TECHNOLOGY

An Investment Perspective on Tokenization—Part II

Policy and Regulatory Implications

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CFA Institute
Research & Policy Center

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FOREWORD

The rise in the use of digital assets has required the intervention of governments and international organizations to draft principles and laws that clarify how private law rules apply to digital assets. The International Monetary Fund (IMF), the European Law Institute (ELI), the United Nations Commission on International Trade Law (UNCITRAL), the Hague Conference on Private International Law (HCCH), and the International Institute for the Unification of Private Law (UNIDROIT) have sought to encourage the regulation of private law aspects of digital assets and tokenization to encourage market confidence and the interoperability of tokenization across jurisdictions. At the national level, the work of the Law Commission for England and Wales and the amendments to the Uniform Commercial Code (UCC) with Article 12 are notable regulatory studies. Determining the applicable legal framework for the growth of digital assets and tokenization is especially necessary for personal property rights, rights of enforcement, cross-border recognition and compliance, and jurisdictional reach of laws.

Because regulatory frameworks differ among jurisdictions—thus preventing a one-size-fits-all approach—developing soft law and a harmonized approach in defining digital assets and their regulatory treatment will help achieve a robust regulatory framework. The discussion about the nature and proprietary aspects of digital assets has led to significant debates. The Law Commission for England and Wales, for example, has recommended the creation of a third category of things; it set the conditions, but it has not, rightly so, defined the third category of things to which personal property rights can relate. Although the value of a plurality of legal approaches is important, for regulatory reform in digital assets and tokenization to be successful, a coordinated approach to harmonization is needed. Only then can reform and harmonization go from being utopian concepts to hopeful ones in this field.

Skillfully researched and written by Giovanni Bandi, PhD, Olivier Fines, CFA, and Urav Soni, this report is the second installment in a two-part series that covers the topic of tokenization from an investment management perspective. Focusing on the regulatory and policy issues surrounding tokenization and digital assets, the report discusses international and supranational standards by non-governmental bodies and provides a comparative cross-jurisdictional analysis of regulatory sandbox initiatives. Given the perceived values of a robust regulatory framework and the establishment of the legal status of tokens, the authors show how these would help build trust in the market, underpin investment and innovation in tokenized assets, and lead to market expansion. This report provides new insights into what is a complex, controversial, and fast-moving field of law, policy, and regulation at both the national and international level.

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EXECUTIVE SUMMARY

This report is the second in a two-part series on tokenization from an investment management perspective. "Part I: A Primer on the Use of Distributed Ledger Technology (DLT) to Tokenize Real-World and Financial Assets" (Soni, Fines, and Sun 2025) provided an introduction to tokenization, the underlying distributed ledger technology, and tokenization's benefits, limitations, and potential implications.

This second part of the series focuses on the important legal and regulatory evolutions considered necessary to support sound development of the tokenization industry, in line with expectations around investor protection and market integrity. The report's core premise revolves around the necessity of determining the applicable legal framework for digital assets. It provides four key reasons why identifying the applicable law of tokens is essential:

- personal property rights,
- cross-border recognition and compliance,
- rights of enforcement, and
- jurisdictional remit.

We pursue this analysis with a discussion of key international and supranational standards and proposals, which have been established by non-governmental bodies tasked with finding an appropriate global basis. These include recommendations from the International Monetary Fund (IMF), the United Nations Commission on International Trade Law (UNCITRAL) model laws, and the International Institute for the Unification of Private Law (UNIDROIT) Principles on Digital Assets and Private Law.

Finally, we provide a jurisdictional comparative analysis that includes a brief description of current policies and rules for key jurisdictions at the forefront of digital finance development, including the following:

- Switzerland
- European Union
- United Kingdom
- India
- Mainland China
- Singapore
- Hong Kong SAR
- United Arab Emirates
- United States

Additionally, we examine various regulatory "sandbox" initiatives in several of these jurisdictions. The objective of such initiatives is to provide the tokenization industry with a controlled environment for testing technological innovations under regulatory supervision.

In this report, we find that the growth of tokenization requires a legal and regulatory framework that provides clarity, fosters market confidence, and ensures interoperability across jurisdictions. This combination of a robust regulatory framework alongside an established legal status for tokens would help build trust in the market and encourage both investment and innovation in tokenized assets, enabling market expansion. The UNCITRAL model law and UNIDROIT's work on digital assets provide a foundation for integrating electronic rights into legal systems and facilitate harmonization of regulation across regimes, both of which can help create uniform rules for digital assets.

Overall, to maintain financial stability and legal integrity while promoting innovation and growth through tokenization, global regulatory cooperation and measures to safeguard stakeholders through market surveillance should become a priority for regulators and policymakers. At the same time, legislation should provide explicit recognition of property rights associated with tokenized assets.

Key Takeaways

- The growth of digital assets and tokenization requires essential legal and regulatory frameworks to address issues related to personal property rights, cross-border recognition and compliance, rights of enforcement, and jurisdictional remit of relevant regulatory authorities.
- Various jurisdictions have undertaken different approaches for regulatory frameworks for digital assets and tokenization. These approaches range from applying existing securities law to digital assets—creating a new set of rules on digital assets—to maintaining stringent limitations based on the view that digital assets are a threat to financial stability.
- Regulators need to focus on establishing harmonized rules for the regulatory treatment of digital assets and harmonizing definitions used to qualify digital assets. Industry participants and regulators need to work in lockstep to establish rules and processes conducive to a broader interoperability among various blockchain networks.
- Regulatory developments must stay adaptive and maintain technological neutrality while incorporating stronger regulatory safeguards to promote innovation and the tokenization industry—all while maintaining investor protection, financial stability, and legal integrity.

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We thank Professor Chao Zhou of the University of Manchester, United Kingdom, for his contributions to this research. Chao is a licensed attorney, currently pursuing a PhD at the University of Manchester, where his research focuses on advancing artificial intelligence in financial technology regulation.

