

INTERNATIONAL MONETARY FUND

Digital Tokens: A Legal Perspective

José M. Garrido

WP/23/151

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**2023
JUL**



WORKING PAPER

IMF Working Paper
Legal Department

Digital Tokens: A Legal Perspective

Prepared by José M. Garrido

Authorized for distribution by Yan Liu
March 2023

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ABSTRACT: Tokens are units digitally represented in a distributed ledger or blockchain. The various uses of this technology have the potential to transform a wide array of economic activities, from traditional commercial transactions to sophisticated financial undertakings. This paper explores the similarities and differences of tokens with traditional legal instruments in commercial law and how tokens could offer superior solutions, provided that proper legal foundations are established for their operation, including aspects of the law of securities and consumer protection law.

RECOMMENDED CITATION: Garrido, J. M., 2023, *Digital Tokens: A Legal Perspective*, IMF WP/23/151

JEL Classification Numbers:	K10, K12, K22
Keywords:	Tokens; Commercial Law; Securities Law; Fintech; Consumer Protection
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WORKING PAPERS

Digital Tokens: A Legal Perspective

Prepared by José M. Garrido¹

¹I am extremely grateful to Yan Liu for her guidance and support throughout the various stages of this paper. I am also grateful to Marianne Bechara, Lorena Barrenechea, Marek Dubovec, Ender Emre, Alessandro Gullo, Juan Sebastián Viancha, and Akihiro Yoshinaga for their valuable comments, and special thanks go to Jess Cheng for the fruitful conversations and debates on this topic during her tenure at the Legal Department of the IMF, as well as for her thoughtful comments. All errors and omissions remain my own.

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Glossary

AMF : Autorité des Marchés Financiers (France)

AKSHI : National Agency for Information Society (Albania)

B2B: Business-to-Business

B2C: Business-to-Consumer

BaFin: Bundesanstalt für Finanzdienstleistungsaufsicht (Germany)

BTC: Bitcoin

C2C: Consumer-to-Consumer

CNMV: Comisión Nacional del Mercado de Valores (Spain)

CSD: Central Securities Depository

DAGs: Directed Acyclic Graphs

DAO: Decentralized Autonomous Organization

DApp: Decentralized Application

DLT: Distributed Ledger Technology

ECDSA : Elliptic Curve Digital Signature Algorithm

ELI: European Law Institute

ERC-20: Ethereum Request for Comment -20 (standard for fungible tokens in Ethereum)

ERC-721: Ethereum Request for Comment- 721 (standard for non-fungible tokens in Ethereum)

ETH: Ether

FCA: Financial Conduct Authority (UK)

FINMA: Financial Market Supervisory Authority (Switzerland)

HBAR: Hedera Hashgraph

HCCH: Hague Conference on Private International Law

HTLC: Hashed Timelock Contract

ICO: Initial Coin Offering

IEO: Initial Exchange Offering

IOSCO: International Organization of Securities Commissions

IoT: Internet of Things

IP: Intellectual Property

IT: Information Technology

ITO: Initial Token Offering

MAS: Monetary Authority of Singapore

MiCA: Markets in Crypto Assets Regulation (EU)

MDIA: Malta Digital Innovation Authority

MLETR: UNCITRAL Model Law on Electronic Transferable Records

NFT: Non-Fungible Token

OECD: Organization for Economic Cooperation and Development

POS: Proof of Stake

POW: Proof of Work

PREMA: Primary Residence of the Encryption Private Master Keyholder

PROPA: Place of the Relevant Operating Authority

SAFT: Simple Agreement for Future Tokens

SEC: Securities and Exchange Commission (US)

TT: Trustworthy Technology

UCC: Uniform Commercial Code

UETA: Uniform Electronic Transactions Act

WpHG: Wertpapierhandelsgesetz (Germany)

UNCITRAL: United Nations Commission for International Trade Law

Executive Summary

Digital tokens represent a revolutionary innovation for economic activities. Based on developments in cryptography and particularly in Decentralized Ledger Technology (DLT) and equivalent techniques, tokens are digital items that cannot be forged and whose transfer is traceable and economical.¹ The potential applications of tokens are multiple in commerce, finance, and many other economic areas.

This paper connects tokens with the traditional doctrine of commercial instruments. By identifying the fundamental principles that originated in commercial practice with the incorporation of rights to negotiable instruments, the paper analyzes to what extent tokens can perform functionally equivalent roles to those of the existing instruments in commerce and finance.

Tokens have the potential of replacing existing commercial instruments and of performing additional economic functions. Tokens have greater flexibility than traditional commercial instruments and can be deployed in any economic activity. DLT and similar technologies that enable the use of tokens are still evolving and are implementing solutions to ensure efficiency and scalability of operations. If these issues are addressed, tokens have the potential of becoming the lynchpin of the new digital economy.

This paper uses a classification based on the rights that each token affords. Some tokens do not include any right at all and only have extrinsic value based on social consensus (i.e., native tokens, also known as crypto currencies), but other tokens are connected to rights in the virtual sphere, and others are connected to rights to off-line assets or services. Tokens connected to rights have immense potential, but also raise challenges from the legal point of view. The law's intervention is indispensable in establishing an enforceable link between tokens and the off-line reality, and in ensuring the correspondence between the tokens and the off-line assets or services.

Fundamental legal rules are necessary to provide legal certainty to the operation of tokens. Apart from establishing legal rules for the connection of tokens with off-line reality, the law needs to provide responses to fundamental questions such as the legal rules for the transfer of tokens (including rules for loss, for illegal transfers and for good faith acquisition), the creation of security interests, the impact of insolvency, the use of enforcement actions, and eventually, jurisdictional and conflict of law rules for legal relationships involving tokens. These legal issues will need to be addressed by all countries, irrespective of their legal traditions, and need to be resolved for all economic uses of tokens.

Legal systems need to establish clear criteria to distinguish tokens that are subject to securities laws. Tokens can be used to replace traditional securities, and in such cases, the rules of securities law need to be adapted and applied. The law should establish clear rules to distinguish tokens that are securities from tokens that perform other functions. Extending securities law to tokens that are not securities can produce undesirable results and stifle economic innovation.

Consumer protection and market functioning rules should be adapted to the needs of the new digital economy. For most tokens that perform economic functions but cannot be classified as securities, the law should respect innovation and take an enabling approach. This may require only some additional changes in

¹ Naturally, there are also risks that affect tokens, such as the loss or theft of keys, or the hacking of systems.

commercial law, apart from the fundamental legal rules common to all uses of tokens, At the same time, tokens that are used in legal relationships with consumers should be subject to consumer protection rules. These rules need to be adapted to the special characteristics of tokens to offer equivalent protection to that of traditional economic relationships. Aside from regulating bilateral relationships, one of the key features of the new digital economy is the multilateral and decentralized nature of numerous activities. This may involve regulating markets for tokens and token intermediaries to ensure a smooth and fair functioning of those new activities.

Solid legal foundations can support the technological development of tokens, which in turn may result in significant economic benefits. The law can help a wider use of tokens across the economy, and this can result in significant gains in liquidity, cost reduction and enhanced security. Legislators should pay particular attention to the importance of legal frameworks in supporting innovative technologies.

I. Introduction

Digital tokens represent one of the most promising applications of distributed ledger technology. Tokens are units designated by entries in a digital ledger that uses cryptographic techniques.² These entries are numerical values incorporated to a ledger based on distributed ledger technology (DLT), such as blockchain.³ Tokens can be used as units of value and exchange in connection with “smart contracts”, i.e., self-executing contracts written in code, and also incorporated to the blockchain.⁴

Tokens are a purely digital creation. Digital tokens do not have any physical reality. As used in the context of digital technology, the term token is a *metaphor* of what tokens are in the physical world,⁵ i.e., objects that either represent value (e.g., casino tokens), or give access to another object (e.g., wardrobe tokens) or to a service (e.g., the old telephone tokens that allowed users to make calls from public phones). Lacking physical reality, tokens are simply represented by a number in a ledger, symbolizing value. Tokens are different from *electronic documents*:⁶ the main difference is the use of cryptography and their integration in a database, which greatly reduces the possibilities of forgery. Tokens are a subcategory of *electronic records*.⁷

Tokens are inherently flexible and can perform multiple functions. Through the integration of DLT and smart contracts, tokens can be connected to rights to receive an asset, a payment, or the delivery of a service, among other possible content. Tokens can be deployed for a wide range of functions, in connection with multiple assets and services. Tokens have been initially used for payment and investment purposes, and many central banks are exploring the use of tokens for their new digital money. This paper analyzes tokens from a general point of view and then focuses on the connection of tokens with rights or assets. This paper does not analyze specifically the use of tokens as money or as payment instruments.⁸

²There are many definitions of “token.” For instance, a token can be defined as “a unit of value that an organization creates to self-govern its business model, and empower its users to interact with its products, while facilitating the distribution and sharing of rewards and benefits to all of its stakeholders” (Mougayar, 2016). This definition seems especially adequate to describe tokens like bitcoin or ether, but it is more questionable as a general definition, given the varied possibilities in which tokens can be used.

³Throughout this paper, “blockchain” and “DLT” are used interchangeably, despite some differences in scope between the two terms. DLT (distributed ledger technology) comprises different a set of techniques to ensure the integrity and reliability of decentralized ledgers. Blockchain is just one instance of DLT.

⁴ These terms are further explained in section II of this paper.

⁵ See Voshmgir, 2020, at 39.

⁶An electronic document is just the digital equivalent of a paper document. The electronic document can be a converted version of a paper document or can be created originally as an electronic file.

⁷The concept of electronic record is also broad, and refers to any information stored in an electronic format. The peculiarity of tokens is the use of cryptographic tools and their connection to an integrated database. A concept such as “controllable electronic record” is broad and includes other electronic records apart from tokens. On the other hand, the concept of “electronic transferable record” seems narrower than the concept of token, as it only refers to negotiable instruments and documents of title.

⁸There is abundant research at the IMF on digital money and the use of tokens as money or as a payment instrument: see in particular, IMF, 2021, He et al., 2016; Adrian and Mancini-Griffoli, 2019; and Bossu et al., 2020.

Especially, tokens can provide a new technique for the issuance, recording, and transfer of rights. If rights are adequately linked to tokens, they could benefit from the technology used for DLT transfers. The transfer of tokens is simply done through updating the digital ledger. This holds important promises for access, speed, security, and cost-savings. New market practices and business models are emerging around tokens and tokenized assets.

Tokens rely on advances in cryptography and information technology that have not been necessarily recognized by most legal systems. The technological developments in the use of tokens are not always easy to reconcile with the realities of existing legal regimes. The legal status of a token has important consequences, and in turn, the response of the legal system to tokens can undermine or facilitate the economic uses of digital technology.

Although the law should not favor one technology over others, technology neutrality should not be understood as an absolute principle. Legal rules are designed in such a way that apply equally to all existing technologies, which could result in over-inclusive and suboptimal laws.⁹ Lack of legal clarity may undermine the use of technology, whereas legal clarity is instrumental in the adoption of these innovative tools.¹⁰ Thus, legal rules need to be adapted to innovative technologies.

The analysis of the legal features of commercial instruments can offer a useful conceptual framework. By examining how commercial law developed instruments for the incorporation, transfer, and exercise of rights, it is possible to extract valuable lessons about the capabilities of tokens and the legal obstacles that tokens need to overcome to be used more effectively.¹¹

Legal status designations under commercial law may also result in the application of an associated legal and regulatory regime. The use of tokens by companies and entrepreneurs raises similar issues to those of traditional commercial instruments. In some instances, the classification of a token under a certain legal category may come with the application of a special legal and regulatory regime (notably, when a token is classified as a security).¹² The same rationale for legal treatment will apply if new forms of tokens represent financial interests that can be issued massively and transferred freely. This paper examines the legal foundation for the application of securities laws to certain tokens, with a focus on its scope and rationale.

⁹See Greenberg, 2016, at 1562: “When legal regimes adopt technology neutrality as a general principle, it leads to rules that are over inclusive and speak poorly to unforeseen technologies. This makes technology neutrality socially undesirable. It also, in turn, results in inconsistent treatment of similar technologies and increases uncertainty about whether and how the law will be or should be applied.” See also Reed, 2007.

¹⁰ See Cheng, 2020.

¹¹The legal analysis included in this paper focuses primarily on commercial law and related areas, such as securities law or consumer protection law. Tokens can raise issues in other fields of the law, such as data protection law, or financial integrity law. FATF’s recommendations refer to virtual assets, understood as *digital representations of value that can be digitally traded, or transferred, and can be used for payment or investment purposes* (FATF, 2012-2022). The concept of virtual assets seems to correspond with tokens that are used for investment and payment purposes. In any case, other tokens that would be connected to other rights or assets would be covered by AML rules corresponding to those underlying rights of assets.

¹²Securities law includes aspects of both private law (commercial and corporate law) and public law (administrative law, which includes regulatory and sanctioning aspects). Legal systems differ in their approach to securities law, particularly on the connection between private and public law aspects,

The use of tokens may involve not only commercial law and securities law, but also consumer protection law. For tokens falling outside particular legal regimes and transactions that involve consumers, there may be a need to invoke consumer protection law to safeguard the interests of weaker parties. There may also be a need for the establishment of market rules, given the decentralized nature of digital activities.

More broadly, tokens can become the linchpin of the new digital economy. As digital activities become ubiquitous, their increasing share in traditional economic and financial businesses may require specific legal rules for the use and operation of tokens. Particularly, tokens can be critical in connecting the digital world with assets and services existing in the physical world. There is enormous potential in the use of tokens and other innovative technologies, and these developments may benefit all countries, provided that a solid legal and institutional architecture is in place. This requires a solid legal foundation, as this paper argues.

This paper is organized as follows: Section II presents an overview of the technological developments that have led to the expansive use of tokens. Section III offers a summary of the characteristics and functions of commercial instruments and lists the similarities and differences with tokens; Section IV addresses the question of whether tokens can replace commercial instruments. Section V looks at the interaction of tokens and securities law, while Section VI analyzes the implications of the use of tokens for consumer protection law. Section VII explores the possibility of a new legal regime for tokens in the digital economy. Section VIII concludes.

II. The Token Revolution

Tokens have the potential of transforming broad areas of economic activity. Uses of tokens are expanding, and will likely expand further in the coming years to cover various business needs. An overview of the technological features of tokens provides the necessary background to assess their functionality.

Tokens are a product of decentralized ledger technology. DLT was developed experimentally to prove that parties who do not trust each other can perform transactions under proper conditions. The bitcoin blockchain is the best-known working example of DLT: any person can transact with any other person; any person can access the transaction data; and any person can participate in maintaining the database. The idea of having a decentralized database that maintains its integrity despite its open access was made possible thanks to advances in cryptography.¹³ Blockchain is one of the technical possibilities to maintain a decentralized ledger, but there also are other alternatives.¹⁴ Blockchain can also be used in

¹³ See Grigg, 2000.

¹⁴ For instance, directed acyclic graphs (DAGs) do not require the creation of a chain of blocks. Instead, the ledger uses alternative cryptographic mechanisms to reach consensus. Added information must refer to past data, but it does not require including all past information in a block. The best-known examples are *Hedera Hashgraph* (HBAR) and IOTA. Both ledgers can be classified as DLT, but not as blockchain. One of the primary advantages of DAGs over blockchains is that they can reduce the data size per transaction (which results in lower costs and higher speed) and address the issue of scalability that affects blockchain.

solutions that are not completely decentralized, such as permissioned ledgers (also known as “consortium blockchains”)¹⁵, and in centralized databases under the control of a single party (Box 1).¹⁶

Box 1. Types of blockchains

Blockchains can be classified as follows, based on the degree of decentralization of the mechanism:

- *Public blockchains*: a public blockchain is a blockchain that anyone in the world can read, anyone in the world can send transactions to and expect to see them included if they are valid, and anyone in the world can participate in the *consensus process* - the process for determining what blocks get added to the chain and what the current state is. As a substitute for centralized or quasi-centralized trust, public blockchains are secured by crypto economics - the combination of economic incentives and cryptographic verification using mechanisms such as proof of work or proof of stake, following a general principle that the degree to which someone can have an influence in the consensus process is proportional to the quantity of economic resources that they can bring to bear. These blockchains are generally considered to be “fully decentralized”.
- *Consortium blockchains*: a consortium blockchain is a blockchain where the consensus process is controlled by a pre-selected set of nodes; for example, one might imagine a consortium of fifteen financial institutions, each of which operates a node and of which ten must sign every block in order for the block to be valid. The right to read the blockchain may be public, or restricted to the participants. These blockchains may be considered “partially decentralized”.
- *Fully private blockchains*: a fully private blockchain is a blockchain where write permissions are kept centralized to one organization. Read permissions may be public or restricted to an arbitrary extent. Likely applications include database management, auditing, etc., internal to a single company, and so public readability may not be necessary in many cases at all, though in other cases public auditability is desired.

Source: Buterin, 2015

A decentralized ledger is a shared database. The database includes values (tokens) and transactions. Those values and transactions are connected to *addresses*, instead of persons or entities. The addresses connect the values in the database with the users thanks to cryptography: a person can generate a private key, and a cryptographic function generates a public key from that private key.¹⁷ Finally, the address is a shortened form of the public key. A person who has the private key for an address can access the tokens using software (so-called “wallets”).¹⁸ The database shows the transactions between addresses. When bitcoins, for instance, are sent from one address to another, the transactions are reflected in time-stamped blocks, and these blocks are joined with the previous blocks through the

¹⁵ See Swanson, 2015.

¹⁶ Permissioned ledgers have a lesser degree of decentralization since only some persons or entities have the authority to make changes to the ledger. Examples of permissioned ledgers include *Quorum* (created by JP Morgan and specialized in financial activities), *Corda* (an open-source system that allows businesses to build blockchain networks), and *Hyperledger Fabric* (a modular architecture system for the development of applications that uses smart contracts known as “chaincode”).

¹⁷ The private key is a 64-character alphanumeric code. From the private key, an algorithm (ECDSA – Elliptic Curve Digital Signature Algorithm) generates the public key and the address. The public key and the address are used to receive the tokens. It is not possible to derive the public key from the address, and it is not possible to derive the private key from the public key.

¹⁸ The wallet is a software program that stores the public and the private keys. There are “hot” and “cold” wallets (depending on whether they are connected to the Internet or not). Wallets can have a seed or secret recovery phrase. The wallet is really an interface, and does not hold any tokens. In this regard, rather than a “wallet” it would be more appropriate to think of the wallet as a *keyring* (Voshgmir, 2020, at 78).

resolution of complex cryptographic problems (proof of work).¹⁹ The different nodes submit their solution to the problem, and the fastest node in finding the correct solution adds the new block to the blockchain including the most recent transactions.²⁰ The new block becomes part of the distributed ledger shared by all the nodes.

There are alternative mechanisms for the addition of blocks. Apart from proof of work, there are other possibilities for the addition of blocks.²¹ For instance, it is possible to provide voting power to the different nodes according to the relative stakes the nodes have in the system (proof of stake).²² This assumes that those who have a larger interest in the ledger will also be the most interested in maintaining its integrity. In practice, only nodes with large stakes can add blocks to the ledger in such a system. A different possibility is the so-called “delegated proof of stake,” whereby users can delegate votes on other users (delegates).

Cryptography ensures the integrity of the system. Instead of storing documents in their original format, the technology uses *hashing* to keep those documents. A hash is a string of randomly generated numbers and letters, and each hash value is specific to the encrypted data.²³ Thanks to hashing, it is possible to incorporate and concentrate a large amount of information, at the same time maintaining the confidentiality and integrity of such information. Hashing is a core aspect of all mechanisms used to add blocks.

