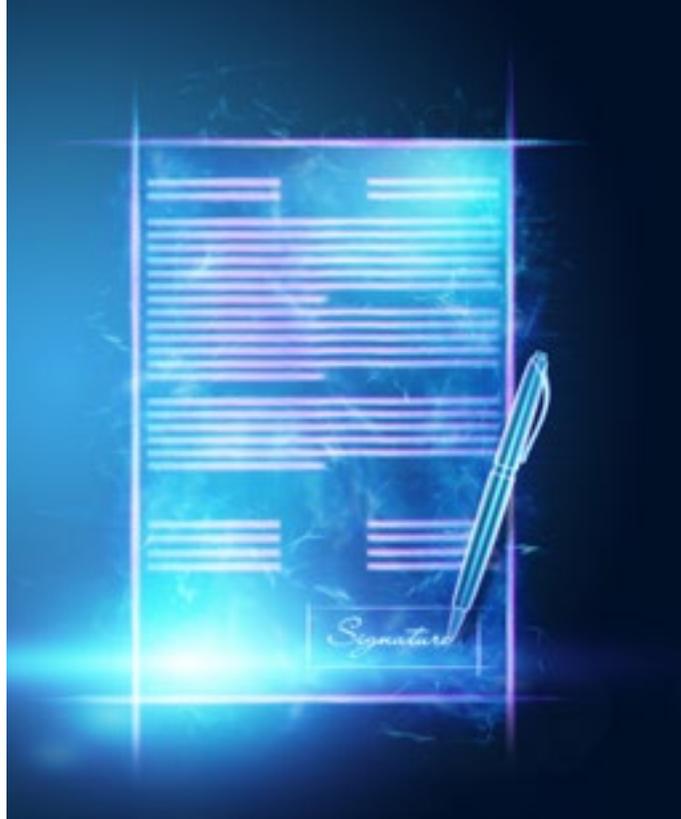


E-signatures are used to identify a person and to indicate that person's intention with regard to the information contained in an electronic message.

Through cryptography, e-signatures provide an effective means of guaranteeing the authenticity and integrity of the message and can significantly improve security against malicious attacks.⁶ Given that electronic files can also be manipulated, like paper-based documents, many jurisdictions require that digitally signed documents provide a guarantee of integrity, and in some cases be legally recognized⁷, to be considered equivalent to a handwritten signature.

Beside e-signatures, other electronic or trust services can provide assurance of certain qualities of a data message (e.g. integrity or origin), including, *inter alia*: electronic seals; electronic time stamps; website authentication; electronic archiving; and registered electronic delivery services.

According to the EU eIDAS Regulation on electronic identification and trust services for electronic transactions,⁸ an e-signature is a type of trust services.



The draft United Nations Commission on International Trade Law (UNCITRAL) Model Law on the Use and Cross-border Recognition of Identity Management and Trust Services follows the same approach. Access to these trust services would be essential to support digitalization processes in trade, such as emerging paperless trade systems or electronic transferable records.⁹

Across the globe, some 60 countries have established their own laws and standards regarding e-signatures, ensuring that signatures on documents and contracts should not be denied legal effect or ruled unenforceable simply because of their digital nature.¹⁰ For instance, the EU eIDAS Regulation stipulates what an electronic identification and trust services for electronic transactions in the internal market should be.

While these are welcome developments, cross-border use of electronic services and trust services remains limited. There are different reasons for which governments can play an influencing role. Without a global alignment of national regulatory approaches, the legal validity and enforceability of e-signatures and trust services abroad is uncertain. Compliance costs for companies to obtain legally recognized e-signatures and trust services will be high.

BOX 9

THE EIDAS REGULATION AND THE BALTIC STATES

Despite a very similar shared legal context in terms of the eIDAS Regulation, cross-border use of e-signatures and trust services in the Baltic States remains limited. A study on Nordic-Baltic Trust Services by Hinsberg *et al.* (2020) provides several reasons for this.

First, although trust services fall under the eIDAS Regulation, the legal meaning differs. While the eIDAS Regulation defines a qualified e-signature as “an advanced electronic signature that is created by a qualified electronic signature creation device, and which is based on a qualified certificate for electronic signatures”, some EU member States recognize the legal effects of lower levels of e-signatures. “Other trust services within the meaning of the eIDAS Regulation and their legal meaning are usually not defined”, thus creating different legal meanings in EU member States.

Second, countries* involved in the Nordic-Baltic eID Project (NOBID) have different “digital maturity ... in doing business, conducting transactions, and using e-services online.” This stresses the importance of capacity-building to support market adoption of cross-border trust services.