1. INTRODUCTION

The rapid growth in digital assets has shone a spotlight on a system that requires policy guidance to operate effectively at scale within the trade customs. In humanity's long history of transactions, legal changes have always followed the adoption of new ways of exchanging and acquiring economic rights. The most common example of this natural evolution in financial services is the information infrastructure of financial markets, a system that handles trillions of records and is regulated by many thousands of complex and intertwined policies. The tokenization of real assets will be no exception to this evolutionary process.

Part I of the CFA Institute work on tokenization (Soni, Fines, and Sun 2025) involved a practitioner analysis of this development and raised a series of issues that we believe industry professionals as well as regulators and policymakers should all consider. It highlighted the transformative potential of tokenization, underscored by its ability to increase operational efficiencies and provide broader access to alternative assets. It also identified two critical unresolved problems:

- enforcing ownership rights and
- identifying the responsible issuer or issuing entity.

Because these unresolved issues are pivotal for the adoption and mainstream acceptance of tokenization, Part II addresses these concerns by delving in to the essential legal and regulatory frameworks needed to support the burgeoning tokenization industry. We explore the necessity of identifying legal attributes to ensure lawful certainty for stakeholders when acquiring or transacting within a tokenized system. Enforcing ownership rights and clearly identifying issuers are both essential components in this framework for all open markets. In this sense, requirements for using tokens are not dissimilar from requirements established for any financial transactions, in even their most primitive forms. Digitization is just a matter of parallel evolution of the regulatory framework.

In an ongoing process begun a few years ago, key policymakers seem to have adopted a model addressing two key aspects of digital financial transactions: (1) legal clarity or certainty on one's property rights over a digital asset and (2) the applicable regulations for those operating within the financial system. Legal trends in some large financial services markets—such as the United Kingdom, the European Union, Switzerland, Singapore, and (in part) the United States—confirm this approach. Although the methodologies may differ among regions, the resulting policies all address requirements in these two areas.

2. KEY LEGAL ASPECTS FOR TOKENIZED ASSETS

Tokenization—the digital representation of assets, whether tangible or intangible—raises unique legal issues. For a tokenized world to operate at scale, we need to answer one simple question: What is the applicable law?

Determining what laws apply is always crucial in financial transactions, but it becomes particularly important in the context of private international law. The applicable law determines the legal framework governing the issuance, ownership, transfer, and overall regulation of a digital asset. It establishes how to address a variety of potential (either identified or anticipated) wrongdoings and sets the margins of what is permissible and what is not.

Beyond legal compliance concerns, identifying and understanding the applicable law is also about fostering a stable, predictable, and trustworthy environment for all stakeholders in the blockchain ecosystem. The following summary highlights why identifying the applicable law for tokens is essential.

2.1. Personal Property Rights

Central to the discussion of digital assets is the concept of personal property rights, which serve as the foundation of most countries' social, economic, and legal systems. These rights are crucial for analyzing any commercial transaction and providing a framework for understanding complex legal relationships, within or outside national borders.

The legal definition of a digital asset may encompass a vast and diverse range of items. It can vary from the ownership of a plain digital file to an in-game asset or a non-fungible token used in everyday life.[1] Now, however, it also includes more complex, innovative financial services, such as digital carbon credits, cryptocurrencies, and digital tokens. All of these digital assets are created and exist through varying technologies with distinct characteristics and legal features.

In the finance world, transactions create further property rights intricacies. Parties' relationships within these transactions may include intermediated holding arrangements, collateral arrangements, and trust structures. Defining the correct property status of each party also governs the legal landscapes in the unfortunate circumstance of bankruptcy or insolvency. In any case, well-defined property rights offer universal protection within the broader context of digital assets. Such rights play a critical role in shaping the legal and operational frameworks that govern these modern entities.

[1]See England and Wales Law Commission (2023b) for examples of the everyday use of tokens.

2.2. Cross-Border Recognition and Compliance

Tokens may be issued in one jurisdiction and traded in another. Their legal status identifies any applicable property rights that the owner may have. In some jurisdictions, however, it is uncertain how digital assets can be treated as entities covered by property rights. This ambiguity arises from the constant evolution of both the digital market and the technology in question, a trend that will continue.

For asset-backed digital tokens, the main point of analysis migrates from the digital representation to the actual underlying asset. This shift occurs so that property rights concerning the tangible or intangible assets in question present no significant legal dilemma—because the status of the asset itself, within the ambit of property law, is already well established. The key questions, then, lie elsewhere.

First, a major issue is whether possession of a token inherently bestows upon the holder any legitimate rights over the corresponding linked asset. In some cases, when the underlying asset itself is intangible (e.g., a representation of an NFT), a question may arise as to whether the linked asset is an object of property rights. The nascent market has already experienced a variety of cases of "stolen property," such as the 50,000 Bitcoins stolen from Silk Road in the United States (US Attorney's Office, Southern District of New York 2022). The value of reported crypto-fraud increased 41% between 2022 and 2023, reaching a record GBP306 million in the United Kingdom (Venkataramakrishnan 2023).

Second is the matter of whether the act of transferring said token to another party implies a lawful transference of those rights pertaining to the linked asset to the transferee. Obtaining clarity on this issue is imperative for delineating the legal and operational ramifications of using tokenization as a mechanism for asset management and proprietary rights allocation, even more so in financial services activities.

Some courts have started reinterpreting existing legislation to apply cross-border rules to current technologies. For example, Switzerland's Zurich High Court established some important guidelines for territorial jurisdiction over cryptoassets in November 2023. Specifically on the matter of payment tokens, the Court underscored the concept of "factual accessibility" over physical location, allowing jurisdiction if the cryptoassets are de facto accessible within Switzerland, irrespective of their actual location (see arrestpraxis.ch 2024 and Sievi 2024). In Singapore,[2] the High Court acknowledged that cryptocurrency has gained increased recognition; thus, even digital assets that encompass "cryptocurrency or other digital currency" fit the definition of "movable property," explicitly indicating that cryptocurrency has been recognized as a form of property eligible to be the subject of an enforcement order (Dentons Rodyk 2023).