Decentralized ledgers have noticeable advantages in promoting transactions. The main advantage of decentralized ledgers is that they enable parties located anywhere in the world to transact with each other safely without the need of any intermediaries.²⁴ This removes one of the traditional obstacles to commerce, the lack of trust, particularly in an international setting. In addition, decentralized ledgers may also bring a substantial advantage: generally, transfers between parties can be done at low fees and can be completed within a short time frame.²⁵ There are also advantages in the way the transactions are

¹⁹The resolution of the problem consists of finding a hash below the target set by the blockchain. Finding the hash requires considerable computing capacity, particularly to guess the “nonce” (number only used once) which is necessary to compose the hash for the block.

²⁰In the Bitcoin blockchain, the node adding the new block is rewarded with tokens (“mining”). Mining is akin to a payment made for bookkeeping.

²¹ See generally Bains, 2022.

²²See, for instance, NEAR (<https://near.org>), a decentralized application platform on its own blockchain, that uses proof of stake and *sharding* to avoid the scalability problems typical of proof-of-work blockchains. Sharding refers to a technique for database partitioning that separates information in small parts that are autonomous. This allows databases to grow and to be easily manageable.

²³Hash functions are algorithms that convert any type of data of an arbitrary size (message) into data of a fixed size (hash). See Menezes, van Oorschot, and Vanstone, 1996. The Illinois Blockchain Technology Act includes a definition: “*Cryptographic hash means a mathematical algorithm which performs a one-way conversion of input data into output data of a specified size to verify the integrity of the data.*”

²⁴Tokens must be distinguished from units in an electronic registry. It is possible to have a digital registry in which units are recorded. However, those registries are typically managed by an authorized entity (i.e., the registry is not decentralized) and, even more importantly, those units are not connected with rights or assets through smart contracts. A permissioned blockchain is different, since it involves a registry that is partially decentralized (only authorized nodes are able to register transactions), but the technology is the same as in blockchain (transactions are included in blocks that are linked to other blocks using cryptographic techniques). Permissioned blockchains include examples such as Corda, Hyperledger, and Quorum. In a private blockchain, there is only one person who is authorized to record transactions, and the ledger is not open to the public at all.

²⁵However, because the blocks include all previous information in the ledger, the time to effect transfers increased over time, as the amount of information included in the blockchain becomes larger. This has raised the issue of efficiency and scalability in some

(continued...)

recorded, for accounting and auditing purposes,²⁶ since the record is time-stamped and not subject to tampering.

A token is a unit of value represented in DLT.²⁷ DLT is instrumental in building ledgers, and the entries in such ledgers need to include a value. This numerical value is what is commonly referred to as “token.”²⁸ These tokens are different from their equivalents in the physical world: whereas traditional tokens are manufactured objects (e.g., casino tokens), these tokens lack any physical reality. It is also important to emphasize that these tokens are not electronic documents or files, they are just numerical values. Transfers of tokens may be done by different techniques, but there is no “movement” of any document, and transfers are conducted by adjusting values in the ledger.²⁹

DLT is premised on the existence of a *native* token. Because DLT is substantially a registry of transactions and values, it requires an original value as its foundation (“native token,” “intrinsic token” or, in more generic terms, “coin,” or “crypto asset”), such as “bitcoin” in the bitcoin blockchain. The token can be used to reward those that cooperate in maintaining the integrity of the ledger.³⁰ The units that exist in the blockchain do not incorporate any right, or have any connection with any asset or right located outside the ledger. They are just numerical values in the ledger. Bitcoin and other so-called “cryptocurrencies” are good examples. The source of value is “*extrinsic to itself, imposed by the collective belief of the people who use it.*” Of course, those who control bitcoins are free to exchange them for money or any other assets or services, but the blockchain only registers changes in value at the different addresses, not the parts of the transactions that involve assets outside the ledger.³¹

blockchains. However, there are technological changes that can improve the efficiency of blockchains and address the issues of scalability, although these new approaches are being tested: see, for Ethereum, https://www.cryptopolitan.com/why-merge-wont-solve-ethereums-scalability/#The_future_of_scaling_Ethereum.

²⁶In this regard, the use of DLT would make it possible a new system, the so-called “triple-entry” accounting, where DLT links the books together so that separate double entries are sealed cryptographically (the “triple” entry) and cannot be altered. See Boyle, 2003, and Grigg, 2005. In reality, there is no “triple” entry, but the integrity of double-entry accounting is enhanced thanks to the operation of DLT.

²⁷There are other meanings attached to the term “token” in IT. In a broader sense, a token is an object (which can be an element of hardware or of software) that allows a person to perform an operation in an IT system. Tokens can be used to identify persons and to grant access to sites, preserving security thanks to cryptography. In this regard, the term is used in diverse ways, to refer to identifiers (session tokens, which are included in so-called “cookies”) or access to systems (access tokens). Tokens also have different meanings in computer programming: essentially, a “token” is a single element of a programming language. The term “tokenization” can also have different meanings: in IT, tokenization refers to the process of replacing sensitive data by encryption, whereas tokenization in DLT refers to the process of using tokens to represent any rights or assets, as discussed in the text.

²⁸Another frequently used term is “crypto asset.” The term “crypto asset” suggests that there is an asset, a piece of property. However, the usage of “asset” in this context is close to that of “financial assets,” rather than suggesting any similarity with physical assets. It is a generic term that can cover even immaterial rights (such as, for instance, IP assets). The EU MiCA Regulation includes the following definition of crypto asset: “*a digital representation of a value or of a right that is able to be transferred and stored electronically using distributed ledger technology or similar technology*” (art. 3.1 (5)). Of course, the critical issue would be explaining what “representation” means.

²⁹Blockchains do not need to be organized as an account system. The Bitcoin blockchain only records transactions, and does not have a list of accounts that are updated. Technically, the bitcoin network is a matrix of Unspent Transaction Outputs (UTXOs). A person may have multiple UTXOs (and for this reason, the system is different from an account-based system). There is some debate as to how transfers of bitcoin operate, since a partial transfer of a bitcoin holding will result in two UTXOs, one for the transferred amount and another one for the amount not transferred. It is questionable however, that the second UTXO represents a “new” token. These technical aspects do not detract from the general analysis. In a ledger based exclusively on transactions, the reliability and functionality are the same as in an account-based system.

³⁰In fact, this is how most bitcoins have been created. The original block (or “Genesis block”) only included 50 bitcoins, and as of January 2022, there were almost 19 million bitcoins.

³¹Permissioned ledgers do not require a native cryptoasset or coin to operate. A permissioned ledger can operate in an equivalent way to an ordinary ledger, recording transactions among participants, and for this reason, a native token is not needed to reward the person managing the ledger, or to conduct any transactions within the platform.

Tokens have expanded their usability thanks to their integration with smart contracts. Although the foundations for tokens were laid out by the bitcoin blockchain, the real revolution for the use of tokens has come through the integration of smart contracts and DLT. Smart contracts are predefined relationships, where the action of one party automatically determines actions of another party. The contract is a set of rules written in code embedded in the ledger, and associated with tokens, which represent numerical values for the transactions conducted according to such contract. The contract is also integrated in a DApp, a decentralized application, i.e., software that runs in the decentralized network. This integration was first achieved through the *Ethereum* blockchain, but there are increasing numbers of DLT platforms performing a similar function (for instance, *Solana* or *Avalanche*), as well as ledgers that are partially decentralized. In these examples, there is a ledger that provides a foundation for the deployment of contracts and applications, and the native token can be used for payments within the platform.

The integration of smart contracts with DLT modifies the function of native tokens. When DLT serves as the fundamental layer over which DApps are deployed, the native tokens are used as a means of payment within the platform in exchange for deployment and maintenance of services.³²

Other tokens can be created over the native DLT. In a decentralized ledger, with its native crypto asset, other tokens represent separate and additional values -also assigned to addresses- that are connected to a smart contract.³³ In this way, for instance, a smart contract can allocate computing power in a network in exchange of tokens. Interested parties can acquire tokens which then are exchanged for the service offered according to the contract. As the content of the smart contracts is practically unlimited, tokens can be programmed and used for almost any conceivable activity or product.³⁴

III. Commercial Instruments and Tokens

The rise of tokens can be put in context by analyzing their connections with classic commercial instruments. Consideration of the uses of tokens and their integration in the legal framework can benefit from a brief overview of the use of documents or instruments in commercial law. Since early stages of history, documents have been used as *evidence* of the existence and content of contractual relationships and of the fulfilment of obligations (receipts), first in private law and then in commercial law. But commercial law operated a deep transformation in the role of documents, that can be used not only to evidence the existence and fulfilment of contracts and obligations, but also to *incorporate rights*.

³²Any person can write a smart contract in code (using the Ethereum Virtual Machine and *Solidity* language) and deploy it in the Ethereum platform by paying a certain amount in the native token (Ether – ETH). There is a cost for the deployment and storage of the contract, and further costs are incurred for memory usage. These costs are commonly referred to as “gas,” and are paid in ETH, or more exactly, in *gwei*, which is a fraction of ETH (each *gwei* is equal to 0.000000001 ETH).

³³ Ethereum decoupled the smart contract from the underlying blockchain network processing the agreements. However, there may be a problem of scalability. A different system has been followed in the creation of Polkadot, which includes so-called “parachains,” i.e., blockchains that serve a specific purpose and that are positioned over a supporting layer called “Relay Chain.”

³⁴Of course, smart contracts are subject to the general limitations of contract law (e.g., contracts cannot have an illicit purpose) and they may also be affected by requirements of formality under substantive law (e.g., requirements of written form and other formalities for certain transactions, such as those over real estate).

Incorporation of rights to documents has been one of the major developments in commercial law.

This legal creation was the result of a process that started in the Middle Ages, which initially consisted of “incorporating” the right to receive a payment to a written instrument. This is how the bill of exchange was created, with the original purpose of avoiding the risks of transporting money physically from one point to another (see Annex 1). The incorporation of the right to the document did not only enhance the security of the holder –it also opened the way to *transfer the right by transferring the document*.

Documents can incorporate various rights. Incorporation of different rights to documents eventually developed into a set of different instruments, depending on the nature of the incorporated right: whereas the bill of exchange incorporated the right to receive a payment in a certain currency and in a certain place and time, in maritime law the bill of lading incorporated the right to receive specified goods from a sea carrier, at a certain port and time. Eventually, other documents incorporated the rights of members of a company (shares) or the rights of creditors (bonds).

Incorporation is the fundamental principle for the law of commercial instruments. A set of principles complements incorporation and provides a strong conceptual framework for the operation of commercial instruments. These principles are: *legitimation* (the person entitled to the right is the person holding the document), *literality* (the right is the one described in the document), *transferability* (the right is transferred with the document, and this may imply that the regime for the transfer of movable assets is applied), *formality* (the document needs to respect formal requirements in order to be recognized), and *autonomy* (the exercise of the right by the holder of the instrument is autonomous from developments in the underlying legal relationships) (see Annex 1 for a detailed description of these principles).

There is considerable variety in commercial instruments. The principles listed above apply in their entirety to negotiable instruments and documents of title. But the variety of instruments used in commercial and financial practice is wider, and there are many other examples where these principles only apply partially. Table 1 shows the diversity of instruments for the exercise and transfer of rights and includes a succinct description of their characteristics.

Table 1: Typology of instruments designed for the exercise and/or transfer of rights

(Source: own elaboration)

Instrument	Example	Economic Function	Other features
<i>Signs of legitimation</i>	Wardrobe token	<i>Facilitate</i> the identification of the person entitled to a service (recovery of items deposited)	Not designed to be transferred. No complex document is involved. Not always indispensable to exercise the right.
<i>Documents of legitimation</i>	Plane tickets, credit cards	Identify the person entitled to exercise a right (right to travel, right to access cash)	The holder is identified in the document. Not designed for circulation (in fact, circulation tends to be forbidden).

		or use credit in transactions)	
<i>Improper titles or instruments</i>	Vouchers, coupons, lottery tickets	Promote and market the goods or services of a business; organize participation in schemes for distribution of prizes.	Incorporation of any right (right to a product or service; purchase at a discount; right to receive a prize if conditions apply, right to receive a payment if documents are produced) No identification of the holder Not designed specifically for circulation; but can be transmitted.
<i>Negotiable instruments</i>	Bill of exchange, promissory note, deposit certificates	Mobilize credit; obtaining financing.	These documents are specific (i.e., bills of exchange relate to specific obligations arising of specific transactions). When documents become standardized (i.e., the issuer creates a series of promissory notes), they belong in the category of securities.
<i>Documents of title</i>	Bill of lading, dock warrant, dock receipt, warehouse receipt, order for the delivery of goods	Mobilize the right to receive the specified goods at a specific place and time (enabling the sale of the goods stored or in transit)	The common feature of these instruments is that they incorporate the right to the delivery of specified assets. These documents are specific to each transaction. In international trade, these documents are accompanied by insurance policies that incorporate the right to receive the indemnity in case of loss.
<i>Securities</i>	Shares, bonds, hybrid securities, fund units, derivative securities	Mobilize investments; increase access to capital and finance; allow hedging and speculative transactions.	These instruments can be incorporated or dematerialized (and can be held directly or through intermediaries).

Secured instruments	Mortgage bonds or notes, pledge bonds or warrants for warehouse receipts	Mobilize rights, including a security interest	These documents incorporate the right to a security interest, with or without an associated credit right.
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The various functions performed by instruments explain their different classes. Table 1 shows that the most basic types of instruments are those designed for legitimation (e.g., wardrobe tokens and plane tickets), whereas the more sophisticated instruments are designed for the transfer and exercise of rights in commercial and financial transactions, such as negotiable instruments (e.g., bills of exchange, cheques, promissory notes, and letters of credit), financial contracts (derivatives, swaps), securities (shares, bonds, warrants, and fund units), and documents of title (e.g., bills of lading, dock warrants, dock receipts, and orders for the delivery of goods).

Although paper money is historically linked to these instruments, it has a different legal nature.

Originally, money was based on the intrinsic value of the coins (so-called commodity money, which relied on the value of the metal in the coins). However, a series of transformations occurred: at its inception, paper money was based on the same structure as commercial instruments - a document including a promise to pay the bearer a certain amount in commodity money. Over time, the right to receive commodity money was abandoned and eventually abolished. Since then, money does not have intrinsic value and *does not incorporate a right to receive anything*. The defining feature of money is its ability to discharge an underlying obligation.³⁵ Money is a means of payment and performs fundamental economic functions as a store of value and unit of account, but it does not have the characteristics of a commercial instrument.

The different regimes for the transfer of instruments reveal the existence of a trade-off between transferability and security. In essence, it can be said that *the easier the transferability, the less security in the transfers*. The documents that are more difficult to transfer are those that reflect the name of the holder (“nominative” documents), but these documents are also more effective at preventing the illegitimate transfer and exercise of rights. At the other end of the spectrum, there are “bearer” instruments, where the mere transfer of the physical document implies a full transfer of the right. With increased ease of transfer, there is also a higher risk of illegitimate transfer and exercise of rights. Intermediaries and depositaries tend to have a more significant role where there is increased transferability, as they provide additional security for holders.

However, the trade-off between transferability and security is affected by developments in technology. The traditional instruments were designed using paper and signatures. Paper provided easy transmissibility and transportation, and the use of signatures and printing techniques made forgeries more difficult. The interplay of these elements allowed various combinations of transferability and security. With dematerialization and cryptographic techniques, transfers have become faster and more reliable, the loss of the physical document is no longer a risk, and passwords replace signatures as the technique to show authenticity of the actions of a person. This means that there is both easier transmissibility and higher

³⁵ See Cheng, 2020.

security. The trade-off between transferability and security always exists, nonetheless. Even with the protection that cryptography provides, and the ease of on-line transfer, there are risks in the loss of keys, instances of fraud and use of coercion in transfers.

Commercial instruments are primarily designed to facilitate the transfer of rights, but they also need to include protection against risks. The incorporation of the right to the document creates the risk of loss of the right derived from the loss of the document, and, from the perspective of third parties, there is also a risk of forgery. Against the risk of loss, there various measures protect the holder of the document, such as the possibility of obtaining a replacement of the document after proving the loss of the original document.³⁶ These measures show that “incorporation” operates more as a metaphor than as a real identification of the right with the document, which otherwise would inexorably tie the right to the document. Against the risk of forgery, instruments tend to have embedded protection measures (for instance, watermarks or serial numbers) and parties must examine signatures to verify their authenticity.

The principles of commercial instruments were instrumental in the creation of securities. However, there are some significant differences: in contrast to classic commercial instruments, such as bills of exchange, securities tend to have imperfect literality (i.e., the rights of a shareholder derive from legislation and from the articles of association of a company and are not normally described in the share title itself), and they are issued in series, occasionally massive, whereas instruments in commercial practice tend to be created for specific situations (i.e., a bill of lading for a particular shipload), and not as part of a series.

Incorporation of rights to documents was essential for the creation of financial markets, but became victim of its own success. Incorporation allowed the creation of the stock exchanges, where paper shares and bonds could be easily negotiated.³⁷ Although incorporation made securities markets possible, the growth of markets resulted in a sheer mass of paper documents representing securities, which became eventually cumbersome for market participants (“paperwork crisis”).³⁸

Immobilization and dematerialization emerged as two alternative approaches to resolve the problem of handling mass paper documents. *Immobilization* still depends on the existence of physical documents, but these share or bond certificates are deposited with intermediaries, and modern systems can be deployed for the trading of securities. The securities do not need to circulate to be transferred – intermediaries record the transfer in the system and the securities are attributed to the new owners without possession of the certificates changing hands. In these regimes, the regulation of intermediaries and the contractual relationships between intermediaries and investors became paramount. A step further in this process comes with *dematerialization*. A dematerialized regime does not rely at all on paper documents: securities only exist as electronic entries in a registry.³⁹

³⁶ This can be subject to various legal requirements and procedures.

³⁷ The first stock exchange was created in Amsterdam in 1602 to enable transactions over the bonds and shares issued by the United East India Company. Other major financial centers followed suit.

³⁸ In 1968, the New York Stock Exchange was negotiating around 12 million shares per day. The shares needed to change hands for the trades to be perfected, and the logistical needs to mobilize the paper documents threatening the collapse of the market.

³⁹ In countries, like Denmark, Sweden, or France, there has been a total abolition of share certificates, and securities are represented by entries in a digital registry.

The body of law of negotiable instruments, documents of title, and securities experienced a serious crisis with the advent of dematerialized titles. The replacement of physical shares and bonds by digital entries in a registry questioned the doctrine of “incorporation” (since there is no physical element anymore) and forced a reworking of these conceptual principles to adapt to a new reality. Dematerialization not only affected mass fungible titles (securities), but also the rest of commercial instruments (for instance, cheques, or bills of exchange). In most cases, traditional commercial instruments continued being created as documents, but after creation become immobilized and replaced by digital images or records (immobilization or imperfect dematerialization).⁴⁰

The traditional principles of commercial instruments were partially replaced by registration techniques in many legal systems. Instead of establishing a connection between the right and a document (*incorporation*), the law established a connection between the right and the electronic record (*dematerialization*), or between the document and the electronic record (*immobilization or imperfect dematerialization*).⁴¹ These processes of immobilization and dematerialization have resulted in increased speed and reduced cost in the processing of commercial instruments.