Third, trust services providers use different semantics and formats, hindering interoperability between systems.

Fourth, consumption habits differ: “If the Baltic states are generally more dependent on qualified trust services and require a high level of assurance of electronic identity, then Nordic countries use ... advanced e-signatures instead of qualified e-signatures.”

* Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden.

UNCITRAL has adopted various instruments to facilitate such cross-border recognition. Many States have adopted the UNCITRAL functional rule on e-signatures and trust services, but not all. The UNCITRAL Model Law on Electronic Commerce (MLEC) and the United Nations Convention on the Use of Electronic Communications in International Contracts (Electronic Communications Convention), which entail the adoption of the UNCITRAL functional rule, have been adopted by 78 and 15 parties, respectively. The UNCITRAL Model Law on Electronic Signatures (MLES) builds on the fundamental principle underlying article 7 of MLEC and establishes criteria of technical reliability for the equivalence between electronic and hand-written signature to foster cross-border use of e-signatures. At present, however, national legislation based on or influenced by MLES has been adopted by only 36 States.¹¹ The draft UNCITRAL Model Law on the Use and Cross-border Recognition of Identity Management and Trust Services will define what outcomes are expected from each trust service and methodological requirements to guarantee the reliability of a trust service. Global adoption will be essential.

Even when legislation exists, it may not be sufficient to foster cross-border use of e-signatures and trust services, as the case of the Baltic region demonstrates (see Box 9).

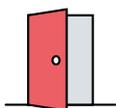
What can trade agreements do to foster cross-border use of e-signatures?

Twenty-one RTAs refer to MLEC and ten to the Electronic Communications Convention, which support the functional equivalence between electronic and hand-written signatures. No trade agreements refer explicitly to MLES, which contains criteria of technical reliability for the equivalence between electronic and hand-written signatures as well as basic rules of conduct that may serve as guidelines for assessing duties and liabilities for the signatory, the relying party and trusted third parties intervening in the signature process. This common framework is essential in international trade.

Recognition of e-signatures and other electronic authentication methods is also being discussed in the context of the WTO Joint Initiative on E-commerce, in which more than 80 WTO members participate, among which 69 members have already signed RTAs including provisions on e-authentication or e-signatures. Governments could leverage trade agreements to support the global adoption of international frameworks for e-signatures and trust services. International standards and guidelines provide a useful basis upon which governments can work towards regulatory convergence.

Governments should recognize that global regulatory alignment is one step towards the cross-border use of e-signatures and trust services and, more generally, of electronic documents and transactions. Other barriers include, *inter alia*, different digital maturity levels and data models.

B | TRANSFERABLE DOCUMENTS AND INSTRUMENTS



A transferable document or instrument entitles the holder to claim the performance of an obligation indicated in the document and to transfer the right to perform that obligation through the sale or disposal of the document. Transferable documents are used extensively in international trade, such as in shipping, logistics and finance (e.g. bills of exchange, invoices, bills of lading, promissory notes, warehouse receipts).

The availability of transferable documents in electronic form may greatly facilitate e-commerce. It can improve speed and security of transmission, permit the reuse of data and automate certain transactions through smart contracts. Electronic transferable documents can make an important contribution to trade facilitation.

Digitizing transferable documents is an essential step towards trade digitalization, but it is not sufficient. To be used in cross-border trade transactions and transferred across borders, electronic transferable documents need to be recognized as functionally equivalent to paper documents.

To support global legal recognition of electronic transferable documents, UNCITRAL adopted in 2017 the Model Law on Electronic Transferable Records (MLETR). The MLETR establishes a method for an electronic transferable record to become functionally equivalent to a paper-based transferable document or instrument. This method is used:

- a. to identify that electronic record as the electronic transferable record so that multiple claims of the performance of an obligation indicated in this record would be avoided. This requirement implements the principle of **singularity**.
- b. to render that electronic record capable of being subject to **control**¹² from its creation until it ceases to have any effect or validity.
- c. to retain the **integrity**¹³ of that electronic record.

MLETR is technology neutral and so can be implemented with any technology.

BOX 10 MODEL LAW ON ELECTRONIC TRANSFERABLE RECORDS AND DOMESTIC LEGISLATION

Abu Dhabi Global Market*

In February 2021, the ADGM enacted the Electronic Transactions Regulations 2021, based on the MLETR. The Regulations affirm that e-signatures, contracts, records and documents are as legally enforceable in ADGM as traditional, non-electronic (i.e. physical) versions, and thereby enable the reliable and efficient electronic transfer of signed documents, contracts and financial instruments within the United Arab Emirates and internationally.