[2]ByBit Fintech Ltd v. Ho Kai Xin and others [2023], The High Court of the Republic of Singapore (SGHC) 199.

2.3. Rights of Enforcement

The ability to enforce any rights associated with a digital token is equally important for all stakeholders in terms of the applicable law. Whether these rights pertain to ownership of a digital token, claims against issuers, or rights against third parties, determining the governing law also defines the enforceability of these rights. Enforceability is particularly important when disputes arise and parties seek legal recourse.

In the United States, a federal court in New York sided with the SEC's enforcement authority over certain Coinbase cryptocurrency transactions under federal securities laws.[3] The court determined that Coinbase's cryptocurrency transactions met the criteria of being "investment contracts" under the Howey test, thus subjecting those transactions to securities regulation. Similar situations may occur in other markets, such as the EU and the United Kingdom, where securities regulators have definitive enforcement powers on tokens that resemble the characteristics of securities.

But cross-border enforceability remains challenging. For example, in 2023 the English High Court instructed a cryptocurrency exchange to transfer cryptoassets held overseas to England, following a worldwide assets freeze.[4] The exchange abroad, however, did not contest or consent to the order. In light of the obvious risk of the investor being unable to retrieve the assets, the English Court demanded the conversion into fiat currency and delivery to England so as not to disadvantage the claimant if the assets remained outside its jurisdiction.

2.4. Jurisdictional Remit

The decentralized nature of distributed ledger technology (DLT) presents complex private international law challenges, stemming from the dispersed location of nodes responsible for recording the data that form or represent the digital assets. Because tokenization can involve participants from multiple jurisdictions around the world, identifying the applicable law helps determine which legal standards are enforced. Making this determination is crucial not only for regulatory compliance but also for providing certainty to all parties involved in terms of their legal rights and obligations.

The case has been already encountered by the US Commodity Futures Trading Commission (CFTC). Within its jurisdictional perimeter, a decentralized autonomous organization (DAO)—defined as an application consisting of self-executing operational rules without a centralized management structure (Bank for International Settlements 2023)—was serving as a trading platform where holders of an Ethereum wallet could bet on the rise and fall of virtual currencies by contributing collateral currency (see D2 Legal Technology 2023).

[3]SEC v. Coinbase, Inc., No. 1:23-cv-04738-KPF (S.D.N.Y. Mar. 27, 2024) (Katherine Polk Failla, J.).

[4]Joseph Keen Shing Law v. Persons Unknown & Huobi Global Limited [2023 WL 03483927 (2023)].

The protocol was found to be operating, in practice, an illegal trading platform and unlawfully acting as a futures commission merchant.[5] The CFTC went to court and obtained a default judgment to pay more than USD600,000. It is unclear, however, against whom this judgment will be enforced. The court accepted that legal communication by the CFTC to the DAO's "chat box" was sufficient for the case of an "unincorporated association" under California law, and hence "the person"[6] had violated the law. But it remains unclear who should be paying the fine if the smart contract protocol runs by itself.

The Financial Stability Board's regulatory philosophy of "same activity, same risk, same regulation" in this policy context has already been replicated by the Hong Kong SAR Securities and Futures Commission as well as other parties. Reed Smith (2023b) points out how the individual governance of the type of tokens associated with the DAO, taking economic benefits and rights from such holding, perhaps could also be used as a legal expression to hold accountable private individuals and legal persons alike.

Common Law Courts and Digital Assets

Common law courts usually distinguish themselves for the remarkable characteristic of being agile and responsive to commercial cases. This feature holds true for legal cases involving digital tokens.

In Australia, in the case of Re Blockchain Tech Pty Ltd VSC 690, the Supreme Court of Victoria recognized Bitcoin as property under Australian law, aligning the country with the United Kingdom, New Zealand, Hong Kong SAR, and Singapore in acknowledging cryptocurrencies as property. In that case, Justice Attiwill applied the so-called "Ainsworth test," a generalized set of four criteria to determine property statuses, to Bitcoin and found that:

- a Bitcoin can be identified by its unique public key on the blockchain (Identifiable);
- its ownership is verifiable on the shared ledger, allowing control and exclusion of third parties (Third-Party Recognition);
- Bitcoin exists at a specific digital address until a transaction occurs (Permanence); and
- although Bitcoin transactions do not involve physical transfers, this fact does not negate its status as property (Alienability).

[5]See Commodity Futures Trading Commission v. Ooki DAO, No. 22-cv-5416 (N.D. Cal. 2022).

[6]The DAO was found to be a "person" for the purposes of the Commodity Exchange Act.

Hence, the court articulated that a Bitcoin, as an intangible asset, is classified as a "chose in action"—a legal right to a benefit that does not entail immediate possession of a tangible object.

Similar thinking was recorded in Singapore in B2C2 Ltd v. Quoine Pte Ltd [2019] SGHC(I) 03. A dispute arose between B2C2 Ltd, an algorithmic market maker, and the cryptocurrency exchange where it operated. Because of an operational malfunction on the platform, B2C2 executed trades on the exchange at a rate approximately 250 times the prevailing market rate at the time of the transaction. The exchange reversed the trades, asserting that they were executed in error. B2C2 brought a claim against the exchange for breach of contract and breach of trust, arguing that the platform's terms and conditions prohibited the unilateral reversal of trades. The court agreed, and the judgment definitively established cryptocurrencies as property capable of being held on trust, embedding the rights borne with it, and adapting traditional property law to emerging financial technologies.

In Hong Kong SAR, the High Court heard the case of a cyberattack on Gatecoin, a cryptocurrency exchange platform, and the subsequential loss of assets valued at USD2 million (Gatecoin Limited [2023] HKCFI 914). Once more, the court had to recognize cryptocurrencies as "property" under Hong Kong SAR law and that they can be held on trust.