Registration has similar effects to incorporation, but it is structurally different. Registration also “incorporates” the right, in the sense that any change in registration implies a change in the right or in the person entitled to exercise the right. The law states that changes in registration determine changes in ownership. In addition, registration also offers the opportunity of creating charges over the registered rights in a less intrusive way than in an incorporation regime.⁴² Alternatively, in regimes based on immobilization, the certificates are immobilized, and the intermediaries take a leading role in the establishment and transfer of rights over securities, which occurs through accounts with those intermediaries.

The principles and evolution of commercial instruments offer useful lessons for the emergence of tokens. Tokens share the objectives of commercial instruments: they are designed to facilitate the transfer of rights and enhance the security of those transfers. But the technology that enables tokens is entirely different from the techniques that created commercial instruments, and tokens have more flexibility than commercial instruments. In any case, the experience with commercial instruments is helpful to understand the potential capabilities of tokens. Dematerialization of instruments can be seen as an intermediate step between traditional paper-based commercial instruments and tokens. Both tokens and dematerialized instruments lack a physical reality and operate with digital records. The difference is that tokens are embedded in a ledger where all transactions are recorded, which ensures the integrity of the database of transactions. This is not necessarily guaranteed in a dematerialized system. A dematerialized

⁴⁰The process is also referred to as “truncation.” In the US, this is regulated by the Check Clearing for the 21st Century Act of 2003 (“*Check21*”).

⁴¹Imperfect dematerialization occurs when documents are still printed in paper form, but are then immobilized (typically, with a depositary) and represented by records in an electronic registry. Pure or perfect dematerialization implies that there are no documents whatsoever.

⁴²In an incorporation regime, creation of a charge over the document requires transfer of possession and/or annotation of the charge over the document itself, as a general rule.

system needs a depository or a similar institution that keeps track of dematerialized titles and ensures the integrity of the system.

Tokens operate differently than traditional commercial instruments. The main difference between tokens and traditional commercial instruments is the *lack of incorporation*. As tokens are immaterial, there is no possibility that incorporation plays a role in their configuration. This influences the way that the rest of the principles operate when considering tokens. Tokens are not incorporated in a document, and for that reason, the regime for transmission of movable assets is not applicable -at least, in the absence of a special legal rule to that effect-. Because the principle of incorporation does not apply, the rest of the principles are also affected (see table 2). However, the fact that principles apply differently does not generate problems for the operation of tokens; quite the opposite, there are opportunities for tokens, which can benefit from their higher flexibility.

Table 2: Application of principles of the law of commercial instruments to tokens

(Source: own elaboration)

Principle	Application to tokens	Possible issues	Opportunities
<i>Incorporation</i> (rights are incorporated to the document)	Not applicable – tokens do not have any physical reality, so there is no incorporation.	Uncertainty about the regime applicable to the transfer and creation of rights over tokens.	No need to use documents.
<i>Legitimation</i> (The person in possession of the document is entitled to the exercise of the right)	There is no possession of a document, so this does not indicate the person who can exercise the right.	No legal rule states that the person with the private keys is the legitimate holder of the right. ⁴³	The person who has the private keys controls the token and is entitled to exercise the right. This principle can be based on contractual obligations accepted by parties.
<i>Literality</i> (The contents of the right are described in the document)	Since there is no document, the rights of the holder of the token are not included in it.	Tokens do not include text that clearly indicates the rights of the holder.	Tokens are connected to smart contracts, which are not limited in content as typical documents may be. This means that tokens can integrate much more extensive content.
<i>Transferability</i> (The document is designed to be transferred)	The regime for the transfer of movable assets and the regime for the circulation of some documents	There are no legal rules indicating how tokens should be transferred.	Transfer can be done by updating the ledger. This can be more secure and more economical than the transfer of documents. In the

⁴³ An exception is the UCC, where “holder” includes a person in control of an electronic record/digital asset (UCC 1-201).

	(endorsement) do not apply.		absence of any statutory rules, transfer operates by way of contract.
<i>Formality</i> (The document is recognizable for the formalities it needs to respect)	There are no formal signs that identify tokens.	There is no established legal way of identifying a token and immediately determining its content.	Tokens are not limited to specific economic functions, such as the payment of a certain amount or the delivery of goods – they can refer to any right.
<i>Autonomy</i> (The exercise of the right incorporated in the document is not constrained by the circumstances of the underlying relationship)	Third parties do not acquire rights from an underlying relationship because of the transfer of a document. However, a token can be transferred to a third party.	It is not clear whether a third party would be affected by aspects of the underlying relationship between the token issuer and an original token holder.	Autonomy can be defined by smart contracts and can be tailored to the specific needs of each instrument (for instance, a native token may be completely immune to any aspect of the relationships between issuer and original token holder). However, the whole contractual relation is contained in the smart contract, so the “autonomy” concept does not really apply.

Tokens represent a different technique for the exercise and transfer of rights, and represent an improvement on existing instruments. As tokens are based on advanced technologies of digitalization and cryptography, there are clear advantages in its operation over the use of documents. As noted above, incorporation is not required for tokens. Tokens can operate with both less costs and more security than traditional commercial instruments. There are also other advantages that are less obvious: literality and autonomy can be *tailor-made*, which is not possible with commercial instruments.

Tokens compare favorably against existing commercial instruments because of their higher flexibility and versatility. A comparison between tokens and existing commercial instruments sheds light over their similar functions and certain distinct characteristics.⁴⁴ If we look at the functions performed by instruments in commercial law, tokens can perform them all. In fact, tokens could have the potential to perform all those functions.⁴⁵ Tokens can be used as functional alternatives to signs or documents of legitimation, can be used in the role of negotiable instruments and documents of title, as secured instruments, as securities, and can also be used as money. In addition, certificates of deposits can be

⁴⁴ See DiCaprio and Jessel 2018.

⁴⁵ For instance, there is a DApp for the creation of bills of exchange: <https://cryptonomica.net/bills-of-exchange/#/>

replaced by tokens.⁴⁶ Tokens can also coexist with existing commercial instruments, but remarkably, can perform additional functions that are out of reach for commercial instruments. The connection with smart contracts means that tokens can have *any* content, and therefore are not subject to the constraints of a limited number of instruments as it is the case in commercial law.⁴⁷ Tokens do not experience the typical limits of the literality principle, either. Through smart contracts, it is possible to include the complex suite of rights that a shareholder has, for instance. In this way, a whole contractual relationship or the whole status of a shareholder can be included in the token.⁴⁸ This overcomes the limits of literality: every acquirer of a token can know exactly the contents of all the rights attached to the instrument.

In the area of negotiable instruments and documents of title, the emergence of the concept of “electronic transferable record” opens the way for the use of tokens. The Uniform Electronic Transactions Act of 1999 (UETA) and successive reforms of the Uniform Commercial Code (UCC) in the US introduced the concept of electronic transferable records, which recognizes the possibility of electronic alternatives to paper documents for various purposes in commerce. The fundamental innovation consists of allowing the replacement of paper documents by electronic alternatives, and then substituting the concept of control for the concept of possession. Tokens used for the functions of negotiable instruments and documents of title would fit within this general framework, as well as within the UNCITRAL Model Law on Electronic Transferable Records (see Box 2).

Box 2. The UNCITRAL Model Law on Electronic Transferable Records

UNCITRAL adopted its Model Law on Electronic Transferable Records (MLETR) in 2017. The Model Law does not aim to affect in any manner existing law applicable to transferable documents or instruments (“substantive law”). The Model Law defines “electronic record” as “information generated, communicated, received or stored by electronic means” (art. 2), and “electronic transferable record” is an electronic record that is a document or instrument that entitles the holder to claim the performance of the obligation indicated in it, or transfer the right to performance (arts. 2 and 10). The Model Law *enables* the use of electronic technologies in the area of negotiable instruments and documents of title. The Model Law is premised on technology neutrality and functional equivalence of electronic records and paper documents.

The Model Law is based on the concept of control of electronic records, which is fundamental as it replaces possession of paper documents. The provisions allow the inclusion of additional information in the electronic record (for instance, metadata). The fact that a record is electronic cannot be a reason to deny its legal effects. Legal requirements that a document should be in “writing” should be understood to be satisfied by an electronic format. Although the framework is technology-neutral, any system recognized under the law must be reliable and maintain integrity of the information.

⁴⁶A much broader application is designated by the term “tokenized deposits.” Instead of referring to deposit certificates, a tokenized deposit consists of the representation, in fungible tokens, of the balance held in an account in a banking institution.

⁴⁷In some legal systems, this is known as the “typicity” of commercial instruments (i.e., parties can use cheques, bills of exchange, and any of other typified instruments, but it is not clear they can create other instrument for instance, a document that gives the right to use a piece of industrial equipment). However, with the connection of smart contracts and tokens, there are no limits to what can be done. In particular, tokens can give right to services, whereas traditional commercial instruments were not designed to that end.

⁴⁸The relationship between smart contracts and tokens is complex: on one hand, smart contracts can operate as exchange mechanisms that take tokens as their object; on the other hand, smart contracts can provide the contents of the rights of the token holders. Naturally, even smart contract can have gaps, and these will have to be filled with contract law rules. “*Blockchain business organizations cannot evolve to the point that they no longer need contract law-or, more precisely, that they no longer need the gap-filling that contract law traditionally provides*” (Rodrigues, 2019).

The MLETR takes an enabling approach for the use of electronic technology in domestic and international trade. The Model Law does not include the introduction of other changes in substantive law. “*The Model Law sets out a legal framework to validate electronic transferable records. The Model Law does not provide technological guidance on how this is to be achieved, nor does it provide guidance on how the underlying substantive law of paper instruments and documents can be adjusted to conform to their electronic equivalents.*” (Gabriel, 2019).

Bahrain and Singapore are the first countries to enact the Model Law. The UK is now in the process of incorporating the Model Law through the Electronic Trade Documents bill 2023. The impact assessment for the UK bill mentions positive effects such as reduction in costs associated with trade, an acceleration in trade transaction times and an increase in trade volumes. The estimate for net benefits is more than one billion pounds for the first ten years that the law is in force. Germany and France are also in the process of drafting laws and regulations enabling the use of electronic documents in trade.

Additional legal changes may be needed to maximize the potential of tokens. The emergence of tokens requires another radical legal shift to integrate and absorb this innovative technology within the conceptual framework of commercial instruments⁴⁹ and to extend similar techniques to other areas of commerce and finance. The experience with dematerialization can provide valuable lessons, but it is likely that additional changes will be required.

IV. Token Taxonomies

Tokens have developed within a brief period, independently from legal institutions. Tokens are being used in various contexts, in connection with diverse economic activities, but their rapid transformation and versatility makes it particularly challenging to classify them according to established legal or economic categories. Tokens cannot be classified according to traditional commercial law typologies, because of their distinct characteristics.

Taxonomies are attempts at understanding the nature and functions of tokens. Taxonomies provide some order in an area where changes occur at fast speed. Some taxonomies are extremely granular in seeking to understand the various technological and business aspects of tokens.⁵⁰ In other cases, the motivation is to create unified technical standards for the industry.⁵¹ In addition, taxonomies are often incorporated to inform legal reforms and regulatory guidance: in these cases, taxonomies may have important legal consequences beyond the characterization of tokens, since they become the foundation for the regulatory architecture.⁵²

Taxonomies combine private law and regulatory approaches. A major issue with taxonomies is that they may combine classification criteria that are based on private law categories with criteria that are

⁴⁹ This point applies broadly to the technological innovations brought about by DLT: See De Filippi and Wright, 2018.

⁵⁰ Among these taxonomies, see especially Euler, 2018, and Freni, Ferro and Moncada, 2022.

⁵¹ See InterWorkAlliance, 2021, and Tapscott, 2020.

⁵² See Bains et al., 2022.

aligned with financial regulation classifications. In many cases, the overall thrust of the classification is to place some tokens under the authority of securities regulators, others under the competence of the central bank or payment systems overseer, and then leave out the rest of tokens.

Certain taxonomies are based on functional criteria. These taxonomies look at the functions performed by tokens and establish some basic differences among them. This has been the preferred approach among regulators since these taxonomies are useful to delineate the scope of regulatory regimes. According to these functional taxonomies, there are three types of tokens, namely:

1. *Payment or exchange tokens*
2. *Utility tokens*
3. *Security tokens*

The difference among various tokens is the function assigned by parties to the particular token.⁵³ Payment tokens are accepted by parties for the settlement of obligations among them. Security tokens perform the same function as traditional securities, such as bonds or shares. Utility tokens can be similar to vouchers: the token is redeemed against a service or a good provided by the issuer.⁵⁴

Functional taxonomies help understand the flexibility of tokens and place tokens under certain regulatory regimes, but do not resolve key legal questions. In practice, the functional taxonomy is asymmetrical. Whereas the classification of a token as a security has legal consequences, it is not clear that classifying a token as a “payment token” or a “utility token” has any effect. These categories of tokens are based only on the actual usage of tokens by market participants. Because tokens are extremely flexible and can perform multiple functions, any taxonomy based on functional criteria has limitations. In fact, tokens can perform more functions than those captured in functional taxonomies (for instance, tokens can be used as a means of proving the identity of a person, thanks to non-transferable, identity tokens)⁵⁵ and tokens can also perform several functions simultaneously (for instance, a utility token can also be used as a payment token). A token can also become a “hybrid” by adding more contents to the typical contents of an instrument (for instance, a security token that works as a share can also give additional rights to the holder such as discounted prices for products).

Other taxonomies include additional categories of tokens. In some cases, a fourth category has been added, including the so-called “*asset-referenced tokens*” or “*asset-backed tokens*.” This category refers to tokens that are connected to commodities or any other asset and are used to transact indirectly in them (for instance, a token backed by a currency or a basket of currencies, gold, diamonds, or real estate). This points to a use of tokens that is not clearly captured in the basic functional taxonomy, and which raises legal issues (see section V below). The EU⁵⁶ considers asset-based tokens as a separate

⁵³See Allen et al., 2020, at 10. This taxonomy reflects the efforts of numerous jurisdictions in elaborating a classification of tokens, including Abu Dhabi, Germany, Israel, Malta, Singapore, Switzerland Thailand, and the UK. There is some variation in the terminology, but the three categories of tokens are identified in all these countries.

⁵⁴ Structurally, these tokens are also similar to warehouse receipts or bills of lading since they can give the holder the right to receive goods. The difference is that tokens are extremely flexible, so they can refer to any good or service, and do not need to be associated to any warehousing or transportation contract. GDF 2018 prefers to use the term “consumer tokens” for this category.

⁵⁵These have been called “soulbound tokens” (Weyl, Ohlhaber, and Buterin, 2022). The Hague Conference on Private International Law has announced a project on this topic: <https://assets.hcch.net/docs/a91fd233-acf7-4c42-9aad-a426c4565068.pdf>.

⁵⁶ See Regulation (EU) 2023/1114, of 31 May 2023, on markets in crypto-assets (MiCA).

category, together with utility tokens, e-money tokens⁵⁷ and crypto assets (see Box 3). Switzerland also contemplates the category of asset-backed tokens (FINMA, 2018). In many cases, asset-backed tokens overlap with the category of “stablecoins,” i.e., tokens designed for payment purposes that provide price-stability by being pegged to a currency or any other asset with a stable price.

Box 3. Token Taxonomy in the EU legislative package

The Markets in Crypto-Assets Regulation (MiCA), adopted in May 2023, includes the following definitions in its article 3:

- ‘*Crypto-asset*’ means a digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology.
- ‘*Asset-referenced token*’ means a type of crypto-asset that is not an electronic money token and that purports to maintain a stable value by referencing another value or right or a combination thereof, including one or more official currencies.
- ‘*Electronic money token*’ or ‘*e-money token*’ means a type of crypto-asset that purports to maintain a stable value by referencing the value of one official currency.
- ‘*Utility token*’ means a type of crypto-asset that is only intended to provide access to a good or a service supplied by its issuer.

The main consequence of the classification is to regulate the offers of crypto assets and establish regulatory regimes for those that provide token-related services (see Box 8 below)⁵⁸.

Some taxonomies are being developed as part of legal reforms. The EU, for instance, has designed a legal regime that establishes a special token taxonomy (see Box 3). This taxonomy is motivated by the need to delineate legal and regulatory regimes for financial activities. As with other legislative designs, there are some categories that fall directly under a legal regime (for instance, the e-money regime), and categories that fall outside existing financial regimes, such as “utility tokens,” for which the proposed regulation is silent. In this regard, the main purpose of such taxonomies is to delineate the application of special regimes under the principle of “same activity, same risk, same regulation.”

Alternative classifications look at other characteristics of tokens, such as fungibility and divisibility.⁵⁹ Functional taxonomies tend to highlight fungible tokens, but tokens can be fungible or non-fungible.⁶⁰ The distinction is similar to the one in corporeal assets. Fungible assets are replaceable with other assets of the same category (for instance, commodities such as oil or coffee are fungible), whereas non-fungible assets possess individual characteristics that preclude their replacement (for instance, a work of art, or a trademark). Similar to corporeal assets, tokens can also be undistinguishable from each other or have a unique identity.⁶¹ Tokens can also be divisible or non-divisible. In principle, fungibility and divisibility are correlated, but there are exceptions: fungible tokens are normally divisible, but this is not always the case (for instance, a token may give right to a certain service or good that cannot be divided – such as the right to receive a specific tool), and divisibility may have limits (even ultra-fungible tokens,

⁵⁷E-money tokens need to be accepted by more parties than the issuer. This is a clear difference with utility tokens. See Dobler *et al.*, 2021.

⁵⁸ On the EU token taxonomy, see also Token Alliance, 2021.

⁵⁹ A detailed classification, based on a variety of technical aspects, can be found in Euler, 2018.

⁶⁰ See Tomu, 2018.

⁶¹ There are special platforms designed for the creation of non-fungible tokens, such as *Oxcert*. The standard ERC-721 allows the creation of non-fungible tokens in Ethereum and can be used for any type of asset that is not fungible, such as digital art or specific goods. Fungible tokens are created according to the ERC20 standard.

such as “crypto-currencies”, can be divided to a point where the fractions are practically worthless, often referred as “dust”).⁶² On the other hand, indivisibility is a technical characteristic of non-fungible tokens,⁶³ but it is possible to create fungible –and divisible- tokens that represent fractions of a non-fungible token.⁶⁴

Box 4. Non-fungible Tokens (NFTs)

The market in Non-Fungible Tokens has experienced a rapid expansion. The main difference between the fungible tokens and the non-fungible ones is that the non-fungible tokens are unique, cannot be replaced by other tokens, and their properties are also unique, whereas all fungible tokens provide the same rights and can be replaced by other fungible tokens of the same class.

Among other business uses, NFTs are being used to market digital art. In fact, NFTs are not in themselves works of art – NFTs tend to include a hyperlink to a digital or physical work of art, but that does not imply that the owner of the NFT is actually the owner of the work of art. The only thing the buyer acquires is the token itself, and the work of art can only be found through the link included in the token.

The lack of a legal connection between NFTs and actual works of art may generate confusion and frustration among buyers.

On the other hand, it should be possible to establish a real connection between a NFT and a work of art (or any other singular object, such as a building), with the same characteristics of fungible tokens connected with assets and services. If the NFTs are then fractionalized into fungible tokens, legal issues may arise regarding their classification as collective investment schemes.

Legal analysis can be based on a taxonomy of tokens that distinguishes various “levels.” The first distinction in such taxonomy is between native tokens and the rest.⁶⁵ Native tokens are regulated by the DLT protocol, only exist in the blockchain, and have no connections with any other reality outside their virtual environment.⁶⁶ The rest of the tokens are connected with assets or services through smart contracts. The smart contracts determine the rights that token holders have. A further difference can be made between tokens that refer to services and assets that only exist in the virtual environment, and tokens that provide rights to services and assets existing off-line. These three categories (that we can call level 1, 2 and 3 tokens – see fig. 1) not only are functionally and structurally different but also raise different legal issues.