The Regulations are based on the MLETR, as this was considered the most minimalist and proportionate approach to address the needs of stakeholders as well as any risks. Having adopted the MLETR, the AGDM is now developing proofs-of-concept to demonstrate how the MLETR can foster trade between firms and facilitate trade finance.

Kingdom of Bahrain

In November 2018, the Kingdom of Bahrain became the first country in the world to enact the MLETR after collaborating with UNCITRAL to create a modern, efficient and effective legal framework for a more enhanced digital economy. As part of a plan to digitally transform trade, attract investment and increase transparency among local and international stakeholders, the Kingdom of Bahrain introduced a number of technologically friendly laws and regulations. Examples include the Law of Electronic Communications and Transactions, which aims to facilitate e-transactions and contracts by reducing red tape and improving the reliability of digital payment systems. To further buttress facilitation of cross-border trade with the rest of the world, the Kingdom of Bahrain acceded to the Electronic Communications Convention in February 2020.

The strategy to enact the law was based on close collaboration with different parties and leading experts. This included the introduction of an accreditation mechanism, not contemplated in the MLETR, to enable operators of information management systems to offer electronic



transferable records in the country. This was an innovative solution to enhance oversight, prevent fraud and build trust in electronic transferable records.

Although the Kingdom of Bahrain is a pioneer, more progress is still to be made. Mindful of the need to develop regulations that are technologically neutral, the Kingdom of Bahrain is studying the marketplace in terms of evolving technologies, before embarking on developing regulations for the accreditation of operators of an information management system for electronic transferable records. This system is used for the issuance, transfer, control, presentation and storage of electronic transferable records in accordance with the law. Even though an electronic transferable record would still be recognized by law in the absence of an accredited operator, the use of one gives users an added benefit with respect to the reliability of the electronic transferable record, such as the acceptability of the method used to secure recognition and achieving unique control and possession. This is because the method used by an accredited operator would be presumed to be reliable under the law unless there was evidence to the contrary.

Singapore

On 1 February 2021, Singapore became the second country to adopt the MLETR into domestic legislation in a move which may have been in response, at least in part, to fraud scandals linked to trade documents.

Agencies such as the Infocomm Media Development Authority, the Maritime and Port Authority of Singapore, Singapore Customs, the Monetary

Authority of Singapore and the Ministry of Trade and Industry were involved in the development of the legislation, and all actively promote global adoption of the MLETR. The agencies worked with industry through a series of public consultations to meet the challenges of domestic adoption of the MLETR.

Key impediments to electronic transferable documents and instruments have been to establish what constitutes an “original” document and its “possession” in an electronic environment. Technological advancements have made it possible to meet these requirements where existing and new commercial e-bills of lading have demonstrated that stakeholders can use e-bills of lading with trust, through the use of technologies such as title registries and blockchain and DLT. Singapore had to amend legislation and pass the Electronic Transactions (Amendment) Act 2021, with provisions that set out specific requirements that an electronic record must meet to be recognized as the electronic functional equivalent of a paper transferable document or instrument. Companies can decide to change the medium from an electronic transferable record to a physical transferable document or instrument and vice versa.

In an effort to give such foundational functionalities to the international community so that systems can be kept open and interoperable, the Infocomm Media Development Authority conceived the TradeTrust** framework and has made its software components freely available for implementers on open source licensing terms.

* See <https://www.adgm.com/media/announcements/adgm-enacts-electronic-transactions-framework>.

** See <https://www.mas.gov.sg/-/media/MAS/News/Media-Releases/2021/Annex-B---TradeTrust-Factsheet.pdf>.

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UNCITRAL model laws need to be adopted into national legislation to have full legal bearing. As of March 2022, however, only Abu Dhabi, the Kingdom of Bahrain, Belize, Kiribati, Paraguay, Papua New Guinea and Singapore had adopted the MLETR into domestic law (see Box 10). Other jurisdictions may have legislation in line with the principles of the MLETR. Germany, for example, enacted legislation in 2013 (before the MLETR) that is compatible with the principle of equivalence of the MLETR.

The MLETR is a uniform model law and, as such, may be adapted to domestic legal needs. The United Kingdom, for instance, chose to follow a flexible approach to the MLETR provisions to strike an effective balance between international alignment and domestic legal tradition. Indeed, in a world where laws were drafted for paper-based processes, legal recognition of electronic transferable documents is not as simple as it may first appear, in part due to the notion of

possession limited to tangible objects (see the example of the Law Commission of England and Wales in Box 11). However, and similar to other uniform law texts, the MLETR benefits from uniformity in enactment, application and interpretation.¹⁴ Uniformity ensures legal predictability and reduces transaction costs.