The High Court's analysis was based on the common law definitions of "property." It considered the statutory definition of property in Hong Kong SAR and cases from other common law jurisdictions (including England and Wales, Australia, Singapore, New Zealand, Canada, the British Virgin Islands, and the United States). The court found that the definition is inclusive, intended to have a wide meaning. Adopting the reasoning in the Legal Statement on Cryptoassets and Smart Contracts[7] and the New Zealand case of *Ruscoe v. Cryptopia*, the court agreed with the liquidators that cryptocurrency is a type of intangible property, which is capable of forming the subject matter of a trust.

In the United Kingdom, a variety of cases have already touched on the issue of property rights. Recently, the case of *D'Aloia v. Persons Unknown and Others*[8] for the England and Wales High Court addressed the legal status of the cryptocurrency Tether (USDT). D'Aloia alleged that he was defrauded into transferring approximately GBP2.5 million worth of USDT to the first defendant via an online exchange operated by Bitkub Online Co. Ltd. The transferred USDT was subsequently moved through various accounts and ultimately withdrawn as fiat currency by unknown individuals. D'Aloia sought to trace and recover his

[7]UK Jurisdiction Taskforce, "Legal Statement on Cryptoassets and Smart Contracts" (November 2019).

[8]D'Aloia v. Persons Unknown Category A and Others [2024], EWHC 2342.

assets, asserting claims of unjust enrichment and breach of constructive trust against Bitkub.

The court held that USDT qualifies as property under English common law, aligning with the England and Wales Law Commission's stance (see the box titled "United Kingdom: The Case for a New Legal Status"). It further examined the principles of tracing and following in the context of mixed funds. The court concluded that although common law tracing through mixed funds is impermissible, equitable tracing may be possible if each unit of cryptocurrency retains a distinct identity, allowing it to be followed through different wallets and mixtures. This decision highlighted the challenges associated with tracing digital assets, emphasizing the necessity for precise court evidence when pursuing legal remedies for misappropriated cryptocurrencies.

3. INTERNATIONAL STANDARDS AND PROPOSALS

A natural step to solve these global-scale issues would be for national policymakers and regulators to collaborate on a convergent solution. As in many other areas of policymaking, international bodies of sovereign nature are already tasked with addressing these challenges. These institutions, traditionally tasked with setting standards in financial regulation and supervision or promoting financial stability, are now addressing the impending challenges embedded in the tokenization process.

A 2025 study by the Cambridge Centre for Alternative Finance at the University of Cambridge suggests that, despite global standard-setting institutions publishing comprehensive recommendations and guidelines in recent years, cryptoasset market regulation still differs significantly across jurisdictions. The study highlights how the swift adoption of tokenization engenders systemic vulnerabilities. These vulnerabilities include liquidity mismatches, leverage risks, and operational fragilities. Such risks are further compounded by tokenized markets' inherently global and cross-border characteristics.

The Cambridge Centre for Alternative Finance (2025) research further highlights how jurisdictional divergences reflect distinct policy priorities and institutional capabilities among 19 selected jurisdictions, both advanced and emerging economies. One notable trend is the growing preference for comprehensive regulatory and licensing frameworks over ad hoc or retrofitted measures. Approximately 60% of advanced economies adopted comprehensive frameworks, compared with only 20% of emerging market and developing economies. These frameworks typically encompass rules on governance, prudential requirements, and market integrity, reflecting a sophisticated understanding of the risks and opportunities in the digital finance sector. In contrast, as of mid-2024, more than 55% of emerging and developing economies in the sample pool had yet to establish formal regulations, with some opting for bans or restrictive measures, with limited effectiveness given the difficulty of enforcement in a decentralized-born and transnational market.

In the same study, some divergences were found in anti–money laundering (AML) measures, in particular for the Financial Action Task Force Travel Rule, which requires the collection and transmission of specific customer information during crypto transactions. This rule has been implemented at varying rates, with different threshold checks and evident enforcement limitations (Financial Action Task Force 2024). Similarly, the technological integration in regulatory frameworks has been evidenced mostly for advanced economies, especially in the format of blockchain analytics tools designed to enhance regulatory oversight. These tools enable real-time monitoring of transactions, improving the detection and prevention of illicit activities (Dillenberger, Novotny, Zhang, Jayachandran, Gupta, Hans, Verma, et al. 2019). For example, Hong Kong SAR

regulations mandate the use of blockchain analytics to monitor transactions and enforce AML/CFT (combating the financing of terrorism) measures effectively (Hong Kong Securities and Futures Commission 2023).

The Cambridge Centre's team concluded that the regulation of tokenization is at an early stage of development compared with broader cryptoasset regulation. Although both the Financial Stability Board (2024b) and the EU (see European Securities and Markets Authority 2023b)[9] have made strides in setting guidelines for cryptoassets, tokenization-specific rules remain limited and fragmented across jurisdictions. Advanced economies, which typically have more mature financial regulations, are leading the way in fostering tokenization by creating regulatory sandboxes, issuing targeted guidance, and/or providing exemptions to facilitate innovation. In emerging markets and developing economies, however, regulatory frameworks for tokenization are less developed, reflecting broader challenges in aligning regulatory capacities and resources.

Therefore, we next analyze the recommendations and notes from those supranational institutions directly addressing the risks inherent in financial services policies for cryptoassets and tokenization, when relevant. We also report some more fundamental proposals on legal standards and proposals from other international bodies, specifically addressing the uniformization of the law on DLT-related legalities.

3.1. OECD: Policy Implications

In early 2025, the Organisation for Economic Co-operation and Development (OECD) released a document discussing the impediments to and implications of asset tokenization and DLTs in financial markets. The OECD highlighted both the potential of asset tokenization and the challenges posed by the inconsistent legal and regulatory frameworks, regardless of the strong interests of market participants and policymakers.