⁶²See Vosghmir, 2020, at 163-164. Dividing to an “n-point” may create “dust,” i.e., a millionth fraction of a token that is worth more transferring than keeping.

⁶³In this regard, non-fungible tokens can make fungible assets unique: for instance, an electronic art piece, which is usually fungible (it can be copied and replaced) is made unique through the creation of an NFT. A NFT can also connect with a specific document, such as a passport or another ID.

⁶⁴Technically, a NFT representing a work of art, for instance, can then be connected, through a smart contract to a set of fungible tokens. This creates fungible and divisible quotas over the work of art.

⁶⁵See the Thai Emergency Decree on Digital Asset Businesses, B.E. 2561 (2018), which distinguishes between “cryptocurrencies”, that are designed as a medium of exchange (and do not include any right) and tokens that give rights to token holders.

⁶⁶See Blandin et al., 2019, at 15, distinguishing between “natively digital assets” (i.e., assets that only exist in digital form within the boundaries of the issuing system) and “tokenization of existing assets”.

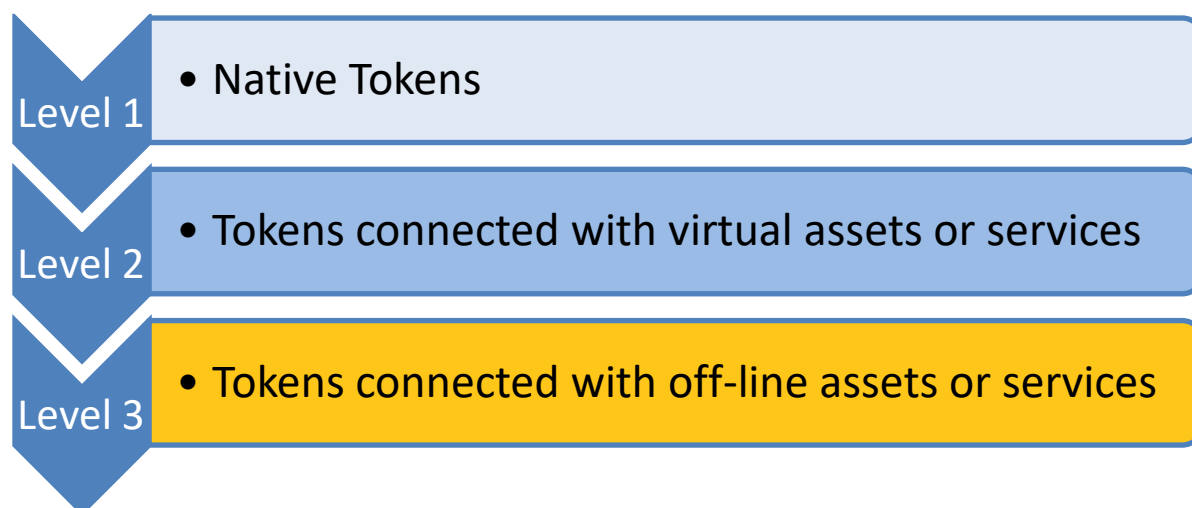


Figure 1: Token Classification by Levels (source: own elaboration)

The levels represent various categories of tokens, depending on whether there is a connection with on-line or off-line assets. Although native tokens need not perform any particular function (e.g., bitcoin)⁶⁷, it is possible that the native token in DLT is also used as means of payments for services in a platform -for instance, ETH is used as payment for the deployment of smart contracts in Ethereum-. In this way, the same token can operate in levels 1 and 2. However, the difference between level 2 and level 3 is clear: tokens can either give a right to a virtual service or asset (fully autonomous tokens) or to a real service or asset (which could be called “synthetic” tokens). This is actually the most important distinction from the point of view of commercial law, and raises distinct legal issues.

V. An Inventory of Legal Issues

The legal analysis of tokens is still in its initial stages. Since tokens have been in use only for a short period of time, and are based on a rapidly evolving technology, the law has not given a response to most of their legal issues.⁶⁸ Academics, policy makers, and international organizations such as UNCITRAL and Unidroit are contributing to the development of legal rules and principles that can be usefully applied to crucial questions that affect the use of this innovative technology.

International organizations are in a privileged position to provide guidance on the legal issues raised by the used of tokens. The work of UNCITRAL on electronic transferable records provides a blueprint for the use of tokens in the area of negotiable instruments and documents of title (see above,

⁶⁷Naturally, this refers to functions beyond maintenance of the blockchain itself (i.e., issuance of bitcoin is necessary to support miners and ensure that the blockchain’s integrity is safeguarded).

⁶⁸The legal issues that are mentioned here are foundational, and can be included within the boundaries of private, commercial, and procedural law. Naturally, tokens may also raise other issues in other legal areas, such as criminal law, tax law, and data protection law. These aspects are outside the scope of this analysis.

Box 2). UNIDROIT has engaged in a more general analysis of private law aspects of digital assets,⁶⁹ defined as “controllable digital records,” following the same approach adopted in the latest revision of the UCC in the US. This concept covers tokens and possibly also other digital assets that are not tokens. In the same line of the UCC reforms and the MLETR, the guidance of UNIDROIT is based on the definition of digital assets as objects that can be subject to property rights (principle 3), and that are subject to control, instead of possession (principle 6). Transfer of control equals the transfer of possession (principle 9) and is also the preferred technique for perfection of security interests (principle 15). As tokens can be subject to property rights, their owners can have property rights in the event of the insolvency of custodians (principles 13 and 19). The Guidance does not cover the aspects of the connection of digital assets with other rights (principle 4), or aspects of enforcement law (principle 17).

A comprehensive inventory of legal issues can help understand how the law can react constructively to the widespread use of tokens. An indicative list of issues that focuses on those of major economic significance includes the following (table 4 below summarizes these issues):

1. *Legal nature of tokens*
2. *Applicable regime for the transmission of tokens*
3. *The connection of tokens to off-line assets or services*
4. *Security interests over tokens*
5. *Loss, fraud, and illegal transfer*
6. *Rights of token holders in insolvency*
7. *Procedural remedies*
8. *Conflict of laws*

1. Legal nature of tokens

The starting point is the legal nature of tokens. There is no definition of what a token is, from the legal point of view.⁷⁰ As seen in the description of technology, a token is just code, a piece of electronically stored information. Basically, a token is just a value that is included in a database (DLT). A definition of token would need to be based on legal definitions of DLT and smart contracts, as these concepts are interdependent.⁷¹ Definitions are important, but it is even more important to regulate the legal effects of the use of technology (e.g., the approach with telecommunications or with the Internet). Technology neutrality may demand open-ended definitions that apply to DLT and similar technologies, as well as to

⁶⁹See <https://www.unidroit.org/work-in-progress/digital-assets-and-private-law/>. All references come from the latest available version of the document (May 2023).

⁷⁰There are few examples of legal definition of tokens. One is found in the Colorado Digital Token Act (2019), which defines “digital token” as a digital unit with specified characteristics, secured through a decentralized ledger or database, exchangeable for goods or services, and capable of being traded or transferred between persons without an intermediary or custodian of value. Other examples are found in French law (PACTE law), which defines tokens (“jetons”) as any intangible asset that represents, in a digital form, a right or various rights that can be issued, registered, preserved or transferred by means of a shared electronic recording device that allows to identify, directly or indirectly, the owner of such asset” (unofficial translation).

⁷¹There are definitions of DLT and smart contracts in the legislation of an increasing number of jurisdictions (see Garrido et al., 2022). For instance, several states in the US include definitions of DLT and smart contracts (Arkansas (2019), California (2018), Illinois (2019), New York (2021), North Dakota law (2019), South Carolina (2021), Utah (2019), Washington (2019) and Wyoming (2019)). Italian law also includes definitions of blockchain and smart contracts (Decree no. 135/2019). Maltese law defines DLT as “a database system in which information is recorded, consensually shared, and synchronised across a network of multiple nodes.” (Virtual Financial Assets Act, 2018).

tokens and similar instruments. However, definitions need to capture the defining features of innovative technologies, or they risk being over-inclusive or inadequate.

Tokens can be classified as digital assets, part of broader category of intangible assets. Tokens are digital assets. “Digital asset” are non-tangible assets that are created, traded, and stored in a digital format. The concept of digital assets is overly broad and may include any information stored electronically, such as software programs, and other forms of intellectual property. In turn, digital assets are included within the class of intangible assets.⁷² Classifying a token as an asset has consequences: it means that tokens can be the object of property rights.⁷³ In some legal systems, there may be uncertainty as to the classification of intangibles as assets or rights. However, this issue should not arise in the context of tokens: tokens, rather than rights, are primarily a digital creation, part of a database and software program. Therefore, tokens are immaterial objects rather than rights. As such, tokens can be owned – they are subject to the exclusive control of the holder, which is one of the defining characteristics of property.

Judicial decisions are converging on the definition of tokens as property. Apart from the consensus among English common law experts on tokens being classified as property,⁷⁴ courts have decided that tokens are property in Singapore⁷⁵, in England⁷⁶, and in New Zealand.⁷⁷ The issue is more complex in certain civil law jurisdictions: countries like Japan or Germany have been traditionally reluctant to extend

⁷² The classification of tokens (particularly, native tokens like BTC) as “commodities” is not easy to understand as tokens do not have any intrinsic value. The US and Indonesia, however, classified some digital assets as commodities, but this seems to have been prompted by the desire to regulate *derivatives* over BTC, rather than the conviction that the spot market involves any tangible assets.

⁷³ This is in contrast with earlier legal theories of DLT and tokens that classified them as the result of pure contractual networks: See, among others, Geiregat, 2018; and De Graaf, 2019.

⁷⁴ See UK Jurisdiction Taskforce, 2019, highlighting that cryptoassets satisfy the conditions of certainty, definition, control, exclusivity, assignability, and permanence. The analysis of cryptoassets is equally extensible to tokens in general.

⁷⁵ In the case *B2C2 Ltd v Quoine Pte Ltd* [2019] SGHC(I) 3, The Singapore International Commercial Court decided that bitcoins qualify as “property” capable of being held on trust. The court referred to the English case of *National Provincial Bank v Ainsworth* [1965] 1 AC 117, in which the House of Lords held that an object must be “*definable, identifiable by third parties, capable in its nature of assumption by third parties, and have some degree of permanence or stability*” to qualify as an object of property rights. The Singapore court held that “cryptocurrencies” meet these requirements. In addition, the Singapore Court of Appeal in the case of *Quoine Pte Ltd v B2C2 Ltd* [2020] SGCA(I) agreed that cryptocurrencies could be capable of assimilation into the general concepts of property, but also noted that there are difficult questions as to the type of property that is involved and ultimately refrained from opining on the legal classification. The High Court took a similar line in *CLM v CLN and Others* [2022] SGHC 46.

⁷⁶ In *AA v Persons Unknown* [2019] EWHC 3556 (Comm.), the High Court of England and Wales endorsed the approach taken in the UK Jurisdiction Taskforce that cryptoassets are capable of being “property” under English law, at least for the purposes of granting a proprietary injunction.

⁷⁷ In *Ruscoe v Cryptopia Ltd (in Liquidation)* [2020] NZHC 728, the New Zealand High Court held that cryptocurrencies are a form of “property” for the purposes of company law, and that they are capable of being held on trust by a company for the account holders, so that the company’s creditors cannot seize the cryptoassets to collect their claims.

property principles to immaterial rights.⁷⁸ However, German law seems to have evolved in this regard, and has recently subjected security tokens to the regime of movable assets by way of a legal fiction (Electronic Securities Act of 2021)⁷⁹. Few jurisdictions have designed a legal definition and typology of tokens.⁸⁰

The classification of tokens as intangible property does not resolve all legal questions. In a certain way, classifying a token as an intangible asset is akin to classifying a bill of exchange as a movable asset (a piece of paper). The nature of the token may be that of an intangible asset, but there is more than that. Legal policy makers are realizing that existing categories may not be sufficient to resolve the issues raised by digital tokens, and some proposals seek to introduce a new category of assets.⁸¹

The “levels taxonomy” shows that tokens may have different legal characteristics. At level 1, native tokens are the simplest in terms of analysis. Native tokens do not include any right – the holder only acquires the token itself, and can transfer it to other parties. At levels 2 and 3, however, tokens are connected to rights, and the holder is entitled to request from the issuer the delivery of an asset or the performance of a service. In levels 2 and 3, tokens include rights, but this is differently articulated in each of the levels.

In level 2, the rights are attached to tokens by way of smart contracts. The smart contract is used, in the first place, to issue tokens. Tokens are then connected to assets or services existing in the digital domain, as the practice in online platforms is showing. Because the services or assets are entirely virtual, the tokens operate seamlessly, and provide rights without the need of any other legal technique. As smart contracts cannot be detached from the tokens, this ensures that there is full effect of rights and complete integration with tokens, even as these are transferred to third parties.

⁷⁸In the bankruptcy proceedings following the collapse of the Mt. Gox exchange (see the translation into English of the Japanese judgment, available at the Oxford Commercial Law Centre https://www.law.ox.ac.uk/sites/files/oxlaw/mtgox_judgment_final.pdf); the question arose whether bitcoins were “things” capable of ownership under Japanese law. Article 85 of the Japanese Civil Code defines “things” as tangible assets and restricts the right of ownership to things. The claimant argued that an object that is capable of exclusive legal control should be regarded as “thing,” because the electronic record held across nodes of the Bitcoin network embodies a bitcoin, and is not merely a record of it, and because it is possibly an object of ownership. The court recognized that there are some exceptions that allow property rights over rights (such as a pledge in a right under Art. 362 of the Civil Code), and that some special laws provide for the exclusive control of specific rights (e.g., the Copyright Law, or the Patent Law). However, the Japanese court insisted that main test is whether an object is (i) tangible and (ii) subject to exclusive control: according to these criteria, bitcoins do not qualify as “things” under Art. 85 of the Japanese Civil Code. Following the court case, the Payment Service Act was amended to regulate crypto-assets and strengthen consumer protection. In that context, the Act defined “crypto-assets” as (i) property value which is recorded on an electronic device, and excluding the Japanese currency, foreign currencies, and currency-denominated assets, (ii-a) which can be used in relation to unspecified persons for the purpose of paying for the purchase of good and services and (ii-b) can also be purchased from and sold to unspecified persons, and (iii) which can be transferred by means of an electronic data processing system.

⁷⁹The official report of the Act uses the term “fiction.” A legal fiction is an established term in jurisprudence that refers to the application of a legal solution even when the facts do not match with such solution (i.e., the law cannot make that tokens become movable, tangible assets, but can apply some rules “as if they were” movable assets.

⁸⁰Wyoming is a notable exception, since it has defined digital assets and has assimilated diverse types of tokens to existing classes of property. Wyoming amended Art. 9 of its Uniform Commercial Code in 2019. The amended provisions recognize digital assets as objects of security interests and property rights. The law includes three types of digital assets: digital securities, virtual currencies, and digital consumer assets. All these digital assets qualify as *intangible personal property*, and are respectively considered as securities, money, and general intangibles. A new law, adopted in 2021, defines digital asset as “a representation of economic, proprietary or access rights that is stored in a computer readable format” (HB0043, effective July 2021).

⁸¹See Law Commission (UK), 2022, at 77, proposing a new category of personal property called “data objects”. However, after the consultation and the criticisms to that term, the Law Commission does no longer use it and has adopted the term “digital asset” within a broad category of “third category things” (i.e., things that are not physical objects nor choses in action. See Law Commission (UK), 2023, at 52.

In level 3, tokens need additional legal support to ensure that holders have an actual right over an off-line asset, or the right to receive an off-line service. Smart contracts cannot guarantee that the issuer will actually deliver an off-line asset or service to the token holder. This separates these tokens from many other tokens, particularly level 1 tokens, where there are no rights.⁸² Several techniques can be used in order to increase confidence in the content of token rights. *Oracles* can integrate outside world information in the performance of smart contracts, and can also be used to ensure that there is correspondence between the stipulations of the contract and the characteristics of the off-line assets or services. *IoT* can also be used to ensure off-line performance against the use of tokens⁸³ (for instance, a programmed refrigerator would request grocery items and transfer tokens to a groceries provider; and an automated system would select and deliver groceries at the specified address).⁸⁴

In the absence of legal rules, it is challenging to characterize the connection between tokens and rights. Under rules of commercial law instruments, a document “incorporates” a right. As we have seen (section III above) incorporation is metaphorical and has the consequences established in the law. The operation of tokens in combination with smart contracts is a new development and has no clear legal correspondence with existing instruments. The main point for level 2 and 3 tokens is whether there is full incorporation, i.e., whether the right identifies with the token and follows it. This issue is not relevant for level 1 tokens, since a native token is just a digital asset, with no connection with any other rights, virtual or otherwise. For level 2 and 3 tokens, it would be necessary to characterize “incorporation”. As tokens are intangible assets, there is no real incorporation, similarly to what happens with dematerialized securities, but it is important to determine: a) whether the control of the token is necessary for the exercise of the right; and b) whether the loss of control of the token implies the loss of the right. Smart contracts can define the conditions for the exercise of rights in level 2 tokens, and in theory, could also establish the consequences of losing control of tokens. In level 3 tokens, the law could state whether the use of the token is the only possibility to exercise the right, and whether there are any measures in place to resolve the issue of the loss of control over the tokens.

2. Applicable regime for the transfer of tokens

There is a widespread assumption that transfers in DLT have legal effects. Although many consider DLT as independent from the law or an underpinning legal system, they nevertheless seem to assume that the use of such technology yields legally binding results.⁸⁵ Defining what a token is does not resolve the issue of the applicable regime for transfers. In DLT, transactions take place as a result of an order: the holder of tokens issues an order to transfer tokens to another address in the blockchain. The changes in the blockchain are understood to represent changes in the legal position of the parties. This is more a factual than a legal issue: the proper way to transfer the control over a token is by issuing an order according to the DLT protocol, so that a token is transferred to another address. In theory, it should be

⁸²For this reason, some countries, such as Ukraine (2022) distinguish between “secured” and “unsecured” tokens, hinting at the difference between stablecoins that provide a right to an underlying currency, and virtual currencies that do not provide any right.

⁸³See Christidis and Devetsikiotis 2016.

⁸⁴The availability of advanced forms of technology, and the reliability of technical or human “oracles” may result in different difficulties for adoption of these tokens in emerging and low-income countries.

⁸⁵ Lehmann, 2019, at 101.

possible to transfer tokens by contract, but the transfer will not be fully executed unless there is a DLT transfer. The law would need to reconcile the general regime for the transmission of intangibles with the actual operation of DLT technology. This would be done by integrating the DLT transfer within the generally applicable regime: typically, a transfer of an asset will require valid consent, and the mechanics of the transfer perform a similar function to the transfer of possession in the transfer of movable assets. From a distinct perspective, transfer is similar to transfer in a registry, but the peculiarity is that the parties do the transfer themselves, without the intervention of a registrar. This is a new development which requires legal recognition.

The role of private keys in the transfer of tokens also deserves analysis. To be able to exercise control over a token, a holder needs the private keys. This does not mean that the keys are identified with ownership of the tokens (as in the popular formulation “not your keys, not your tokens”)⁸⁶: instead, the private keys give the holder control (i.e., the equivalent of possession), but not necessarily ownership. This would also raise the question whether transferring the private keys is a valid way of transferring ownership of the tokens.⁸⁷

Generally applicable requirements for the transfer of rights or intangible assets may present problems for tokens. Legal regimes may differ in the requirements they establish for the transfer of intangible assets, and it is possible that requirements that were designed in the past create obstacles for the normal operation of token transmission in DLT. For instance, in the case of Switzerland, the requirement of having an electronic signature for a valid transfer created a grave issue. A legislative reform was necessary to state that tokens can be validly transferred via DLT.