More movement is needed on this front for electronic transferable documents to be recognized across borders on a global scale. If only a few jurisdictions adopt the MLETR, the benefits from its application and trade digitalization will remain limited. Digitalization of cross-border trade is a classic collective action problem. If the exporting jurisdiction has an enabling legal environment but the destination jurisdiction does not, then parties are likely to continue using paper documents (ICC UK, 2021).

The Infocomm Media Development Authority and the Monetary Authority of Singapore, in collaboration with the ADGM Financial Services Regulatory Authority, have introduced the first cross-border digital trade financing platform using the TradeTrust framework, which is aligned with the MLETR (see Box 12). This platform facilitates the transfer of e-documents used in trade finance between their jurisdictions. It “enables trading counterparties and transacting banks to validate documents digitally and securely even when they are on different trade finance platforms, and allows such documents to be exchanged with another party in real-time”, which

BOX 11

LAW COMMISSION OF ENGLAND AND WALES: REDEFINING THE NOTION OF POSSESSION

Under the current law of England and Wales (Scotland has its own legal system), electronic trade documents cannot be possessed and therefore cannot have the same effects in law as their paper counterparts. The Law Commission has been considering how best to achieve reform.

One way in which the Law Commission’s approach distinguishes itself from the MLETR is in the role played by the concept of control. The MLETR adopts (exclusive) control as an analogue of, or functional equivalent to, possession, without defining it. Instead of stipulating that control is analogous to possession, the Law Commission has proposed that an electronic trade document that can be controlled can be possessed. This will allow electronic trade documents to be plugged automatically into other possession-based concepts in English and Welsh law, including

bailment, the tort of conversion and possessory securities such as pledges.

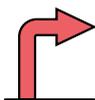
A second difference is that the MLETR deals explicitly with some matters which the Law Commission considers are sufficiently covered in existing law, such as writing requirements. An important outcome from the Law Commission’s work is that other jurisdictions wishing to align with the MLETR should consider a flexible approach to its provisions to achieve the same legal outcomes in ways which fit to their own domestic laws. Although the Law Commission’s approach is designed to fit to the law of England and Wales, its proposals and draft Electronic Trade Documents Bill align closely to the principles and concepts in the MLETR and achieve the same practical result.

helps to mitigate the risk of fraud, reduce costs and improve trust and efficiency; with TradeTrust, “businesses large and small can now authenticate their digital trade documentation and transact seamlessly in the digital economy.”¹⁵

How can trade agreements support the cross-border use of electronic transferable documents?

A limited number of trade agreements contain provisions which refer to electronic transferable documents. DEPA and SADEA provisions require or encourage governments to consider the MLETR. Systematically including a commitment on MLETR transposition in trade agreements, including in the context of the WTO Joint Initiative on E-commerce, would go a long way in facilitating the digitalization of trade. As of March 2022, only seven governments had adopted the MLETR into their domestic framework. At a meeting in May 2021, members of the G7 agreed on a framework that will champion the work of UNCITRAL and promote the adoption of the MLETR in 2022 or 2023. They agreed to map domestic legal barriers to the use of electronic transferable documents and to establish actions to address these barriers.¹⁶

C | AUTOMATED CONTRACTS



Automated business models and processes greatly benefit companies by minimizing contract management and enforcement costs as well as the likelihood of document errors. Contrary

to what their name suggests, smart contracts are not smart (there is no cognitive or AI component to them) and might not be contracts in a legal sense. They translate contractual obligations, in whole or in part, into computer code to improve efficiency through automation. Smart contracts are pieces of computer code designed to start carrying out tasks automatically in response to external triggers (e.g. automated payments in trade finance or customs processes).

Blockchain and DLT bring a new dimension to smart contracts – immutability of information. Transactions by a blockchain-based smart contract are intended to be final, unless blockchain governance is able to reverse them. Hence, blockchain and DLT help to increase the likelihood of trusted data. This ability to capture trusted data gives rise to a whole new evolution of automated business models and

BOX 12

EXAMPLE FRAMEWORKS FOR ELECTRONIC VERSIONS OF TRANSFERABLE DOCUMENTS

TradeTrust*

TradeTrust adopts a multi-pronged approach and is developed as: (i) an interoperability framework that supports the different trade documentation requirements needed to achieve paperless cross-border trade; (ii) a digital utility for system implementers to use without any additional modification; and (iii) as a reference implementation with an intuitive user interface to demonstrate the core capabilities of the framework and serve as a neutral mechanism for users to self-check for interoperability.