OECD (2025) underscored that although the principle of technology neutrality underpins regulatory approaches across numerous jurisdictions, a substantial gap persists in establishing consistent legal frameworks capable of addressing the unique challenges posed by tokenization. Legal uncertainties surrounding ownership rights related to tokenized assets, the enforceability of smart contracts, and the cross-border recognition of digital assets hinder broader market adoption from taking up tokenization. Differences in how the legal status of digital tokens is defined and the varying recognition of tokenized ownership across different jurisdictions are the most common reason for fragmentation, inevitably undermining the operational consistency necessary for scaling tokenized financial instruments on a global level.

[9]The EU's Markets in Crypto-Assets Regulation (MiCA) came into force in June 2023. In May 2024, the European Banking Authority published three final draft regulatory technical standards under MiCA, applicable from 30 June 2024 (see European Banking Authority 2024 for links to the full technical standards).

The OECD (2025) report emphasized the imperative for global standardization and harmonization concerning both legal interpretations and regulatory oversight associated with tokenization. Although existing legal frameworks may accommodate certain elements of tokenization, they fail to adequately address specific challenges, including settlement finality on distributed ledgers and the custodial requirements for tokenized assets. The alignment of both domestic and international regulatory regimes will be necessary to enhance the clarity and cohesion of tokenized markets. By rectifying these legal inconsistencies, the financial ecosystem would be better positioned to exploit the efficiency and transparency benefits inherent in DLTs, all while maintaining robust financial stability and ensuring consumer protection.

3.2. IMF and FSB: Financial Stability and Digital Assets

The International Monetary Fund (IMF) and the Financial Stability Board (FSB) are leading global efforts to address risks in cryptocurrency markets. They collaborate closely with standard-setting bodies to develop effective policy frameworks and regulatory measures. The 2023 "IMF–FSB Synthesis Paper" (Financial Stability Board 2023) introduced a comprehensive policy implementation roadmap to enhance institutional capacity, foster cross-border coordination, and address data gaps related to these rapidly evolving digital assets (Financial Stability Board 2024a, p. 1).

Although cryptocurrency markets represent a small portion of global financial assets, their rapid recovery in late 2023 and early 2024, coupled with their growing connections to traditional finance, underscores the need for vigilant regulatory oversight. Stablecoins in particular pose significant threats to financial stability because of their potential for runs and the vulnerability of their underlying reserve assets (Financial Stability Board 2024a, p. 4).

To address these concerns and others, such as cross-border regulatory arbitrage and persistent non-compliance, jurisdictions are developing new regulatory frameworks or revising existing ones for cryptoassets and stablecoins to implement the policy and regulatory response developed by the IMF, FSB, and standard-setting bodies. A majority of member jurisdictions of the FSB and approximately half of the non-FSB Regional Consultative Group member countries anticipate achieving alignment with the FSB Framework by the end of 2025 (Financial Stability Board 2024a, p. 1).

In parallel, tokenization has emerged as a nascent yet increasingly discussed technology for issuing or representing financial assets on distributed ledgers. Although its current adoption is limited, pilot projects using DLT are steadily expanding, promising potential benefits such as increased efficiency in settlement, cost reductions, enhanced transparency, and greater flexibility for investors. However, challenges such as unclear investor demand, lack of

interoperability between DLT platforms and traditional infrastructure, and varying legal and regulatory frameworks have all hindered substantial scaling (Financial Stability Board 2024b, p. 1).

From a financial stability perspective, vulnerabilities in DLT-based tokenization—relating to liquidity, interconnectedness, and operational fragilities—mirror those in traditional finance but may manifest differently depending on design choices and regulatory oversight. Although these risks are not yet material at the current scale, authorities must address data and information gaps and promote effective cross-border supervision to ensure that tokenization, along with broader cryptoasset activities, does not undermine financial stability as it evolves (Financial Stability Board 2024b, p. 1).

Commonalities in the IMF's Recommendations on Digital Asset Regulations

The IMF recently provided a series of recommendations to the financial services authorities of Spain, Japan, Kazakhstan, and Singapore, specifically regarding cryptocurrency regulations in the context of its Financial Sector Assessment Program for fintech. Although each country has distinct economic and regulatory priorities, the IMF's guidance reveals several overarching themes. These shared recommendations reflect the broader global challenges of market integrity, financial stability, investor protection, and regulatory adaptability in the evolving digital asset ecosystem.

A commonality across all four jurisdictions is **the enhancement of regulatory oversight for crypto exchanges and service providers**. The IMF emphasizes the necessity for clear licensing requirements and strong supervision of cryptoasset service providers to mitigate risks related to fraud, illicit financial flows, and market instability. Spain, Japan, and Singapore have already established licensing frameworks, with Spain aligning with the Markets in Crypto-Assets Regulation (MiCA), Japan enforcing compliance through the Financial Services Agency (FSA), and Singapore regulating digital payment token providers under the Payment Services Act. At the time of the IMF's analysis, Kazakhstan had yet to establish a comprehensive licensing regime, with crypto transactions restricted within the special zone of the Astana International Financial Centre.

The IMF's recommendations noted a key policy aspect in the **strengthening of anti–money laundering** and combating the financing of terrorism (AML/CFT) measures. The IMF urged the four nations to enhance transaction monitoring systems, enforce "Know Your Customer" protocols, and ensure compliance with Financial Action Task Force (FATF) standards. Spain and Japan already had

stringent AML/CFT frameworks, whereas Singapore was advised to extend its regulatory reach to include custodian wallet providers and corporate digital token services. Kazakhstan, with its less developed AML framework in the crypto sector, was encouraged to increase scrutiny of crypto-related illicit activities.

An additional key point was the need for **improved investor protection mechanisms**. The volatility and speculative nature of cryptocurrencies pose significant risks to retail investors, making regulatory safeguards crucial. The IMF called for stronger transparency measures, disclosure requirements, and consumer education initiatives. Japan and Singapore have already established investor awareness programs, and Spain's compliance with MiCA is expected to enhance transparency in crypto markets. Kazakhstan, with its largely restrictive stance, was encouraged to develop investor protection measures within its regulated sandbox environment.