Although technological solutions may seem to operate autonomously, they need the backstop of the law to provide legal certainty. The law should specify that crediting tokens to a DLT address has the legal value of a transfer. This is a new method of transfer because there is no transfer of possession, there is no assignment of a right, and there is not even transfer by registry (where typically, the person in charge of the registry validates the transfer). There is not even a transfer of an electronic document, only modification of information in a database.⁸⁸ In addition to legal rules recognizing the transfer of tokens in DLT, there should also be rules that allow DLT records to be accepted as evidence, and allow references to “written” documents to be satisfied by tokens and DLT records⁸⁹

⁸⁶ See Levitin, 2022.

⁸⁷ Tokens can be assimilated to objects in a private box. It is possible to move the objects to another private box, but should it be possible to give the keys of a private box to another person to transfer the objects inside? The problem with that approach is that it would circumvent AML/CFT rules when these are applicable.

⁸⁸The string of code is never transferred, it is just modified (see Fox, at 144).

⁸⁹As an example, the Illinois Blockchain Technology Act, in its section 10, establishes the permitted uses of blockchain, which include the following:

- (a) A smart contract, record or signature may not be denied legal effect or enforceability solely because a blockchain was used to create, store, or verify the smart contract, record, or signature.
- (b) In a proceeding, evidence of a smart contract, record, or signature, must not be excluded solely because a blockchain was used to create, store, or verify the smart contract, record, or signature.
- (c) If a law requires a record to be in writing, submission of a blockchain which electronically contains the record satisfies the law.
- (d) If a law requires a signature, submission of a blockchain which electronically contains the signature or verifies the intent of a person to provide the signature satisfies the law.

The revision of the UCC has removed all references to writing requirements and written signatures (see, inter alia, Section 1-201(37), Section 2-201; Section 2-202; Section 2-203; Section 2A-201; Section 2A-202; Section 2A-203; Section 4A-103 and Section 4A-202.

3. The connection of tokens to off-line assets or services

Tokens in the third category (level 3 tokens) pose the critical challenge of the connection to off-line assets or services. As we have seen, native tokens are entirely disconnected from any right. Level 2 tokens are integrated with smart contracts, and for that reason, they can provide the rights or bundle of rights set in the smart contract, such as access to digital services (for instance, use of computing power) or assets (for instance, acquisition of software). Level 3 tokens, however, are valuable because of the right to receive an off-line asset or service.⁹⁰ Tokens that are designed to provide access to services or assets that exist outside the virtual world require a “*bridge to reality*”.⁹¹

The “bridge” between tokens and off-line reality is decisive. In general, smart contracts have been able to connect with off-line reality through “oracles.”⁹² Oracles allow smart contracts to operate by integrating outside information (for instance, the listed price of commodities). However, this only addresses part of the problem. Oracles insert information that is necessary for the performance of smart contracts, but there is a fundamental step that needs to be addressed – the functionality of the token, namely, how is the holder of the token entitled to receive an asset or a service? Tokens actually represent a contractual position, the rights of a party under a smart contract.⁹³ When the performance of the contract refers to virtual services or assets, the smart contract will execute seamlessly. However, if the token includes a right to an asset or a service that exists in the real world (for instance, a car or a house), there needs to be a way for the virtual and the real world to meet.

Establishing a bridge with real services and assets requires legal tools similar to those used in commercial law. Tokens do not share the same principles of negotiable instruments, but a similar regime is needed. The rights of the token holder are defined in the smart contract, and that contract created binding obligations for its issuer. But ensuring that the real services or assets correspond to the promises in the contract requires verification and positive actions. Smart contracts cannot self-enforce at this point. Solving this problem can unleash the potential of tokens in multiple areas. One of the possibilities that innovative technologies afford is the use of the Internet of Things (IoT) to automatically perform the obligations assumed under the smart contract.

Token holders need to be assured of their off-line rights. Tokens provide holders with contractual rights, thanks to the integration of tokens and smart contracts. Those acquiring tokens need to rely on the commitments of the issuer. There is a need for legal rules to ensure that holders receive the asset or

⁹⁰NFTs should clarify whether there is any real connection of the token with an underlying asset (for instance, a work of art). Sometimes, NFTs are marketed as if they give a right to actual works of art, even when that right is not present and could be misleading to buyers. See Moringiello and Odinet, 2022.

⁹¹Allen *et al.*, 2020. This of course assumes that there is a legal “bridge” between the token and its underlying asset, so that actions taken on the token are reflected on the underlying asset. See also Liu, 2022.

⁹²Oracles can be simple mechanisms (for instance a temperature or movement sensor), but can also be extremely complex. Some oracles can be based on software or on hardware, and some oracles can be human – including a group of persons acting by consensus. Participants need to trust the oracles, as they present an opportunity for “man in the middle attacks” (i.e., an attacker secretly relays and possibly alters the communications between two parties who believe that they are directly communicating with each other, as the attacker has inserted themselves between the two parties).

⁹³The “smart contract” however, does not necessarily imply the existence of a human-negotiated contract. In most cases, the smart contract is created by the issuer, and the parties acquiring the tokens adhere to the contract, as they would adhere to a standard form (see Werbach 2018).

service exactly as prescribed. One possibility to enhance the legal regime is to entrust to a qualified intermediary the role of guaranteeing that the asset or service corresponds to the contractual description (Box 5).

The law also needs to resolve the conflicts between tokens and other rights over the same assets.

An asset connected to a token can also be transferred according to traditional means. A qualified intermediary would ensure that such a transfer could not take place and the asset remains at the disposal of the token holder. Additionally, a rule could establish that the DLT transfer prevails over other forms of transfer.⁹⁴

Box 5. The token container model of Liechtenstein

Liechtenstein adopted a groundbreaking legal reform in 2019. The “Tokens and Trusted Technology Service Providers Act” regulates the comprehensive use of tokens and its interaction with off-line reality.

The act refers to “trustworthy technology” (TT) as a technology-neutral concept intended to capture DLT and alternative mechanisms. TTs are technologies through which the integrity of tokens, the clear assignment of tokens to TT identifiers and the disposal over tokens is ensured

The law defines token as *“a piece of information on a TT System which can represent claims or rights of memberships against a person, rights to property or other absolute or relative rights.”*

This law allows to “tokenize” any asset or right in a straightforward way. The token “container” model is a design that allows tokens to be digital representations of any right, certificate, obligation, or assets (tangible or intangible) such as a house, a car, a digital identity, a work of art, or include the right to use a program or the right to rent a property. Transactions with tokens that represent assets or services need to respect the underlying laws applying to such assets or services.

The law designs a system where various entities perform distinct roles. All TT service providers acting in Liechtenstein must be registered with the Financial Market Authority. Token issuers offer tokens and token generator creates the tokens; TT key custodians and TT protectors hold tokens for other persons; TT exchange service providers and TT price service providers are entities that operate token markets and supply investor with price information, respectively. Other entities include TT identity service providers that identify authorized signatories, but perhaps the most innovative entity is the “physical validator,” i.e., a person that ensures that the physical reality corresponds to the contents of tokens. For this model to work, the physical world needs to be in synchrony with the digital tokens. According to the reformed civil law, tokens will have priority over the physical world for the cases where tokens exist for rights and assets.

4. Security interests over tokens

Traditional means for the creation and perfection of security interests include transfer of possession or registration. Possessory security interests such as pledges require transfer of possession. Non-possessory security interests are based on registration. DLT records do not have the same legal significance as registration of a security interest in a registry. However, actions reflected in DLT are recorded and accessible to the public and may have legal consequences.

⁹⁴If the law allows tokens to be connected to assets, this also affects the methods of transfer for those assets. In many laws, there are specific requirements for the transfer of certain assets, such as real estate (signatures, notary deed). These requirements would be superseded by the method of transfer of tokens. Tokenization may need to be reinforced by other techniques that prevent that tokenized assets are acquired by third parties in good faith, in conflict with the rights of the token holder.

Since tokens can have significant value, their potential use as collateral needs to be addressed.

However, there are no mechanisms in DLT that allow for recording a security interest over tokens. Tokens circulate unencumbered, since the main concern in designing tokens has been the ease of transfer and the protection of the rights of the acquirer. The technology limits the possibilities for the design of security interests.

The use of tokens as collateral can be structured through property transfers, escrows, and control agreements.

One possibility of using tokens as collateral entails placing them in addresses set up as escrow accounts, with conditions specified in smart contracts for the release of the tokens. It would also be possible to transfer the tokens to an address under the control of a third party who would be in charge of the collateral. The other possibility is to use proprietary, fiduciary transfers (i.e., the grantor transfers the tokens to the secured creditors, who holds the tokens until repayment), or to establish a pledge agreement whereby the creditor is in control of the tokens.⁹⁵

There may be different legal rules for security interests over different classes of tokens.

Since the classification of tokens results in instruments of different nature, because of their connections or absence of connections with rights and assets, it is legitimate to ask whether different classes of tokens should be subject to different security interest rules.⁹⁶ Most notably, cryptocurrencies have been assimilated to money for secured transaction purposes. This means that continuing control by the secured creditor is a requirement for the existence of the security interest. Other tokens would fall either under the rules for securities or under the rules for general intangibles. It is unclear how the rules on general intangibles operate with tokens, as they assume the validity of a generic security interest, the possibility of selling collateral in the ordinary course of business and the continuity of the security interest over proceeds. The recent revision of the US Uniform Commercial Code (UCC) has provided responses to some of these questions: the UCC has now introduced the concept of “controllable electronic record”⁹⁷, which fits the description of digital tokens, but seems broader.⁹⁸ This concept permits the creation of security interests over tokens, perfected by control.⁹⁹

Preventing the transfer of tokens used as collateral is essential to guarantee the effectiveness of security interests.

The regime of secured transactions over movable assets or intangible assets does not seem adapted to the characteristics of tokens. A general security interest over tokens may affect third parties in the case of unauthorized disposal. However, this may create conflicts with the position of bona fide third parties, and for this reason it is more useful to prevent a transfer by the token holder in the first place. Pledges and fiduciary transfers are the most effective techniques to achieve this objective.

⁹⁵In this regard, the applicable regime could be similar to the one designed in the EU for financial collateral (Directive 2002/87/EC).

⁹⁶Wyoming was the first US jurisdiction that sought to integrate tokens within its secured transactions regime. Wyoming's amendments of its regime (modifying its art. 9 UCC) allow the creation of blanket security interests over digital assets that fall under the category of intangibles, and also cover the proceeds of those assets as collateral.

⁹⁷ See § 12-105 UCC.

⁹⁸Actually, other “digital assets” could fall within the category. See, for instance, *In re CTLI LLC*, 528 B.R. 359 (Bankr. S. D. Tex. 2015). The Bankruptcy court of the Southern District of Texas held that social media accounts are assets and are therefore part of the bankruptcy estate.

⁹⁹See § 9-314 and § 9-326A UCC. The revision of the UCC has also introduced definitions for the concept of control over electronic documents of title (§ 7-106).

5. Loss, fraud, and illegal transfer

Tokens present security advantages over commercial instruments. With tokens, it is possible for parties to deal directly, without the need for intermediaries, there is no risk of forgery, and technically, there is no risk of loss either.¹⁰⁰

The loss of private keys is a significant issue. Loss of tokens simply does not happen; instead, what may occur is the loss of the private key. However, the loss of the private key should not be treated in the same way as the loss of a document that incorporates a right. The loss of the private key may have different consequences: for a native token, the loss of the private key is irreplaceable by definition, which means that the tokens become stuck in the address where they are and become unusable.¹⁰¹ If somebody other than the legitimate holder finds the private key, that person would have the control of the tokens, but such control is illegitimate. The legitimate holder should be able to request judicial assistance to recover control.¹⁰² In the case of tokens connected with smart contracts, the situation is similar. The issuer, however, should be able to replace the tokens with newly issued ones (this needs to be complemented by a process to ensure that the old tokens cannot be used by anyone). In the case of tokens connected with off-line assets or services, there should be a possibility to block the tokens and provide the asset or service to the holder that lost the private key and can show that he/she actually made the payment for the tokens.¹⁰³

Tokens should be subject to the rules on fraudulent and illegal transfers. Technology analysts often give the impression that transfer of tokens according to DLT techniques is always effective. However, the law cannot recognize a transfer of tokens when it has been procured by fraudulent means, or through the use of violence or intimidation. Likewise, any transfer that violates a legal rule should be void (for instance, a transfer of tokens done by a party affected by an injunction or a similar administrative sanction). The substantive requirements for the transfer of assets and rights are unaltered by the use of an innovative technology. However, avoidance can only be operated through a reverse transfer since there is no possibility of undoing any action in DLT.

The law needs to reconcile the interests of the legitimate holder and those of parties in good faith. The law should allow the legitimate owner to recover its tokens in case they are stolen or are under the illegitimate control of another person, just as with any other asset. However, acquisitions for value and in good faith should be protected, and the original token holder should receive compensation for damages instead. As with other assets, bad faith acquirers should not benefit from any protection.

6. Rights of token holders in insolvency

A central question refers to the nature of the rights of token holders in the insolvency of issuers or intermediaries. This issue has come to the fore after a string of insolvencies in the crypto asset

¹⁰⁰ However, the risk of hacking is functionally equivalent to the risk of loss or theft.

¹⁰¹ In this regard, loss of the private key for native tokens is similar to physical loss of money.

¹⁰² Of course, judicial assistance may come too late to avoid that the illegitimate controller transfers the tokens to a party in good faith. But the illegitimate holder would remain personally liable to the legitimate one.

¹⁰³ This may seem immaterial for tokens that are connected with small-value items, but the fact is that a token could give right to the delivery of gold or diamonds or provide rights over real estate.

sector. Again, it is useful to distinguish the different classes of tokens, as the nature of tokens may affect the exercise of token holders in the case of the insolvency of an issuer or an intermediary.

For native tokens, the issue is similar to that of rights over money. In the case of native tokens (or level 1 tokens), there is no issuer, so the question refers to the nature of the rights of token holders in the case of the insolvency of an intermediary holding the tokens. In such a case, it is necessary to study the relationship between the original token holder and the intermediary: it is possible that the holder has granted the intermediary the power to manage his/her tokens, but the token holder can retain ownership over such tokens. Of course, it is also possible that the holder has transferred ownership of the tokens to the intermediary, in which case the original holder is entitled to the delivery of the same number of tokens. Both legal relationships are possible, since these tokens are fungible -or even ultra-fungible, as money-, but it is also possible to trace them, in certain cases. If tracing is not possible, because tokens have been commingled, the ultimate holders can only have personal rights in the insolvency of the intermediary. For these reasons, it is possible that the rights of holders in the insolvency of the intermediary are *in rem* rights or personal rights, depending on the case. Naturally, the treatment in insolvency is dramatically different: holders of *in rem* rights will have the right to recover their tokens, whereas those holding personal rights will have to share the proceeds with the rest of unsecured creditors. Recent “crypto bankruptcies” of firms in the US like Celsius, BlockFi or FTX demand a judicial response to these questions. The first decision in the Celsius case analyzed the issue based on the specific language used in the contracts and concluded that ownership of the tokens had passed to the firm and therefore the tokens are part of the insolvency estate.¹⁰⁴

There are more complex questions in the analysis of the rights of holders of tokens connected to online assets or services. The relationships in level 2 tokens are more complex since these tokens include rights to assets and services in the virtual world. This means that there are two insolvency problems: the first one is similar to that examined for level 1 tokens, i.e., the insolvency of an intermediary in control of the tokens. The same questions of fungibility and traceability need to be assessed in this case, with the added consideration that these tokens can be non-fungible, in which case the risk of commingling is non-existent. There is a second problem in these tokens – the insolvency of the issuer. If the issuer is insolvent, it will not be able to deliver on the rights included in the token. As a rule, those rights are *in personam* rights: the right to receive a virtual service or asset will result, when unfulfilled, in an unsecured claim against the issuer.¹⁰⁵

The problems of tokens connected with off-line assets and services require special legal rules. For level 3 tokens, the problem of the insolvency of the intermediary should be analyzed in exactly the same way as for level 2 tokens. However, the problem of the insolvency of the intermediary requires special

¹⁰⁴See Judge Glenn’s decision of January 4, 2023. See <https://www.axios.com/2023/01/04/celsius-bankruptcy-earn-accounts>. More recently, Judge Kaplan has decided that certain accounts are owned by users and are not part of the insolvency estate of BlockFi, Inc. (May 11, 2023). In other countries, the issue can be decided by legislation (e.g., in Germany, proposed amendments to the Banking Act define the rights of token holders in the insolvency of the intermediary: see § 26b and § 46i at <https://www.bmj.de/SharedDocs/Gesetzgebungsverfahren/DE/Zukunftsfinanzierungsgesetz.html>

¹⁰⁵The only exception would be NFTs with effective connection to a virtual asset or service – the holder should have the right to receive the virtual asset or service connected to the token.

rules that determine the nature of the right of the token holder. Ideally, the token holder should have an *in rem* right to the delivery of the asset – this would imply that the rights of the token holders are robust. On the other hand, if the token only includes an *in personam* right to the delivery of the asset, the token holder will only have an unsecured claim in the insolvency of the issuer. In the case that the token includes a right to a service, the issue needs to be resolved according to the rules of contracts in insolvency – the issuer may perform the service, but there is no right to specific performance and the service could be replaced by a claim for damages.

7. Procedural remedies

Remedies for the protection of property should be available to token holders. There may be ownership disputes referred to all types of tokens. As tokens are intangible assets, it is possible to apply the procedural remedies for the protection of ownership, including those in criminal law. One peculiarity is that transfers in DLT are irreversible, so technically it is not possible to “avoid” an illegal transfer of tokens. However, it would be possible to order a reverse transfer to the legitimate owner. If a transfer is not possible, the owner should be indemnified for damages.

Enforcement of decisions on tokens will generally be made *in personam*. The courts cannot “seize” tokens unless they gain possession of the private keys. However, the courts can issue orders on the persons who control the tokens, including intermediaries. Courts can also issue “worldwide” freezing orders on tokens¹⁰⁶, but the effectiveness of these orders needs to be tested in practice.

In many legal systems, it will be necessary to regulate additional procedural remedies available to token holders. Native tokens cannot generate any performance disputes since they do not include any right. Level 2 tokens should not be particularly contentious in terms of performance, as their operation is regulated by smart contracts. In addition, it is frequent that smart contracts include arbitration clauses (arbitration *ex aequo et bono*),¹⁰⁷ but there is a need for a full procedural regulation of the rights of token holders. This would include legal proceedings to assert the rights connected with the token, and legal proceedings to recover tokens and to prevent actions by a party who has gained control of tokens illicitly.

Remedies are necessary for tokens that include rights to off-line assets and services. If the issuer refuses payment -or delivery of goods or services- to the holder of the token, or if the goods or services differ in quality or quantity to what was stipulated, the courts should be able to provide all enforcement alternatives. To that effect, tokens should be recognized as an executory title.¹⁰⁸

¹⁰⁶ *Ion Science Ltd v Persons Unknown and others* (UK Commercial Court, unreported, 21 December 2020)

¹⁰⁷ <https://medium.com/cryptononica/cryptononica-ex-aequo-et-bono-and-new-lex-mercatoria-72eef36a2cd5>.