Enigio**

Enigio AB is a Swedish technology company that leverages DLT to create digital documents with the same functionality and properties as paper documents and can distinguish an original from a copy, prove possession and transfer ownership. Enigio’s solution is interoperable with legacy systems and coexists with paper-based documents. This enables documents to be transferred freely and transparently, without requiring the recipient to have any particular software besides a standard web browser.

FQX***

FQX uses DLT to digitize promissory notes – a negotiable instrument that enables companies and individuals to obtain finance based on an unconditional promise to pay. The eNote platform allows businesses to issue, transfer and close electronic promissory notes for financing and investing. These eNotes can be sold and transferred to any third party (i.e. an investor). Pending wider adoption of the MLETR, eNotes are based on Delaware’s Uniform Electronic Transactions Act, which states that “A record or signature may not be denied legal effect or enforceability solely because it is in electronic form.” This legal rule states the principle of non-discrimination contained in UNCITRAL texts.

* Further details can be found on the factsheet available at <https://www.mas.gov.sg/-/media/MAS/News/Media-Releases/2021/Annex-B---TradeTrust-Factsheet.pdf>.

** See <https://enigio.com>.

*** See <https://fqx.ch>.

processes. For instance, smart contracts can be used to document and certify the transaction.

The UNCITRAL Model Law on Electronic Commerce (MLEC) and the United Nations Convention on the Use of Electronic Communications in International Contracts (Electronic Communications Convention), provide a standardized approach to the legal validity and enforceability of contracts formed by the exchange of data messages (i.e. e-contracts) or by the interaction of automated systems (or electronic agents) without human involvement (i.e. automated or algorithmic contracts)¹⁷. Their rules assume that the setting of parameters is performed by an operator. However, UNCITRAL and UN instruments do not provide a reference point to address errors involving truly autonomous or probabilistic systems (i.e. systems that have a mind of their own). Computing techniques such as deep learning in AI operate as black boxes and are perceived as increasingly more autonomous or probabilistic (i.e. neither deterministic nor autonomous, but based on a probability that something is the correct answer). To which extent the various types of algorithm fall under UNCITRAL rules might be a question for future UNCITRAL work. In the meantime, this silence creates legal uncertainty. Although UNCITRAL and UN texts provide solutions for attributing the acts of automated and deterministic systems, the attribution process when AI systems are used is unclear.¹⁸

BOX 13

INTERNATIONAL INSTITUTE FOR THE UNIFICATION OF PRIVATE LAW (UNIDROIT)

The UNIDROIT Digital Assets and Private Law Project develops international standards to enable jurisdictions to take a common approach to legal issues arising from the holding, transfer, use and the taking of security over digital assets. The project follows a neutral approach, seeking to accommodate diverse types of asset and technology, together with various legal cultures. The principles identified embody best practices and international standards and enable jurisdictions to take a common approach to legal issues arising from the transfer and use of digital assets. A variety of digital assets are covered, including cryptocurrencies (e.g. Bitcoin, Ethereum) and digital tokens linked to external non-digital assets.

Source: See <https://www.unidroit.org>.

The underlying technology and practices are still evolving and may benefit from international cooperation helping governments who can come up with joint approaches to update regulations in a coordinated manner (see Box 13). Global regulatory convergence relating to smart contracts would promote greater cross-border transactions by allowing parties to sign contracts with greater confidence (OECD, 2020).

What can trade agreements do to ensure regulatory convergence regarding automated contracts?

Although some trade agreements have integrated provisions to support the use of e-contracts in international trade, none addresses legal challenges associated with the use of AI in contract formation. Twenty-three governments currently refer to the MLEC in their RTAs (including 20 participating in the WTO Joint Initiative on E-commerce) and 22 governments (including 19 participating in the WTO Joint Initiative on E-commerce) have explicitly referred to the Electronic Communications Convention.

Discussions on the legal effect of e-contracts are also underway in the context of the WTO Joint Initiative on E-commerce. That said, none of these trade agreements discusses the legal implications of different types of algorithm (e.g. deterministic, probabilistic, autonomous), thereby increasing the likelihood of distinct national regulatory approaches and thereby of regulatory fragmentation. Trade agreements could encourage governments to update existing international instruments, such as UNCITRAL model laws and UN texts, and to support in a coordinated manner other initiatives addressing the legal gaps more broadly in the area of transactions in digital assets, such as the UNIDROIT Digital Assets and Private Law Project (see Box 13). International cooperation will avoid regulatory fragmentation and in turn support the cross-border use of all types of algorithm in trade transactions.