Another shared policy recommendation was the need for enhanced market surveillance and systemic risk monitoring. The IMF highlighted the **need for advanced regulatory tools** to detect market manipulation, price distortions, and cyber vulnerabilities in cryptocurrency markets. Japan, as a highly regulated crypto market, was advised to further refine its market surveillance through automated monitoring systems. Singapore was similarly urged to assess the risks of expanding crypto-derivatives markets. Spain's regulators are expected to integrate the EU's MiCA reporting and compliance mechanisms. In Kazakhstan, the IMF recommended a cautious but structured approach to monitoring cryptoasset activities, particularly in the mining sector.

In general, the IMF underscored the importance of **regulatory flexibility and readiness** for expansion. Given the fast-paced evolution of the crypto industry, regulators must adopt a **proactive and adaptive approach**. While Spain and Japan remain focused on refining and strengthening their existing crypto regulations, Singapore was advised to balance innovation with oversight, and Kazakhstan was encouraged to transition toward a controlled regulatory framework.

These commonalities illustrate the global imperative for harmonized and dynamic regulatory policies that safeguard financial stability while enabling responsible digital asset adoption.

3.3. UNCITRAL Model Laws

What Is UNCITRAL?

The United Nations Commission on International Trade Law (UNCITRAL) is crucial for developing a strong legal framework to support international trade and investment. It works to harmonize and modernize trade laws globally by creating and advocating for both legislative and non-legislative guidelines in various commercial law areas, including "model" laws.

The development of global standards for tokenization and digital assets has been greatly influenced by fundamental legal frameworks and model laws, particularly the UNCITRAL Model Law on Electronic Transferable Records (2017) (MLETR). A model law is a template created by international organizations, such as the UN Commission on International Trade Law, to help countries harmonize their laws, ensuring consistency across borders.

As its title suggests, this UN commission proposed a model law that can be used to establish a legal framework for the use of transferable electronic records in international trade law, a crucial aspect for the global digital economy. Tokenization, intended as the process of converting asset rights into digital tokens on a blockchain or similar technology, benefits from the MLETR's adaptable approach, which accommodates various technologies without mandating specific technological solutions.

The MLETR incorporates key principles of non-discrimination, functional equivalence, and technology neutrality, which are foundational to UNCITRAL's framework on electronic commerce. The MLETR envisions various technologies and models, including registries, tokens, and distributed ledgers, to manage electronic transferable records (UNCITRAL 2017). Under this model law, an electronic record can serve as the functional equivalent of a transferable document or instrument if it includes all necessary information and uses a reliable method to ensure the record's identification, control, and integrity from its creation to the end of its validity. Importantly, the MLETR promotes the cross-border recognition of electronic transferable records, ensuring non-discrimination against records of foreign origin, or records used internationally, while maintaining that substantive law governing traditional documents remains unaffected.

Building upon the principles established by the MLETR, we should delve into the broader taxonomy of legal issues that emerge within the digital economy. These complex challenges include the legal status of digital assets. In the context of secured transactions, these challenges manifest in determining the legal recognition of digital assets as collateral, establishing clear protocols for the

perfection and priority of security interests in intangible assets, and ensuring compliance with evolving regulatory frameworks (UNCITRAL 2023, p. 35). Digital assets are increasingly pivotal in trade, serving not only as items of exchange and objects of trade-related services but also as methods of payment, collateral for financing, investment vehicles, consumables in business operations, and tools for enhancing business processes. The integration of digital assets uses emerging technologies to deliver a range of benefits, including efficiency gains driven by automation and disintermediation, greater transparency, faster and more efficient clearing and settlement, lower barriers to investment, and enhanced access to finance for micro, small, and medium-sized enterprises (UNCITRAL 2023).

For digital asset applications such as cryptocurrencies, a holder might want to use the asset as collateral to secure a payment or another obligation. This scenario leads to the question of whether digital assets can be encumbered under secured transactions law, which may be tied to property law, allowing only objects of property rights to be encumbered. For asset-backed digital tokens, which represent a security interest in a linked asset, further questions arise about the creation, transfer, and perfection of the security interest, ensuring its effectiveness against a transferee.

Both cases raise concerns about whether secured transactions law provisions on perfection of the transaction and enforcement of the rules are suitable for digital assets. So, some jurisdictions have had to amend or adopt new concepts for secured transactions or adopt another UNCITRAL model law on transactions. This was the case for the Dubai International Finance Centre, for example (see Dubai International Finance Centre 2024).

3.4. UNIDROIT Proposal on Digital Assets and Private Law

What Is UNIDROIT?

The International Institute for the Unification of Private Law (UNIDROIT) is an independent intergovernmental organization that aims to modernize, harmonize, and coordinate private and commercial law between states and groups of states by formulating uniform law instruments, principles, and rules.

In May 2023, the UNIDROIT Governing Council approved the UNIDROIT Principles on Digital Assets and Private Law. This initiative aims to establish international standards and best practices for legal issues surrounding digital assets, allowing jurisdictions to take a unified approach. The principle of technological neutrality is crucial to ensure applicability beyond just DLT.

Key focus areas include cross-border transactions, intermediary legal positions, secured transactions, and insolvency, all of which hold significant commercial importance.

The established set of principles provides a clear understanding and assurance in commercial transactions. As soft law, the structure not only comprises a list of principles but also includes commentary to guide the States[10] in implementing those principles. The commentary provides a comprehensive understanding of the principles and helps to ensure consistency in their interpretation and application. Overall, the UNIDROIT principles act as a framework for commercial activities, facilitating better understanding and communication between parties involved as well as enhancing legal clarity.

The UNIDROIT Principles on Digital Assets and Private Law, adopted in May 2023 by the UNIDROIT Governing Council, represent a pioneering effort to standardize and clarify the legal framework that governs digital assets in international private law (UNIDROIT 2023). These principles address the intricate and unique challenges posed by digital assets, including cryptocurrencies, digital tokens, and other forms of digital property.

Of particular significance is Principle 5, which focuses on determining the applicable law for transactions involving digital assets. Aiming to provide clarity and predictability in legal proceedings, this principle is crucial for navigating the complexities of digital asset transactions across different jurisdictions.