¹⁰⁸ On the need to articulate mechanisms for the resolution of disputes in the blockchain, see Erbguth and Morin, 2018: “*Illegal content on a blockchain cannot be removed and the originator might not be identifiable. At the same time, node operators that have no control over the content stored on their nodes might be held legally responsible. As a decentralized system, Digital Ledger Technology (DLT) needs decentralized governance and smart contract dispute resolution. Existing DLT governance and dispute resolution is only aimed at balancing the interests of DLT and smart contract participants. It fails to address the interests of third parties and society. The failure to do so could trigger government and court intervention within DLT systems. Although the decentralized nature of a DLT system will offer some protection against this intervention, participants might be identifiable and subject to legal prosecution.*”

8. Conflict of laws

Ultimately, the legal regime for tokens will need to be completed with conflict-of-laws rules. The traditional criteria used in private international law seem to need adjustments to the characteristics of tokens. Tokens are not located physically anywhere, so the *lex rei sitae* criterion is useless. An alternative possibility is to use the place where the ledger is located, but frequently the ledger is not located anywhere, particularly in cases of fully decentralized ledgers. In the absence of these basic criteria, the conflict of laws regime could look at the parties to the transaction, and the issuer, where there is one. Other suggested approaches refer to the location of the wallet, the location of the system, or the location of the private keys, but none of these is satisfactory.¹⁰⁹ The recent revisions of the Uniform Commercial Code in the US are based on an approach that supports party autonomy in choosing the applicable law and privileges the indications included in the “controllable electronic record” and the “rules of the system”.¹¹⁰ However, from a broader international perspective, it has been noted that there are multiple competing criteria seeking to connect tokens to a place, such as the “Place of the Relevant Operating Authority” (PROPA), or the “Primary Residence of the Encryption Private Master Keyholder” (PREMA).¹¹¹ There is considerable ongoing debate on the appropriate criteria to settle jurisdictional and applicable law issues, and the lack of substantive rules in most national systems complicates matters further.¹¹²

Table 4: Fundamental Legal Issues in the Regulation of Tokens

(Source: author’s elaboration)

Issue	Comment
<i>Legal nature of tokens</i>	Recognize the nature of digital tokens as intangible property and their possibilities to be connected to assets and rights.
<i>Transfer</i>	Establish the validity of transfers between DLT addresses. Define additional requirements.
<i>Connection with off-line assets or rights</i>	A legal rule must give force to the rights included in tokens. Mechanisms to ensure correspondence between off-line and on-line reality are needed. Transfers of tokens prevail over transfers of tokenized assets or rights.
<i>Security interests</i>	Allow security interests over tokens based on fiduciary transfers or pledges with transfer of control.
<i>Loss, fraud, illegal transfer</i>	Render invalid transfers that are illegal or fraudulent, Establish methods for the recovery of lost tokens in centralized systems.

¹⁰⁹De Vauplane, 2017.

¹¹⁰See Section 12-207 UCC. See Dubovec, 2022.

¹¹¹See HCCH, 2020. The ELI (ELI, 2022) recommends using the place of the grantor of the security right over a token as the criterion to determine the applicable law.

¹¹²The Hague Conference and Unidroit are expected to undertake a joint project to explore the law applicable to various proprietary issues concerning digital assets, such as the effect of transfers and perfection of security interests by control.

<i>Insolvency</i>	Recognize the possibility of in rem rights over tokens, so that token holders can benefit from a more intense protection in insolvency.
<i>Procedural remedies</i>	Develop procedural remedies adapted to the nature of DLT.
<i>Conflict of laws</i>	Determine conflict of law rules that are aligned with the specific features of innovative technologies.

With an enabling legal framework, tokens could perform an even more crucial function in the economy. Tokens are not limited by principles and rules of commercial instruments, so they can potentially play a larger role in the economy if a set of fundamental legal issues are resolved. Tokens can perform crucial functions not only in commerce and in the financial markets, but also in the development of new forms of money and payment instruments. The abstract nature of tokens contributes to their flexibility and allows their use in multiple settings.

VI. Tokens and Securities Law

Since tokens have the ability of being connected to any kind of rights, they can also be securities.

At the most basic level, a security is an instrument that incorporates a bundle of financial rights. These can be simple (for instance, the right to receive coupon and principal payments in a bond) or complex (the right to vote and receive dividend payments in a share). It is perfectly possible to associate these rights with a token through a specifically designed smart contract.¹¹³

The classification of tokens as securities is consequential. Tokens can perform multiple functions, and, in the absence of specific legal regimes, the flexibility of tokens is not hindered by legal prohibitions. Tokens can also be used to mobilize investment, and perform the same functions as securities. While other legal classifications are less relevant, the classification of a token as a security attracts a whole legal and regulatory regime and, most importantly, serious administrative penalties for those selling tokens without following the appropriate procedures.

Countries have different systems for the classification of securities. Some countries define securities as documents or add special regimes for dematerialized securities but in any event tend to include in their laws a closed list of instruments that are to be considered as securities (France, UK, Germany, among others). If tokens are not specifically contemplated in these regimes, they cannot be securities (“enabling approach”). A different approach, however, consists of an extremely broad definition of “securities” and associated concepts, with the idea of capturing anything that could perform the function of a security, as exemplified in the laws of the US and Canada (“prohibition approach”). This

¹¹³Securities law includes a wide range of regulatory requirements for instruments that are classified as securities. In addition, the private law for securities typically includes rules from corporate and commercial law.

implies that tokens that could function as a security are in practice forbidden because of the lack of compliance with registration and other requirements.

The fact that tokens can be designed as securities does not imply that all tokens are securities. It is obvious that tokens are flexible and can perform multiple functions (see Table 3 above) and for that reason, tokens cannot be reduced to a single category. Because tokens can include rights that are different from those included in securities, it follows that many of them will not be securities. In fact, the so-called utility tokens can include many other types of rights, such as the right to receive a service or to acquire goods at a certain price. These tokens do not appear to share any features with securities.

There are several ways in which securities can be “tokenized.” Essentially, there are two ways of “tokenizing” securities: it is possible to issue securities according to the ordinary legal regime (which may even prescribe the issuance of paper certificates), immobilize the securities and then have tokens that represent those securities, with an issuer guaranteeing the correspondence between tokens and certificates. The other possibility is to issue tokens that directly include the rights of shares or bonds. The two possibilities, which show commonalities with immobilization and dematerialization of securities, require legal changes.¹¹⁴

Despite the lack of a legal framework, it is possible to design tokens that operate as securities.

The issuer of a token can connect the token to a smart contract that gives the holder the same rights of a share or a bond. The issuer can promise the payment of coupons and principal, or give voting rights and the right to share in the profits of the issuer’s business, by way of dividends or by way of the capital appreciation of the tokens.

If tokens can be classified as securities, they will be subject to the rules of securities law. This of course requires further analysis on the characteristics of securities and tokens. Mere identification of tokens with some characteristics of securities that are normally negotiated in the financial markets does not necessarily imply that they need to be subject to the securities’ legal regime. A bill of exchange incorporates the right to receive a payment –like a bond- but that does not make it a security. And the members of small companies have shares that provide them with voting rights and rights to participate in dividend distribution, but that does not mean that those shares are securities.

The overarching goal of securities regulation is the protection of investors.¹¹⁵ Securities regulation relies on the actions of a regulator to ensure that securities offered to investors are properly registered and include accurate and sufficient disclosure for investors to make an informed decision. Naturally, there may be exceptions from regulatory requirements in cases of limited issuances addressed to sophisticated investors.

¹¹⁴A major difference between the two approaches refers to the treatment of token holders in the insolvency of an intermediary: if the tokens are the securities, there is a possibility that token holders retain an *in rem* right and recover the tokens. If instead, the tokens represent a right to the delivery of the underlying security, there is a risk that they would be classified as right *in personam*, and token holders could be treated as unsecured creditors.

¹¹⁵IOSCO states three objectives for securities regulation: -protecting investors; -ensuring that markets are fair, efficient, and transparent; and - reducing systemic risk (see IOSCO, 2017) Objectives and Principles of Securities Regulation).

The best way to approach the issue is through technology neutrality. Recent technologies can replace existing systems to issue and trade securities, but this should not undermine the existing legal safeguards. For that reason, the same rules that apply to ordinary securities should apply, with the necessary adjustments, to tokens that can be classified as securities.¹¹⁶ The same rules that ensure transparency and integrity would apply to avoid asymmetries of information and abuses.

The sale of tokens through offerings (Initial Coin Offerings, or ICOs) became a widely used technique to fund new businesses. The rapid growth and collapse of ICOs (Box 6) was a clear sign of the opportunities and risks that characterize the new digital economy. In a certain way, the rise of ICOs resembled other financial bubbles.¹¹⁷ The possibility that ICOs would be unregistered offers of securities prompted warnings from securities regulators.¹¹⁸

Box 6. The ICO explosion: An example of speculative mania?

In 2017, the sales of tokens through ICOs experienced a steep rise that was followed by a rapid contraction the following year. The success of ICOs was due to the rise of digital technologies and some specific advantages: as these new business ventures operate through the Internet, they can rely on it for the dissemination of information about the business and the commercialization of tokens. This means that even highly specialized niche businesses can reach a sufficient number of investors worldwide.

These transactions were structured as sales of tokens (also known as “coins”) for fiat currency or crypto currencies. Promoters stated that the capital raised would be used to fund the development of a digital platform, software, or other projects and that the virtual tokens or coins may be used to access the platform, use the software, or otherwise participate in the project. Once issued, however, buyers of tokens can sell them in a secondary market, even if the project is not yet operational. This created opportunities for speculation: often promoters led to believe potential buyers that they could expect a high return on their investment by mere appreciation of the token value.

ICOs combine aspects of crowdfunding with DLT¹¹⁹ and are not easy to characterize as offerings of securities. In any case, most ICOs did not provide adequate information to token buyers about fundamental characteristics of the promoters or the commercialization scheme. There have been numerous instances of “pull and rug” schemes (promoters syphoning out the funds and abandoning the project) and “pump and dump” schemes (manipulating the value of the tokens, by way of misleading information or by undisclosed trades, especially by pre-sales to selected investors that then dump the tokens on the public). In 2018, activity in ICOs went down spectacularly, possibly due to lack of trust from investors. The “boom and bust” of the ICO market requires rethinking about possible ways of regulating the new digital economy.

The market has rebranded ICOs as ITOs (initial token offerings), and has also developed the so-called IEOs (initial exchange offerings), by means of which token issuers can raise funds by offering their tokens on a token exchange (i.e., a secondary market), instead of offering them directly. The token

¹¹⁶For instance, the SFC (HK) expects that it would incorporate the “same business, same risks and same rules” principle in a proportionate manner. See also Malaysia’s Securities Commission, *Capital Markets and Services (Prescription of Securities) (Digital Currency and Digital Token) Order 2019*.

¹¹⁷It would be possible to compare the ICO craze to tulip mania (Benedetti and Kostovetsky 2021), described by Kindleberger (1984, at 215) as “the high watermark in bubbles”.

¹¹⁸See SEC, Investor bulletin, *SEC’s Office of Investor Education and Advocacy*, available at <https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins-16>

¹¹⁹Zetzsche *et al.*, 2019 define an ICO as a conjunction of crowdfunding and blockchain, and the rise of the ICO is probably due to the lack of sufficiently adequate enough techniques for start-up financing.

exchange acts as an intermediary in the sale, and after the sale is completed, the token is automatically listed in the exchange.

The techniques used in ICOs do not generally comply with the requirements of securities law. The white papers, as essential documents for ICOs, do not include the necessary information to make an investment decision, as characterized in securities law. White papers are far stronger in describing the technological aspects of the tokens and the business venture than in providing fundamental details about the individual and entities controlling the company, its financial records and business projections, and the legal status of members. Even the aspects relative to issuance, underwriting and negotiation in secondary markets are underdeveloped.

The flexibility of tokens represents a challenge for some traditional classifications of securities.

Although “securities” represent a notion that is universally accepted in law and finance, the fact is that there are quite different approaches to the definition of securities in legislation. Some countries define what a security is, and any instrument that is not included in the definition is not a security (e.g., France,¹²⁰ Germany,¹²¹ or the UK¹²²). Other countries, such as the US and Canada, use a more fluid definition. A broad definition increases investor protection, but it can also create legal insecurity for economic operators.¹²³

In particular, the inclusion of tokens under the scope of securities law in the US is contentious.

The US legal system was adopted to provide the maximum protection to investors, and the side-effect of that approach is that the contours of the regulatory regime for securities are not entirely clear. This is not a new issue, but has been exacerbated by the emergence of tokens.

The connections between tokens and securities can be analyzed in several ways. There are instruments that fall clearly within the scope of securities laws. Shares (stock) are not subject to any legal analysis to be considered securities. Debt instruments (notes) are generally considered securities, but not all notes are securities.¹²⁴

The determination of the scope of securities law should be based on functional analysis. In essence, it should be considered whether the analyzed instruments perform the economic function of a security.¹²⁵ This is the general analysis that applies to shares or bonds. In recent times, with the

¹²⁰The instruments considered as securities (*valeurs mobilières, titres financiers*) are those listed under art. L211-1 of the *code monétaire et financier*. The concept of financial instrument includes both securities and financial contracts (but financial contracts must be expressly included in a regulated list to be covered by regulation).

¹²¹See section 2 of the Securities Trading Act (WpHG), also establishing a list of instruments falling under the concepts of security and financial instrument.

¹²²The FCA Handbook lists the investments that qualify as securities and makes it clear that for an instrument to be considered a security it needs to be included in the official list (<https://www.handbook.fca.org.uk/handbook/glossary/G1061.html>).

¹²³For instance, *time share rights* have sometimes been classified as securities, but in other occasions they were not considered securities: see *Scott v. Bluegreen Vacations Unlimited, Inc.*, CASE NO. 19-CV-01807-AWI-JLT (E.D. Cal. Jun. 17, 2020) (the rights were not transferable).

¹²⁴See *United Hous. Found. v. Forman*, 421 U.S. 837, 847-51 (1975) (“economic realities test”). Analyzing and bringing together the line of lower court opinions, the U.S. Supreme Court in *Reves v. Ernst & Young*, 494 U.S. 56 (1990) adopted the “family resemblance” test to determine whether a note is a security. According to this test, there is a presumption that a note is a security, but this can be rebutted if the note bears a resemblance to any of the exceptions under case law.

¹²⁵See *Marine Bank v. Weaver*, 455 U.S. 551, 556-60 (1982).

emergence of new activities in the digital arena, considerable attention has been given to the application of the “Howey test” (Box 7). The Howey test does not define what a security is: rather it serves to identify whether an instrument is an “investment contract”, which in turn is one of the special cases that fall under the scope of the securities regime.¹²⁶ There are other exceptions too: for instance, interests in oil and gas leases fall automatically under the scope of US securities law.¹²⁷ The scope of the securities regime is potentially so broad that the only statutory exclusions are currency and notes with a maturity of less than nine months.¹²⁸ The peculiarities of US law should not lead other countries to follow similar characterizations of instruments and business subject to securities law.

Box 7. Tokens and the US securities laws– The Howey Test and the SEC Guidance

A well-known decision of the US Supreme Court set the standards for the inclusion of certain contracts under the securities regime: *SEC v. W.J. Howey Co.* (1946)¹²⁹. According to the facts of the case, Howey Company was a business operating in Florida that sold tracts of citrus groves to persons who could lease back the land to the company. The company exploited the land and sold the fruit on behalf of the owners, sharing the income with them. This arrangement was classified as an “investment contract,” which subjected it to the securities regime. An investment contract is generally understood to refer to a legal document between two parties where one party invests money with the interest of receiving a financial return.

To arrive at that conclusion, the Court developed the “Howey test,” which requires the presence of the following elements:

- (i) *An investment of money*: In the Howey case, this element was clearly present, as the contracts involved the payment of money by investors. However, over time, the courts have extended this to any type of valuable consideration. Only free distributions would avoid the application of this limb of the test).¹³⁰
- (ii) *In a common enterprise*: this element is not entirely clear. Courts have interpreted that there is a need for some integration of the funds received into an organized form of business, either vertical (under the control of the promoter) or horizontal (sharing powers and responsibilities with other investors).
- (iii) *In which the investor is led to expect profits*: This element refers to the fact that the contract should make the investor expect profits, whether as direct profits, dividends, or capital appreciation. Promotional materials can be important in deciding whether the investor has been led to believe in the existence of financial profits.
- (iv) *Derived from the entrepreneurial or managerial efforts of promoters or third parties*: The last element requires that the profits result from the business efforts of promoters or third parties. This implies, again, an organized business activity that generates profits. This

¹²⁶See the dissenting opinion of Justice Frankfurter in the Howey case: “I find nothing in the Securities Act to indicate that Congress meant to bring every innocent transaction within the scope of the Act simply because a perversion of them is covered by the Act.”

¹²⁷See *SEC v. C.M. Joiner Leasing Corp.*, 320 U.S. 344 (1943). The court also considered factors such as oil leases becoming the object of speculation, and the use of marketing and sales tools, particularly when these refer to “investments.” The court considered that the purpose of securities legislation was to reach any instrument that would be the subject of speculation, irrespective of how unusual the instrument may be. The arguments of the court are as broad as to suggest that an instrument that is not a security, may become a security if it becomes, subsequently the object of speculation.

¹²⁸See *Sanders v. John Nuveen & Co.*, 463 F.2d 1075, 1080 (CA7), cert. denied, 409 U.S. 1009 (1972).

¹²⁹*SEC v. W.J. Howey Co.*, 328 U.S. 293 (1946). The Canadian Supreme Court has replicated the test: *Pacific Coast Coin Exchange v. Ontario Securities Commission* [1978] 2 SCR 112.

¹³⁰However, “free” should mean that there is no consideration of any kind. The so-called “air drops” of tokens, where tokens are distributed freely, but there is a promotional effect like sharing data, or circulation to other investors, could be disqualified from being considered free (Bauer, 2020).

element can be satisfied just by the activity of the promoter of holding assets and selling them at the right time to maximize profit.

This test has resulted in the application of the securities regime to a wide range of transactions. However, the test does not really decide whether a token has the characteristics of a security -it refers to financial contracts only. In July 2017, the SEC applied the Howey test to a sale of tokens for the first time and arrived at the conclusion that the sale of tokens of the DAO (Decentralized Autonomous Organization) represented an unregistered securities offering (SEC, 2017), given the special circumstances of the transactions, which sought to create an organization similar to a company, with token holders assuming a role similar to that of shareholders. The SEC has sought to provide guidance on the analysis of digital assets and investment contracts (SEC, 2019), but this has not sufficed to dispel uncertainty in the market. The SEC guidance include long lists of factors that should be taken into consideration for the application of the Howey test to offers of tokens, particularly for the elements of expectation of profits and reliance on efforts of promoters. The Guidance indicates that decentralized networks are less likely to fall in the concept of investment contract since the existence of the element of reliance on the efforts of others is questionable in such case. In any event, the long lists of factors in the Guidance *“are not intended to be exhaustive in evaluating whether a digital asset is an investment contract or any other type of security, and no single factor is determinative.”*

The use of the Howey test can be explained by the open-ended nature of token contracts. The test should only focus on investment contracts, as it is not designed to determine whether an instrument falls within the definition of a security. The Supreme Court has indicated that other tests are necessary to define what a security is. For instance, in presence of a note (i.e. a document that incorporates the right to receive a monetary payment) the analysis is completely different.¹³¹ The factors used by the courts include: a) the motivations prompting a reasonable seller and buyer to enter into the transaction, b) the plan of distribution and whether the instruments are commonly traded for speculation or investment, c) the reasonable expectations of the investing public,¹³² and d) the presence of an alternative regulatory regime (for instance, banking law).