D | TOKENIZATION



Different types of tokens have different uses and finding a common definition is challenging. There has been little agreement on the definitions and classification of various tokens, but commonly used categories are given in Box 14. Some governments have issued guidelines or norms to classify token types, but their classification differs (see Box 15). The concept of tokenization was coined in the

BOX 14

COMMONLY USED TOKEN CATEGORIES

- Utility or consumption tokens (i.e. used to provide digital access to an application or service, e.g. a voucher for goods or services offered by the issuer).
- Security tokens (i.e. used to participate financially in real physical underlyings, companies or earnings streams, or an entitlement to dividends or interest payments).
- Payment tokens (i.e. used as a means of payment, e.g. electronic money).
- Commodity tokens (i.e. tokens backed by assets that already have an independent value, e.g. gold, oil).
- Non-fungible tokens (NFTs), which represent a physical or digital asset (e.g. a document of title) and can be used for trade documents which are assets (e.g. account receivable or bills of lading) and can be traded on secondary markets.

early 2000s to describe a way to protect sensitive credit-card data to comply with industry standards and government regulations. The advent of blockchain and DLT has opened a whole range of new opportunities and applications.

The use of tokenization in trade is still in its infancy and its full potential for trade is still some time away, but potential applications are numerous, from the transfer of documents along the supply chain to payments, and

fractional ownership¹⁹ (see Box 16 for some examples of how tokens are used in international trade). Possible benefits include efficiency gains driven by automation (through the use of smart contracts) and disintermediation, transparency and improved liquidity which is particularly scarce for small business (OECD, 2020). While in international trade the flow of money and documents are traditionally distinct (taking place in parallel, but not necessary simultaneously), converting trade documents, such as bills of lading

BOX 15

EXAMPLES OF TOKEN CLASSIFICATION

Although some governments have issued guidelines and norms on classifying tokens, differences in approaches creates legal uncertainty, increasing trade risks.

Malta

Malta follows a negative list approach. According to the Virtual Financial Assets Act 2018, which establishes a classification system for virtual financial assets for issuers and services providers (e.g. exchangers, brokers, custodians), a virtual financial asset:

“... means any form of digital medium recordation that is used as a digital medium of exchange, unit of account, or store of value and that is not -
(a) electronic money;
(b) a financial instrument; or
(c) a virtual token; ... [which] means a form of digital medium recordation whose utility, value or application is restricted solely to the acquisition of goods or services [i.e. utility tokens], either solely within the DLT platform on or in relation to which it was issued or within a limited network of DLT platforms”.