Principle 5 seeks to strike a delicate balance between respecting national sovereignty and establishing a coherent framework that accommodates the distinctive nature of digital transactions. This balance is vital to ensure that although countries maintain their legal autonomy, a standardized approach exists to facilitate smooth and predictable international digital asset transactions. Principle 5 thus enhances legal certainty and fosters trust in the digital economy.

UNIDROIT: Balancing National Sovereignty and Coherent Frameworks

Principle 5 is not prescribing a set of minimal directives but rather is proposing a mechanism to identify which jurisdiction rule is applicable in a token transaction. It is designed to harmonize the need for national legal autonomy with the necessity of a consistent international legal framework. The fundamental idea is to ensure that digital asset transactions can be conducted with greater

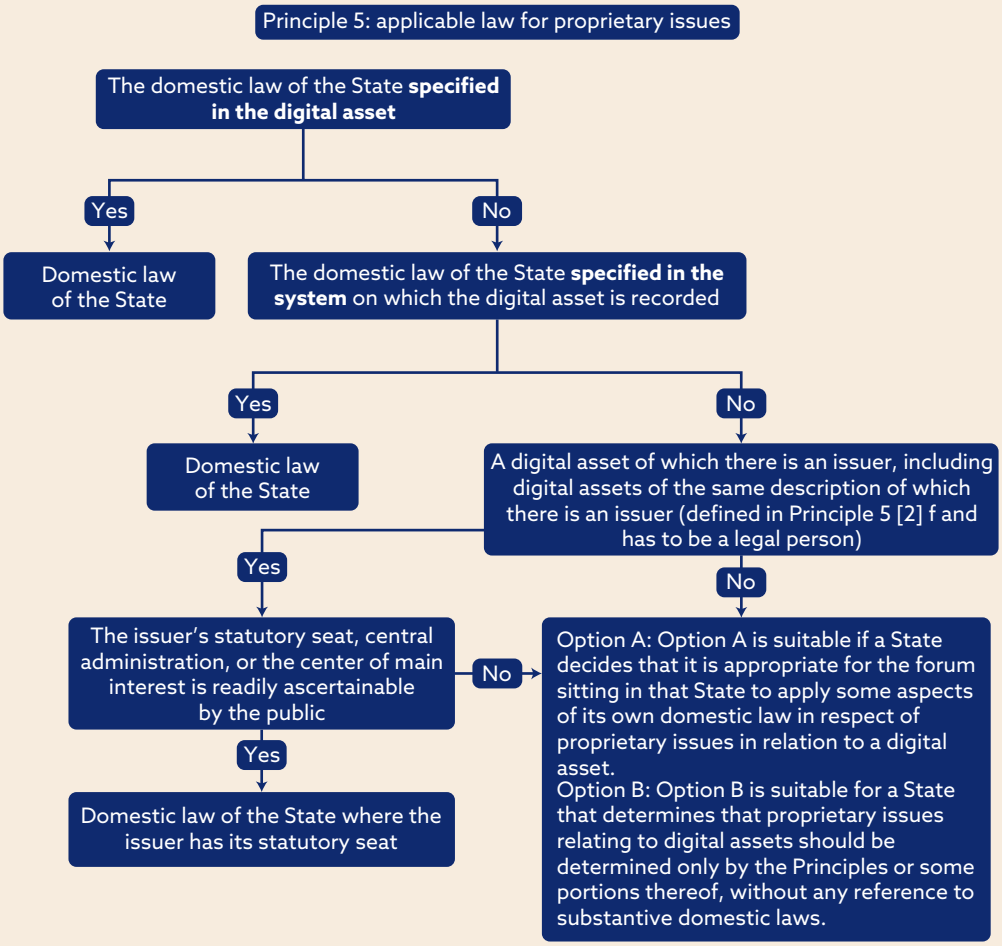
[10]The word "States" here refers to the 65 countries that are members of UNIDROIT.

legal certainty. Principle 5 approaches this goal by indirectly proposing a ranking of "legal best scenarios" based on *where there is a record of the applicable law* for the case at hand:

Digital asset > Digital System where recorded > Issuer (if legal person) > Domestic law (options).

See **Exhibit 1** for a visual depiction of Principle 5.

Exhibit 1. UNIDROIT Principle 5



United Kingdom: The Case for a New Legal Status

In 2022, the England and Wales Law Commission (a statutory independent body created to keep the law of England and Wales current) assessed whether UK common law had sufficient flexibility to accommodate digital assets. It concluded the following (England and Wales Law Commission 2023a, p. 6):

- ***On common law development:***

  "We conclude that the common law of England and Wales is, in general sufficiently flexible, and already able, to accommodate digital assets and therefore that any law reform should be through further common law development where possible."

- ***On targeted statutory law reform:***

  "We recommend targeted statutory law reform only to confirm and support the existing common law position, or where common law development is not realistically possible."

- ***On industry guidance:***

  "We recommend making arrangements for the provision of further guidance from industry experts which would support both the common law and statute."

The Law Commission proposed few targeted statutory law reforms but deemed one, related to private property rights, as "clearly required." According to the report, the two main categories of property in the jurisdiction are real property (land) and personal property (everything else). Tokens and cryptoassets fall into the latter category.

Personal property is further subdivided into "things in possession" (the possession of tangible items) and "things in action" (legal rights for financial assets such as stocks and bonds). Despite things in action not having a physical form, one can still exercise rights over them and have the law recognize ownership through those actions.