There appears to be some confusion as to the application of the Howey test. In fact, it seems as if the critical aspect is not the nature of the token itself, but rather, of the contracts of sale of tokens. It has been said that “tokens” are like the “orange trees” in the Howey case. A token can be hardly classified as an investment contract because a token *is not a contract*. The critical element, in such case, would be that tokens would be the object of speculation, with the elements of the Howey test. Of course, that does not decide the question whether tokens themselves can be classified as securities.

The US approach seems based more on policy considerations (investor protection) than on the legal nature of instruments. SEC Director Hinman’s analysis is extremely interesting – it refers to the possibility that tokens become objects of investment contracts, even if they can cease to be considered associated with investment contracts over time (Hinman, 2018). Hinman distinguishes between tokens that include financial rights -which will always be considered to be securities- and tokens that provide access to goods and services, which could fall under the Howey test, particularly when they are marketed as securities, but could also evolve to cease to be considered as securities. This analysis leaves many questions unanswered and does not provide legal certainty. Subsequently, Commissioner Peirce has

¹³¹See *Reves v. Ernst & Young*, 494 U.S. 56 (1990). See also *Landreth Timber Co. v. Landreth et al.* 471 U.S. 681 (1985).

¹³²This refers to the expectations that the instruments will be subject to the securities laws. In turn, these are influenced by the marketing strategies of promoters.

proposed a safe harbor rule designed to provide a temporary exemption of three years during which tokens could be sold even if formally sales could be categorized as investment contracts, until the network effectively decentralizes, and tokens cannot be subject to securities laws anymore. This safe harbor approach is similar, in design to the special rule by which the EU plans to tackle the problem of speculative offers of utility tokens.¹³³

While there are uncertainties and risk inherent to the sale of tokens under federal law, the use of tokens as securities also faces issues in state corporate law. Although in theory it is possible to use tokens to represent shares in numerous states, transfer of a token in DLT may not be recognized as valid (for instance, Delaware requires that the name, address, and number of shares of each stockholder are recorded in the registry), unless special rules are adopted (Wyoming requires a digital wallet address as the sole mandatory information). In any event, pure token shares will require that the company's certificate of incorporation and the bylaws be included in DLT.

Several systems have sought to provide legal certainty by excluding utility tokens from the scope of securities laws. For instance, BaFin in Germany stated that utility tokens would not be classified as securities.¹³⁴ FINMA in Switzerland privileges substance over form, and provided guidance based on a classification of tokens that included payment tokens (or cryptocurrencies), utility tokens and asset-backed tokens (FINMA, 2018). The analysis excluded cryptocurrencies from being classified as securities, since they do not include any claim. Utility tokens do not include a financial claim either, and are clearly excluded from the concept of security, as long as the product or service to which they refer is already available. Asset tokens, however, could be securities when they include financial claims or membership rights. Singapore has clarified that utility tokens that are limited for use on the particular company's platform are not securities (MAS 2020). Similarly, Malta has developed the category of "virtual token", which refers to a form of digital medium recordation whose utility, value or application is restricted solely to the acquisition of goods or services, either solely within the DLT platform on or in relation to which it was issued or within a limited network of DLT platforms (Virtual Financial Assets Act, 2018). The state of Wyoming provided comprehensive guidance under a "safe harbor" for utility tokens, which is only effective for state securities law.¹³⁵ The EU is seeking to establish clarity by setting conditions for the application of securities laws to offers of crypto assets (Box 8).

¹³³See art. 4.6 MICA: "Where the offer to the public of the crypto-asset other than an asset-referenced token or e-money token concerns a utility token providing access to goods and services that do not yet exist or are not yet in operation, the duration of the offer to the public as described in the crypto-asset white paper shall not exceed 12 months from the date of publication of the crypto-asset white paper."

¹³⁴See BaFin, *Initial Coin Offerings: Advisory letter on the classification of tokens as financial instruments* March 28, 2018, reference no.: WA 11-QB 4100-2017/0010.

¹³⁵The safe harbor is included in the Wyoming Utility Token Act (2019) and establishes the following: "A developer or seller of an open blockchain token shall not be deemed the issuer of a security... if the purpose of the token is for a consumptive purpose, which shall only be exchangeable for, or provided for the receipt of, goods, services or content... [and] the developer or seller of the token did not sell the token to the initial buyer as a financial investment". Tokens do not classify as a security if:

1. The developer or seller did not market the token as a financial investment; and
2. At least one of the following is true:
 - A. The developer or seller of the token reasonably believed that it sold the token to the initial buyer for a consumptive purpose.
 - B. The token has a consumptive purpose that is available at the time of sale and can be used at or near the time of sale for use for a consumptive purpose.
 - C. If the token does not have a consumptive purpose available at the time of the sale, the initial buyer of the token is prevented from reselling the token until the token is available for use for a consumptive purpose; or

(continued...)

Box 8. Securities Regulation in the EU legislative package

The main consequence of the token classification (see Box 3 above) is to regulate the offers of crypto-assets, other than asset-referenced tokens or e-money tokens.¹³⁶ Offers to the public of crypto-assets need to comply with the following requirements (art. 4.1 MiCA):

- the offeror is a legal person
- has drawn up, notified and published a crypto-asset white paper
- has drafted and published marketing communications in respect of the crypto-asset
- complies with general requirements for offerors (including fair conduct, prevention of conflict of interests and adequate systems and security access protocols) (art. 14 MiCA).

The white paper requirements, and the publication of marketing communications are not applicable to the following cases (art. 4.2. MiCA):

- (a) an offer to fewer than 150 natural or legal persons per Member State where such persons are acting on their own account
- (b) over a period of 12 months, starting with the beginning of the offer, the total consideration of an offer to the public of a crypto-asset in the Union does not exceed EUR 1 000 000, or the equivalent amount in another official currency or in crypto-assets
- (c) an offer of a crypto-asset addressed solely to qualified investors where the crypto-asset can only be held by such qualified investors.

There is a series of full exclusions of the securities regime (art. 4.3 MiCA):

- (a) the crypto-asset is offered for free;
- (b) the crypto-asset is automatically created as a reward for the maintenance of the distributed ledger or the validation of transactions;
- (c) the offer concerns a utility token providing access to a good or service that exists or is in operation;
- (d) the holder of the crypto-asset has the right to use it only in exchange for goods and services in a limited network of merchants with contractual arrangements with the offeror.

The text also includes a clarification that tokens granted in exchange of data are not to be considered as offered “for free.”

Some countries have created legal regimes where tokens can be used as securities. In particular, Switzerland adopted the DLT Act in 2020, which introduces a broad reform of private law and of securities law. The law introduces DLT rights (*Registerwertrecht*) which provide the basis for the tokenization of assets and rights. It is possible to create securities represented by tokens in DLT. These tokens can be transferred through DLT, without requiring physical transfer, a written assignment, or a registration by a depository. The Swiss law also addresses the problem of the insolvency of intermediaries by allowing tokens to be segregated and returned to clients. In Germany, the electronic securities act of 2021 has introduced a new category of electronic securities, which includes dematerialized securities in central registries and also tokens in “crypto securities registries”. The law establishes that good faith acquirers are protected and that restrictions to the transfer of tokens must be included in the registry or known to the acquirer to be effective.

D. The developer or seller takes other reasonable precautions to prevent buyers from purchasing the token as a financial investment.

¹³⁶There are also some rules for certain types of tokens. Article 40 of MiCA prohibits that asset-referenced tokens pay interest (Issuers of asset-referenced tokens or crypto-asset service providers shall not provide for interest or any other benefit related to the length of time during which a holder of asset-referenced tokens holds asset-referenced assets). This seems designed to tackle the problems of stablecoins.

The use of tokens as securities is a promising development for financial markets. Tokens can provide increased liquidity to many companies and support new business models.¹³⁷ The use of DLT can bring advantages in terms of cost-reduction, facilitated settlement, transparency, and operability, but there are also technical problems (such as the scalability of DLT, or energy consumption) and most importantly, there must be no legal uncertainty for tokens to operate as securities.¹³⁸

Securities laws and regulations would need to be adapted to the issuance of tokens. Tokens go one step further than dematerialized securities.¹³⁹ Tokens do not need to rely on a central securities depository¹⁴⁰: clearing and settlement can be done end-to-end in blockchain, in real time.¹⁴¹ The problem is that it would be necessary to have interoperability among different DLTs, and solutions in this area are still in its infancy.¹⁴² The DLT pilot regime in Europe shows the complexity of combining DLT with the legal and regulatory requirements for clearing and settlement, particularly in transparency and reporting requirements¹⁴³. If tokens are subject to securities law, it would be necessary to comply with all registration and prospectus requirements. Issuers must provide full and fair disclosure of material information, and this may mean that disclosures would have to incorporate more technical content than that of traditional issuers. Many of the ICOs did not conform to basic requirements of securities offerings.¹⁴⁴

Several regulators have reacted by issuing warnings about the sale of tokens. The SEC in the US, the FCA in UK and the CNMV in Spain, among others, have warned the public about the risks in acquiring tokens, even if those tokens (such as crypto currencies and utility tokens) fall outside the supervisory perimeter.¹⁴⁵ Warnings are a legitimate instrument to protect the public, but there are side-effects: presenting tokens as a risky investment implies a generic assessment of the whole digital economy, where high-risk ventures coexist with more solid businesses, and also with activities that are purely speculative and bring no value.¹⁴⁶ In other cases, securities regulators have reacted by starting enforcement actions.

¹³⁷This may include the development of DAOs (Decentralized Autonomous Organizations) based on smart contracts (see Garrido *et al.*, 2022). This development actually fits with the theory of companies as a “nexus of contracts” (Jensen and Meckling, 1976).

¹³⁸OECD, 2020, at 19-20.

¹³⁹In the EU, there is a plan for full dematerialization of securities by 2025 (CSD Regulation). The objective is to reduce the time for settlement of securities trades to two days (T+2). Securities should be recorded electronically, in book entries managed by a CSD.

¹⁴⁰In the USA, project Whitney by the DTCC (May 2020) seeks to tokenize private securities in Ethereum, with additional connections to other blockchains.

¹⁴¹For instance, France created the DEEP system after the reform of its laws in 2017 to allow blockchain to function as a securities registry for unlisted securities.

¹⁴²One possible solution is the use of “atomic swaps,” i.e., a swap of tokens in a blockchain for tokens in another blockchain. This swap is possible thanks to smart contracts governing the transaction. A Hashed Timelock Contract (HTLC) is like a virtual safe: parties need to comply with the established conditions within the established time, and the result is that each of the parties will receive the corresponding tokens in their addresses.

¹⁴³See ESMA, 2022.

¹⁴⁴See Zetzsche *et al.*, 2019, emphasizing that many ICOs are offered on the basis of inadequate disclosure of information— e.g., more than two thirds the ICO whitepapers are either silent on the issuing entity, initiators, or backers, or they do not provide contact details. In addition, the authors identify informational gaps in applicable law, segregation or pooling of client funds, or the existence of an external auditor.

¹⁴⁵See Cuervo *et al.*, 2019, referring to “warnings” and “prohibitions” as two of the main approaches adopted by regulators on cryptoassets.

¹⁴⁶See Davis, 2022. Davis has also argued that designating some crypto assets like bitcoin as financial products can backfire and give the public the impression that there is some value in them.

The IMF is advocating for developing and applying comprehensive regulations of crypto assets.¹⁴⁷

The analysis of the Fund focuses on unbacked tokens¹⁴⁸ and on stablecoins, due to their use for investment and payments. The Fund proposes comprehensive regulation of all actors dealing with crypto asset, both from the prudential and the financial integrity perspectives. IOSCO (2023) has issued a consultation report that sets forth proposals for the comprehensive regulation of markets and market actors dealing with crypto assets to address concerns related to market integrity and investor protection.

Some countries have opted for an approach that brings digital assets under the supervision of securities regulators. France enacted the PACTE law in 2019 with the objective of creating a voluntary regime for the supervision of token activity, under the control of the securities regulator (AMF). The PACTE law distinguishes between tokens that are securities and are fully subject to securities laws and regulation, and the rest of digital tokens, which are subject to a voluntary regime. Companies may submit a white paper to the AMF for optional authorization, with a clear description of their project and their tokens.¹⁴⁹ A different approach consists of the design of binding regimes for the regulation of tokens: this is the approach followed by Bermuda and Bahamas. In the case of Bermuda, two pieces of legislation (The *Digital Asset Business Act* and the *Companies and Limited Liability Company Initial Coin Offering Amendment Act*, both passed in 2018) establish a comprehensive regime for token activities (Box 9). In Bahamas, the Digital Assets and Registered Exchange (DARE) act, adopted in 2020, includes a comprehensive regulation of digital assets, defined as “a digital representation of value distributed through a distributed ledger technology platform”. DARE lists four types of digital tokens: virtual currency tokens, asset tokens, utility tokens and non-fungible tokens. ITOs (Initial Token Offerings) are defined as an offer made by an issuer to the public for sale of a digital token in exchange for fiat currency or another digital asset. The issuer must be fit and proper; must have prepared an offering memorandum (‘OM’); and comply with any regulations provided for under DARE.

Box 9. The token regime in Bermuda

Bermuda has designed a regime that defines digital assets and provides standards for ICOs and digital asset businesses.

The definition of digital asset refers to anything that exists in binary format and includes a digital representation of value which is used as medium of exchange, unit of account or store of value and is not legal tender, debt, or equity. The concept excludes rewards programs and tokens that can only be used in game platforms.

The ICO legislation regulates offerings of digital assets which are public crowdfunding or similar type projects. An ICO is considered a restricted business activity that requires the authorization of Bermuda’s Minister of Finance prior to an offering being made to the public. A FinTech Advisory Committee assists with initial reviews of applications to ensure that they meet minimum criteria regulations.

Private sales of tokens or issuance of “virtual currencies” are regulated by the *Digital Asset Business Act*.

Similar regimes have been introduced in other jurisdictions in the Caribbean (The Bahamas and the Cayman Islands).

¹⁴⁷ See IMF, 2023. See also Bains *et al.*, 2022.

¹⁴⁸ The concept of unbacked token corresponds with level 1 in this paper’s classification (native tokens).

¹⁴⁹ See Barsan, 2019.

The approaches to tokens in securities regulation vary widely, from the uncertainty of the scope of application of existing regimes, to the design of bespoke regimes. This variety in approaches is consistent with the diverging models for securities regulation and the different attitudes towards innovation in the digital economy.

The uncertainty regarding the use of tokens has resulted in some bad practices. In many cases, sellers of tokens have led the public to believe that tokens were an investment, even when tokens were associated to the use of a service or the delivery of an asset. There is some business logic in the use of token sales to fund the future projects and activities of start-ups,¹⁵⁰ but this is not equivalent to funding businesses through equity issuance. In fact, these token sales are rather sales of future services or products.

All systems would benefit from clear legal definitions to establish whether a token is a security. To define a token as a security, *the critical point is the content of the rights*, i.e., whether the token includes rights with a financial content: in theory, a token can include rights to receive a stream of payments (like a bond) or rights to vote and to receive dividends (like a share). The content of the rights is the essential element of the definition of a security, but there may be also other elements, including mass issuance, and easy negotiability.¹⁵¹ The existence of a secondary market can also be a sign of the issuance of securities.

Tokens that include a right to the property of an asset require careful analysis. A token providing a right to a security will clearly be classified as a security. A token that provides a property right to an asset traded in markets can also be considered a security (for instance a token representing gold, or a basket of currencies). However, the question is more complex when the tokens represent a tangible asset that is not negotiated in markets (for instance, real estate, or a wine collection). This case is particularly difficult when tokens represent fractions of the asset (which can be another token, such as an NFT). In those cases, if the asset generates income or if the motivation for the acquisition is based on the appreciation of the asset, rather than on the advantages of its use, it is possible that the structure falls within the scope of collective investment schemes. This problem is not new and should receive the same response irrespective of the technology used to structure the transaction.

In any case, investor protection measures are only effective when the risks of tokens are those typical of investments. Securities laws ensure that the information provided to the public is accurate, and also remove significant informational asymmetry. When tokens are considered securities, the whole body of securities law should apply, including prospectus requirements, ongoing disclosure obligations, rules for trading, for markets, and for intermediaries, and effective enforcement.

¹⁵⁰See Catalina and Gans, 2018, on the possibility of issuing tokens for future products so that businesses can fund their start-up costs. However, the ability to raise funds seems more limited than in traditional equity finance.

¹⁵¹For instance, under US law, courts use the commercial-investment test (see *Sutter v. Groen*, 687 F.2d 197, 200-04 (7th Cir. 1982)), according to this test, if the context of a transaction is commercial, rather than financial, the transaction does not involve a security (the typical case is the sale of a controlling stake of a company to acquire its business). Negotiability goes beyond transferability. These are instruments that must be *easily* transferable. "Securities are rights that are created to circulate in a liquid market" (Micheler, 2007, at 99).

VII. Tokens, Consumer Protection, and the Digital Economy

Tokens raise distinct issues that go beyond the realm of securities law. The application of securities law to token transactions is particularly contentious, but even the most expansive view of securities law needs to recognize that tokens are a much broader phenomenon. Securities law does not offer all the responses that the widespread use of tokens demands.

Many token transactions only need commercial law rules. Tokens can be used in traditional commercial settings (i.e., relationships between entrepreneurs, also known as business-to-business relations (B2B)). Some of the uses of tokens may correspond to the use of commercial instruments (for instance, bills of exchange, warehouse receipts, bills of lading) and others may represent the incorporation of contractual rights that fall outside those instruments (for instance, tokens that provide access to computing services, or tokens used to structure a sale of assets). As long as these tokens involve B2B transactions, the only rules that are needed are those included in commercial law (see above, section V). The same or similar rules can also operate in transactions between consumers (C2C): these are especially important in decentralized networks.

Token transactions between business and consumers may require the application of legal rules to ensure fairness. Tokens can be used for the provision of all kinds of goods and services, and that means that consumer protection law should apply to transactions between businesses and consumers (B2C). Although the distinction between consumer and entrepreneur has been eroded in the new economy, where there are new categories of economic actors, such as “prosumers” and “solopreneurs,” consumer protection law is still based on this fundamental distinction.

As a first step, token transactions between businesses and consumers should fall under consumer protection law. The fact that these transactions are conducted in a digital setting does not change the justification for the operation of consumer protection rules. Generally, consumer protection law should adapt to the new digital economy. This adaptation can benefit from the efforts made to update consumer protection law to raise to the challenges of Internet commerce. Some additional steps are needed to account for the new practices. For instance, the right of consumers to walk away from transactions needs to be adapted to DLT, where transactions cannot be “undone,” and what is required is a reverse transaction to return the parties to their original positions.¹⁵² Important adaptations are also needed for the resolution of controversies. Consumers may not have the means to commence litigation to enforce their rights, considering, in addition, that the issuer of tokens may be located anywhere in the world, or even lack a physical location. For this reason, it would be advisable to include ADR clauses in

¹⁵²Some commenters deny the right of the consumer to undo the transaction, based on the fact that prices may be dependent on fluctuations in the financial markets (see Koolen, 2022). However, the price of most tokens should be independent from the evolution of financial markets.

token contracts so as to provide consumers an opportunity to resolve conflicts with the issuer by means of alternative, costless mechanisms.

However, more fundamental reforms are needed to protect consumers in token transactions.