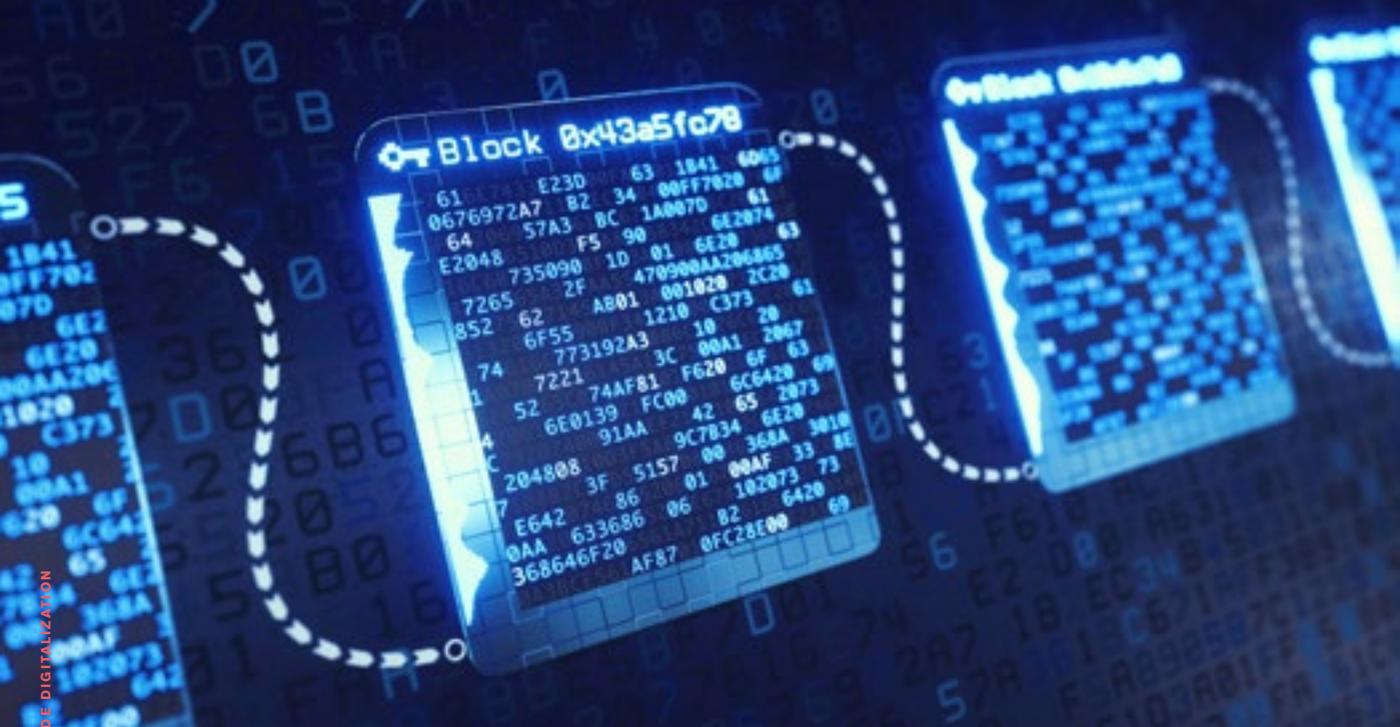
Switzerland

The Swiss Financial Market Supervisory Authority (FINMA) reports that:

“FINMA categorises tokens into three types, but hybrid forms are possible:

- Payment tokens are synonymous with cryptocurrencies and have no further functions or links to other development projects. Tokens may in some cases only develop the necessary functionality and become accepted as a means of payment over a period of time.
- Utility tokens are tokens which are intended to provide digital access to an application or service.
- Asset tokens represent assets such as participations in real physical underlyings, companies, or earnings streams, or an entitlement to dividends or interest payments. In terms of their economic function, the tokens are analogous to equities, bonds or derivatives.”

Source: See <https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung>.



BOX 16

EXAMPLES OF TOKENIZATION OF TRADE DOCUMENTS

TradeFinex

TradeFinex enables bank and non-bank trade finance entities to transform their trade documents (i.e. bills of lading, invoices) into tokens, which can be sold in secondary markets and generate liquidity. These sales transactions are written into smart contracts. Since the industry lacks widely accepted and comprehensive smart contract standards*, TradeFinex decided to refine smart contract standards (based on XinFin Blockchain) to provide not just the standardized datasets for tokens but to also meet know-your-customer and anti-money-laundering requirements. TradeFinex is an ADGM-based software provider entity. The ADGM jurisdiction has a defined framework for settlement, custody and exchange of digital assets in secondary markets through clear guidelines for digital assets.

2Tokens**

The 2Tokens Invoice Market aims to make invoicing more efficient by creating an NFT that will represent individual invoices. By tokenizing invoices on blockchain, Invoice Market transforms invoice data from analogue to digital and in turn synchronizes processes between different parties (e.g. suppliers, debtors, factoring companies, insurance, institutional investors). Digitizing payments as part of the invoice token can increase operational efficiency and lower barriers for small business in supply chain and trade

finance industries. Tokenizing invoices can create a new investable asset class: individual invoice tokens can easily be sold to factoring companies or pooled together and sold to institutional investors looking for credit risk exposure in small business.

Tradeteq***

Tradeteq, a technology provider for trade finance asset distribution, completed in September 2021 what it says is the world's first trade finance-based non-fungible token (NFT) transaction. Launched in 2018, Tradeteq's platform enables originators to package trade finance products into standardized investments that can be bought and sold through private distribution networks and settled like common fixed-income products. The trade finance NFT transaction was conducted on the Singapore-based XDC network operated by XinFin. Trade finance assets were repackaged into NFTs using the network's blockchain technology. According to participants in the transaction, NFTs significantly shorten the settlement time, enhance traceability and fractionalize investments, making it possible to tap into a larger investment base to create liquidity in the trade finance market.

* While there were proposed standards on Ethereum-based smart contracts, these standards did not address know-your-customer and anti-money-laundering requirements. See <https://www.tradefinex.org>.

**See <https://www.2tokens.org/invoice-markets>.

***See Wragg (2021) and <https://www.tradeteq.com>.

or invoices, into tokens and coupling them with smart contracts could allow documents and financial flows (via cryptocurrencies) to move simultaneously, thereby enhancing efficiency and speed and facilitating the sale of these documents in secondary markets. Tokenization can also be used as an incentivizing tool. For instance, vendors can earn tokens (monetary incentives) depending on performance within supply chains.