Rules on consumer protection provide a balanced legal framework for traditional transactions, and even for transactions that incorporate internet communications, but the uncertainties affecting tokens are of a more fundamental nature and require additional rules. Basic regulation is required for the development of competitive markets that incorporate technological innovation in tokens.

The legal and regulatory regime needs to be supplemented with rules specifically designed for the digital economy. Tokens are at the center of the new digital economy. Tokens are new objects that can include various rights, as discussed before. There is a need for rules that ensure that consumers can know and understand the contents of the rights included in tokens. In addition, tokens can be sold massively and can be negotiated in markets outside the scope of financial markets law. Securities law is not applicable, but there are some problems raised by unregulated tokens which may require rules inspired by similar principles (fig. 2).¹⁵³

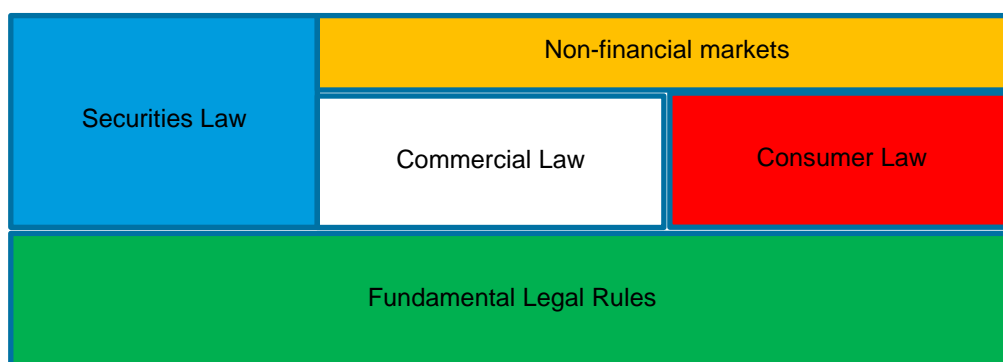


Figure 2: Legal framework for the Digital Economy (source: own elaboration)

In particular, the law needs to ensure transparency and veracity in the sale of tokens. One of the basic tenets of consumer protection law is that there is sufficient information for consumer to assess the products and services, and that promotional materials are truthful (OECD, 2016).¹⁵⁴ Adhering to these principles is challenging in token transactions. Since tokens are connected with smart contracts and these define the rights of the token holder, it can be extremely difficult for consumers to decipher the code and understand their legal position.¹⁵⁵ Even when tokens are not classified as securities, the content of token

¹⁵³In addition, the areas highlighted should be complemented with payment systems law and monetary law, which fall outside the scope of this paper.

¹⁵⁴See also de Streel and Sibony, 2017.

¹⁵⁵For instance, many sports clubs have sold “fan tokens” – in theory, these tokens provide fans with the right to vote on club actions (e.g., colors of training outfits; songs performed at games, etc.), but the fact is that in most cases, the club itself retains so many tokens that the vote of fans is not decisive for any of these actions. See <https://www.makeuseof.com/why-fans-spent-on-controversial-crypto-fan-tokens/>

holder rights and the context for their exercise should be clear.¹⁵⁶ In principle, this is similar to what is required of any other product or service addressed at consumers, but the differentiating factor is the technological element, which may create extraordinary difficulties for consumers who are not familiar with advanced developments.

If tokens are connected with off-line assets or services, it is necessary to ensure the correspondence with their description in digital materials. This is, potentially, one of the biggest consumer protection issues. In addition, descriptions in promotional materials may not match descriptions in the smart contract, which may be even written in code. Consumers should have access to plain-language descriptions of the assets or services connected to the token and the issuer should be liable if there are differences in quality or quantity from what has been described to consumers. Rules on misleading advertising and fraud should be generally applicable to the sales of tokens.

Since tokens can be issued massively, negotiated in markets, and held by intermediaries, there is a need for rules that achieve comparable results to those of securities law. Aside from the informational requirements for the sale of tokens, which should be stricter for tokens issued at a massive scale, there are other areas that need to be regulated for tokens that fall outside the scope of securities law. In particular, platforms or secondary markets need to have basic rules for their fair operation, and intermediaries need to have a fundamental set of duties towards consumers. Practices such as insider trading and market abuse should be banned.¹⁵⁷ When tokens are used for payment and investment purposes, it is necessary to establish regimes that protect financial integrity. Some countries, such as France or Malta, have established regimes that regulate intermediaries, issuance of tokens, and markets for tokens that are not classified as securities (see PACTE law, 2018, and Digital Virtual Assets Act of 2018)¹⁵⁸. The EU (MiCA) also takes an integral approach to the regulation of crypto assets.

Protective rules require technical expertise for their effective application and enforcement.

Ensuring that tokens addressed to consumers include a plain language description of their contents requires a regulator with technical expertise. Verifying the accuracy of information, including the claims made in white papers and promotional materials, requires IT expertise.¹⁵⁹ For this reason, some countries are establishing regulators with specific technical knowledge (for instance, Albania and Malta¹⁶⁰). The technological regulators may operate independently or in cooperation with existing regulators.

¹⁵⁶See OECD, 2016, for electronic commerce: “*Online disclosures should be clear, accurate, easily accessible, and conspicuous so that consumers have information sufficient to make an informed decision regarding a transaction. Such disclosures should be made in plain and easy-to-understand language, at a relevant time, and in a manner that enables consumers to retain a complete, accurate and durable record of such information.*”

¹⁵⁷In some countries, broad prohibitions of fraud and deceptive practices may be applicable. In many jurisdictions, however, insider trading and market manipulation refer only to securities and criminal law provisions cannot be applied by analogy.

¹⁵⁸ See Buttigieg and Sapiano, 2020.

¹⁵⁹Assigning the task of verifying such information to a securities regulator does not guarantee consumer protection.

¹⁶⁰Albania created the *National Agency for Information Society* (AKSHI) in 2008 to promote digitalization in various areas, but with the enactment of a comprehensive legal regime for virtual assets, AKSHI has also taken a supervisory and regulatory role over the sector. Malta established the *Malta Digital Innovation Authority* (MDIA) in 2018, with broad responsibilities, including the supervision and certification of DLT platforms and smart contracts.

VIII. Conclusion: A Comprehensive Approach to the Regulation of Tokens

Tokens exhibit enormous potential in the new digital economy. The combined technological advances of DLT and similar technologies, and smart contracts offer new possibilities to tokens. Tokens can be much more than self-referential virtual assets like bitcoin. Tokens can provide access to digital services and assets, and ultimately, can also connect with off-line assets and services. In this regard, tokens can perform functions similar to those of commercial instruments, but tokens have greater possibilities as they are not limited by some of the foundational principles of commercial instruments.

The functions of tokens illustrate the complex relations between technology and the law. Digital technology and cryptography are creating the space for the development of tokens. The functioning of technology, in itself, is objective and cannot be disputed. But no technology exists in isolation from pre-existing reality, and that reality includes the law. Eventually, legal rules will be necessary to provide confidence in tokens and to enable tokens to fulfil their functions effectively, even in new business models and activities. Rules must also be technology-neutral, to the extent possible, so as to allow improvements and new developments.

Fundamental legal questions need to be addressed in the regulation of tokens If tokens are to achieve their full potential, there is a need for a set of fundamental legal rules that integrate tokens within the existing legal fabric, providing solid responses for the issues tokens raise.¹⁶¹ Among these questions, the law should recognize and define DLT and smart contracts to include them within existing legal mechanisms and recognize their effects in transferring tokens and generating rights for parties. In this regard, it is critical to ensure that there is a connection with valid legal effects between DLT and off-line assets and services.¹⁶² In addition, it is necessary to establish rules that allow the use of DLT as evidence, and resolve issues of unlawful transfer (loss, coercion, and fraud). Remedies must exist to protect the rights of legitimate token holders, but good faith acquirers for value must also be protected.

Tokens offer a possibility for the renewal of commercial and financial law. Tokens are flexible enough, through their integration with smart contracts, to provide opportunities for the digitalization of the economy, including traditional commercial and financial transactions. Tokens can improve existing legal techniques, such as negotiable instruments or securities. Ultimately, if tokens are legally connected to off-line assets and services, tokens will be the vehicle to improve the efficiency of multiple economic activities.

The legal policy addressing the use of tokens should focus on substance. The law is essential to ensure the smooth functioning of tokens in commercial and financial settings. Instead of following a

¹⁶¹See Haynes and Yeoh, 2020, at 247.

¹⁶²Low and Mik, 2020.

formalistic analysis of existing legal frameworks, a legal policy for tokens should focus on the substance of the functions performed by tokens to achieve a similar level of legal certainty and protection. This applies to the approaches to be followed by legislators and regulators.¹⁶³

In the area of securities laws, tokenization represents a step further in the adoption of modern technology. Securities markets have been transformed in the past few decades as a result of the incorporation of modern IT systems. Tokens represent a step forward from dematerialization of securities, and eventually this may result in faster and more economical clearing and settlement model, although this will necessitate changes in the laws regulating market infrastructures¹⁶⁴ As tokens are inherently flexible, they can be designed to provide access to services and assets and therefore fall outside the traditional content of securities. However, marketing techniques may be similar to those employed for speculative investments: it is necessary to establish a clear delineation that provides certainty about the application - or not- of securities law to token transactions.

Consumer protection laws can be adapted to cover the sale of tokens. The foundational layer of regulation of token transactions must be included in commercial or private law, as indicated above. On top of this layer, there could be additional regulation, such as special regulation of tokens that are classified as securities, and also for token transactions where parties are businesses and consumers. Consumer protection rules should be adapted to complement the operation of securities laws, in cases where the sale of tokens falls outside the scope of securities law. In particular, consumer protection rules should ensure adequate disclosure and offer appropriate redress opportunities, bearing in mind the particular challenges of the provision of goods and services in the digital world.

The legal and regulatory regime may need to be supplemented with a special regulation of the digital economy. Adapting the securities laws regime and consumer protection regime may still leave gaps in an adequate regulation of digital activities. In particular, tokens can be transferred in markets that are currently not regulated. It is imperative that those markets respect basic rules of integrity. Laws and regulations need to account for and integrate technological aspects. The creation of platforms, the issuance of tokens and the role of token holders as users and promoters of new digital activities may require regulation and oversight based on technical knowledge, together with the consideration of business, financial and legal issues.

With appropriate legal regimes, the potential for tokens in the new digital economies is extraordinary. Tokens offer new possibilities in all areas of finance and commerce. Together with the Internet of Things and Artificial Intelligence, there is scope for deep transformations in economic activity. Automated contracting, with tokens that provide services and goods thanks to the connections with online manufacturing and distribution, could bring prospects of changes in all economic sector. There are no obvious losers with these changes, and all countries can benefit from these technologies. The technologies, nonetheless, must be supported by strong institutional frameworks and adequate controls.

¹⁶³Allen *et al.*, 2020, recommend that regulatory authorities “*should focus on the substance of the underlying asset and the rights associated with it, rather than its form, unless the form changes the substantive nature of the asset*”.

¹⁶⁴See Van Setten and Kerrigan, 2022.

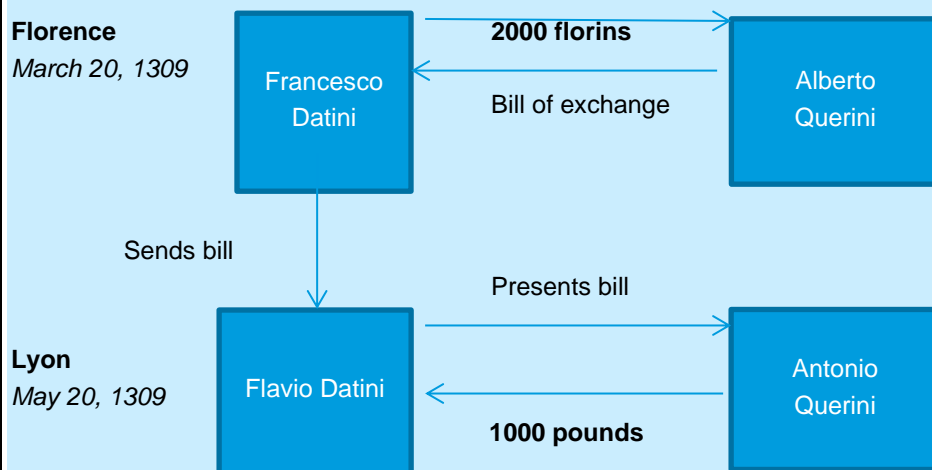
The evolution of technology will require a continuing assessment of risks and adjustments of the legal responses. The use of tokens as fundamental tools for economic activities is not without risks. Solid legal foundations will contribute to minimize risks, but the rapid transformation of digital technologies will also need constant monitoring and the development of legal techniques to provide appropriate safeguards.

Annex I. Development and Principles of the Law of Commercial Instruments

Commercial instruments were created by commercial practice and usages, but legal doctrine also supported their development. By effect of commercial usages and customs first, and later, by legal codification, a set of rules developed that would go beyond the parties of the original contractual relationship that originated the document and which apply also to third parties who would come to interact with the document. *Incorporation is a process that goes beyond contract*. By embedding the right to receive a payment or the right to a delivery of goods in a document, third parties who had not signed any contract could actually hold rights derived from that contract.¹⁶⁵

Box 10: An example of a medieval letter of exchange

A merchant, Mr. Francesco Datini, based in Florence in the 14th century, needs to have funds to buy goods at the fair of Lyon. His son Antonio Datini is the agent of the family firm in Lyon. Instead of sending local currency (florins) to his son, Mr. Datini delivers a sum of money (2000 florins) to Mr. Querini, a Venetian merchant with businesses in several parts of Europe, including Lyon. When Mr. Datini delivers the 2000 florins, he receives a bill of exchange which gives the right to receive a payment of 1000 pounds (*livres*) in Lyon, at a date specified in the document. Mr. Datini will send the bill of exchange to his son, as this procedure is far safer than moving physically funds across borders. In addition, the money delivered by Querini will be the local currency used in Lyon. Mr. Antonio Querini, nephew and agent of the Querini family in Lyon, will make the payment after examining the bill bearing the signature of his uncle Alberto.



¹⁶⁵ Incorporation is more a *metaphor* than real incorporation. The right does not really “become” the document, which explains, for instance, how the loss of the document may not always cause the loss of the right. The theory of commercial instruments has been developed over a prolonged period of time, with fundamental contributions from German and Italian jurists (see, among many others, Pellizzi, 1960; Chiomenti, 1977; and Canaris 1977).

A number of legal principles are necessary for the law of negotiable instruments to operate smoothly. These principles developed with practice, and were identified later in a conceptual framework. The principles are *incorporation, legitimation, literality, transferability, formality, and autonomy*.

The principles governing these instruments follow logically from the fundamental principle of incorporation:

- **Incorporation:** The key concept is that the right is incorporated to the document. The document embodies the right – from this, some of the other principles flow naturally, such as legitimation and transferability. In the example of the bill of exchange, the right to receive a payment from Mr. Querini is incorporated to the document: the document embodies the right to receive the payment and identifies with it.
- **Legitimation:** Since the document incorporates the right, the person who is in possession of the document, or who appears reflected in the document itself, is legitimated to exercise the incorporated right. In a bill of exchange, there is a person designated as holder in the document (Mr. Datini), and the person in possession of the bill of exchange can exercise the right to collect the payment only if he/she is in possession of the document and also if his/her name is included in the document itself in a regular chain of endorsements. Legitimation means that the person indicated in the document has the right to receive the payment – and also that the debtor is only freed from the obligation if he/she makes the payment to the person indicated in the document.
- **Literality:** Because the right is incorporated to a written document, what is written in the document is exactly the contents of the right (i.e., the document indicates a specific amount to be paid at a certain place and time). So, the bill of exchange states, in our example, that Mr. Alberto Querini will pay 1000 pounds in Lyon on May 20, 1309. The amount and currency are established in the document –as well as the place and time for the payment. These –and only these- are the rights of the holder.
- **Transferability:** These documents are created with the aim -or at least the possibility- of being transferred. Due to the fact that the right has been incorporated to a physical object (a piece of paper); the regime for transfer of the right is transformed. In the case of the bill of exchange, the right is transferred by handing possession of the document plus including a signed endorsement in the bill. Other transfer regimes are possible, with more ease of transfer and less security (bearer documents) and with more security and requirements (nominal documents). In the example of the bill of exchange, Mr. Datini could transfer the bill of exchange to Mr. Dupont, a French merchant, by signing an endorsement in the bill of exchange and transferring possession to the new holder. A successive endorsement is also possible, and at the moment of payment, Mr. Querini will pay the 1000 pounds to the person who presents the bill of exchange and appears as the latest designated person in a regular chain of endorsements¹⁶⁶.
- **Formality:** In order for the document to effectively incorporate the right and be recognized by all, including the courts, the document needs to respect basic formal requirements. A bill of exchange must respect a certain formulation to be recognized as such, and this includes the fact that the document itself incorporates the words “*bill of exchange*.” The appearance of the document, its formality, is what makes it recognizable to third parties, and justifies the effects that the document has beyond the bilateral relationship between the persons who drafted it.

¹⁶⁶There are different methods of transfer of the right. The simplest form is mere transfer of the possession of the document (bearer titles), but documents like the bill of exchange require an extra layer of protection for their circulation, and this is given by circulation by endorsement: the original holder must endorse the document for the next holder. An uninterrupted chain of endorsements (i.e., a string of signatures of the holders designating the next holder of the document) is a requirement for the exercise of the right incorporated in the document. Other documents, so called “nominative,” restrict their circulation, which can only operate by way of a full cession of rights.

- **Autonomy:** Due to the fact that the document incorporates a right, according to its literal terms, and also given the fact that the document can be transferred to a third party, there is a detachment between the aspects of the legal relationship that are incorporated to the document and other aspects that relate to the legal relationship that originated the document (for instance, a sale contract). Autonomy -sometimes also referred to as “abstraction”- means that there is a separation between the aspects incorporated to the document, so that a third party acquiring the document in good faith and for value cannot be affected by facts that are not reflected in the document.¹⁶⁷ This protects confidence in the value of instruments; and is consistent with the other principles. In the example of the bill of exchange, there is a delivery of cash from Mr. Datini to Mr. Querini, but could be that Mr. Querini bought a shipment of silk from Mr. Datini, and the bill of exchange would correspond to the obligation to pay the price of the wool. However, once the bill of exchange is endorsed to a third party, e.g., Mr. Dupont, the potential issues in the sale contract (such as defects in the silk) cannot be raised by Mr. Querini to refuse payment of the bill of exchange.¹⁶⁸ Autonomy, therefore, enhances the confidence of the public in the document.

The idea of incorporation has been connected with the economic function that these instruments were designed to fulfil, namely, increasing the transmissibility of rights. Because the right is incorporated to a document, which is a movable good, that implies the application of rules for those goods, such as the protection of good faith acquirers, even when the person transferring the document is not the legitimate owner. However, it is necessary to stress that incorporation is not complete, and there is no perfect identification of the right with the document: rights can continue circulating without the corresponding circulation of the document, and instances of loss and theft show that it may be possible to preserve the right even when possession of the document has been lost.

¹⁶⁷In common law, this is identified with the doctrine of negotiability, with its corollary that the holder in due course acquires rights even if those rights were not held by the transferor and would otherwise be subject to defenses. Modern legal scholars have criticized the doctrine: see, among others, Gilmore, 1981, and Rogers, 1990.

¹⁶⁸This is the main difference between endorsement and cession of rights. When rights are ceded to another party, the whole legal position is transferred, with all rights and obligations, and not just the right included in the document. The difference is that the beneficiary of the cession is exposed to any defenses that the debtor may raise, whereas the position of the endorsee is much more robust.

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