Despite the trade benefits of tokens, their cross-border use is hindered by the absence of an international definition. At present, there is no recognized terminology for the classification of tokens internationally. This absence creates legal uncertainty with regard to applicable rules and potentially increases trade costs if businesses have to comply with distinct regulatory regimes. Divergent regulatory regimes could lead to market fragmentation, hampering competition and negatively affecting industry growth.

One notable approach to avoid asset classification issues is Liechtenstein's Tokens and Trustworthy Technology Service Providers Law on blockchains, which entered into force in January 2020 and amended civil law to allow tokenization. The Liechtenstein Blockchain Act introduces the concept of Token Container Model. Under the Act, a token acts as a container that can hold rights of all kinds, such as ownership rights. By differentiating between the right and the asset on one side governed by existing laws and the token "running" on a blockchain-based system on the other side, Liechtenstein's approach fits tokens into existing laws: the token is governed by the rules that apply to the rights and assets contained in the token. Under this approach, "a security token is nothing else than a security (with all the rules, licenses, duties etc. applying to it) technically 'packaged' into the token which loads the security like a container".²⁰

How can trade agreements support the global adoption of tokens in international trade?

Given the novelty of the subject, it is not surprising that trade agreements have yet to refer to tokenization. Arguably, existing, more general collaboration clauses of some RTAs could apply to discussions on any issue, including tokenization. That said, explicit provisions could provide legal certainty. To support the global use of tokenization, trade agreements could encourage governments to coordinate regulatory approaches to tokenization to avoid the emergence of inconsistencies among regulatory regimes applicable to tokens.

ENDNOTES

1. See <https://go.dcsa.org/ebook-eb1>.
2. See <https://www.gtreview.com/news/asia/analysis-little-hope-for-banks-caught-up-in-agrtrade-collapse>.
3. See https://cdn.shopify.com/s/files/1/2992/1976/files/ICCUK-Coriolis-MLETR-Alignment-UK_Business_Case.pdf?v=1619683679.
4. *Ibid.*
5. See *Form of Multilateral e-Air Waybill Agreement*, IATA Resolution 672, 10 March 2013.
6. It is important to note that there are different types of e-signature with different levels of reliability (see the UNCITRAL Model Law on Electronic Signatures, MLES).
7. In the European Union, trust services need to be recognized to have legal effects. Recently, there was a case of a Swiss company signing with a Swiss qualified e-signature that adheres to the same technical standard as EU eIDAS signatures and a court in Vienna did not accept it because it was not eIDAS-recognized (see <https://www.railway.supply/en/court-overturns-stadlers-victory-in-grand-obb-contract>).
8. 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.
9. In practice, it is expected that electronic transferable record management systems will use the services offered by trust service providers (ICC UK, 2021).
10. See <https://rightsignature.com/legality.html>.
11. See https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_signatures/status.
12. Control is a fundamental notion of the MLETR, since it represents the functional equivalent of possession of a transferable document or instrument. In particular, the possession requirement is met with respect to an electronic transferable record if a reliable method is used to: (a) establish exclusive control of that electronic transferable record by a person; and (b) identify that person as the person in control.
13. In UNCITRAL texts, maintaining integrity of a data message is a requirement for functional equivalence with the paper-based notion of "original" (see <https://undocs.org/pdf?symbol=en/A/CN.9/WG.IV/WP.158>).
14. See article 3 of the MLETR.
15. See <https://www.mas.gov.sg/news/media-releases/2021/worlds-first-digital-trade-financing-pilot-between-mletr-harmonised-jurisdictions>.
16. See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/986162/Annex_4_Framework_for_G7_collaboration_on_Electronic_Transferable_Records.pdf.
17. See *Revised Draft Legal Taxonomy: Revised Section on Artificial Intelligence and Automation Section*, UN document A/CN.9/1064/Add.1, 24 May 2021.
18. See *Exploratory Work on Legal Issues Related to the Digital Economy: Reports of Events*, UN document A/CN.9/LIII/INF/2, 15 May 2020.
19. Fractional ownership is a method in which various unrelated parties own a percentage share of an asset. An asset, such as a bill of lading, can be converted into different pieces or tokens and sold to several persons, thus enlarging the pool of potential buyers and investors, and increasing liquidity.
20. See <https://philippsandner.medium.com/liechtenstein-blockchain-act-how-can-nearly-any-right-and-therefore-any-asset-be-tokenized-based-3899fc9f039b1>.