In the UK, some High Court of Justice case law has recognized that certain digital assets, particularly crypto tokens, may be considered property even if they are neither a thing in possession nor a thing in action. This is not yet a definitive principle in common law, however, because comments in old case law restrict the two categories of personal property. In this context, the England and Wales Law Commission work introduced a third category of personal property to distinguish digital assets and tokens, which do not fall easily into the existing

two types. Items in this third category must have three main characteristics, laid out in the final England and Wales Law Commission (2023a, p. 51) report:

1. Be in an electronic medium: The thing must "be composed of data represented in an electronic medium, including in the form of computer code, electronic, digital, or analogue signals."
2. Have independent existence: The thing must "exist independently of persons and exist independently of the legal system." Broadly speaking, this means that it must exist "there in the world."
3. Be rivalrous: The thing must "be something whose capacity for use is not unlimited; people must therefore compete with one another for it. More formally, a resource is rivalrous if use of the resource by one person necessarily prejudices the ability of others to make equivalent use of it at the same time."

The England and Wales Law Commission work culminated in a proposed Property (Digital Assets etc.) Bill, introduced in September 2024, with the explicit scope to "unlock" the development of the common law and confirm the approach taken in recent UK High Court judgments.[11]

[11]See Property (Digital Assets etc.) Bill [HL], https://bills.parliament.uk/bills/3766.

4. JURISDICTIONAL ANALYSIS

This section provides a brief, non-exhaustive description of current policies and rules related to digital assets and tokens for various jurisdictions. We aim to highlight steps taken at a federal or country level to meet the challenges highlighted earlier.

4.1. Switzerland

The Swiss Distributed Ledger Technology Bill is a significant development in Switzerland's legal framework for blockchain and cryptocurrency regulation. Initiated by the Swiss Federal Council in 2019 and enforced in 2021, the bill updated 10 different federal laws, including the Code of Obligations, the Federal Act on Private International Law, and the Debt Enforcement and Bankruptcy Act.[12] Overall, its scope adapted the existing Swiss federal laws to accommodate the advancements in blockchain technology, particularly focusing on securities and trading systems.

Switzerland's strategy for overseeing DLT and cryptocurrencies is thus grounded in its existing securities laws, rather than necessitating entirely new regulations. This approach promotes the integration of new technologies within the long-established Swiss legal system. The DLT Bill included targeted measures for ledger-based securities, enabling the tokenization of assets such as shares and bonds and streamlining their transfer and trading via blockchain technology (Kaur 2023). As a result, asset tokenization has become more feasible in Switzerland, promoting innovation in the realm of financial transactions and asset management.

The DLT Bill introduced a novel type of market infrastructure known as DLT trading facilities. These facilities, specifically created to function under the supervision of the Swiss Financial Market Supervisory Authority (FINMA), provide services such as trading, settlement, and custody of DLT-based assets, all without needing additional licenses. By establishing this regulatory framework, the Swiss government aimed to strengthen the operational capabilities of blockchain entities by offering a well-defined legal structure that promotes secure and efficient operation of DLT systems.[13]

Furthermore, the legislation aimed to address concerns regarding AML by broadening the reach of the Anti-Money Laundering Act to encompass activities linked with DLT trading facilities. This approach guarantees that the same strict

[12]The DLT Bill covered the Code of Obligations, the Federal Intermediated Securities Act, the Federal Act on Private International Law, the Financial Services Act, the National Bank Act, the Banking Act, the Financial Institutions Act, the Anti-Money Laundering Act, the Financial Market Infrastructure Act, and the Debt Enforcement and Bankruptcy Act. See www.pwc.ch/en/insights/regulation/swiss-dlt-new-regulations.html.

[13]A top location for DLT and blockchain entities, Switzerland is a key financial center in the blockchain sector. The famous Swiss Crypto Valley was born out of a myriad of blockchain and fintech startup companies that settled in the city of Zug thanks to existing regulation and supervision of FINMA, which readily issued the first licenses to these companies in 2015 (Kaur 2023).

protocols implemented for customary financial transactions are also enforceable for operations carried out via DLT platforms.

The resulting legislation preserves the financial system's integrity while combating potential financial crimes. The Swiss DLT Bill provides a substantial example of efforts to integrate blockchain technology into the financial sector while improving legal certainty and investor protection.

4.2. European Union

Within the European Union, policymakers were first to make an extensive set of rules on cryptoassets while concurrently supporting the principles of "same activities, same risks, same rules" and "technology neutrality." In practice, this approach led to the creation of the Markets in Crypto-Assets Regulation (MiCA), which came into force in June 2023. In Article 2, MiCA lists the types of digital assets excluded from such regulation. Most relevant for this discussion is that it "does not apply to cryptoassets that qualify as financial instruments." MiCA applies only to cryptoassets that are not covered by existing EU legislation and, in particular, by the Markets in Financial Instruments Directive (MiFID II), the cornerstone of EU securities regulations.

MiCA and LEI: Which Entities Must Have an LEI?

A legal entity identifier (LEI) is a 20-character, alphanumeric code that allows for identification of legal entities participating in financial transactions.

MiCA requires crypto-related entities to be identified, including cryptoasset service providers and participants in cryptoasset transactions (comprising cryptoasset exchanges and trading platforms). The European Securities and Markets Authority will maintain a register of cryptoasset white papers, of issuers of asset-referenced tokens and e-money tokens, and of cryptoasset service providers.

The regulatory approach implies that entities are uniquely and consistently identified. It also underscores the consistency of FATF recommendations on its Travel Rule.

The provisions of MiCA therefore imply that tokenized assets that resemble securities or, more broadly, EU transferable instruments are excluded by default. We note, however, that MiCA's definition of cryptoassets is distinct from the definition of DLT financial instruments introduced by the DLT Pilot Regime (see more in Section 5.2), which refers to the limited types of financial instruments that can be admitted to trading or recorded on a DLT market infrastructure.

MiCA provided a comprehensive framework for the oversight of cryptoassets, thereby standardizing their regulation within the EU. The provisions of this legislation were designed to take effect in two distinct phases in 2024.

The first phase, effective in mid-2024, primarily affected credit institutions, e-money institutions, and newly authorized asset-referenced tokens (ARTs) issuers, including custodians responsible for the assets backing these tokens. This initial phase focused on the issuance and trading of two types of stablecoins: ARTs and electronic money tokens (EMTs). ARTs are backed by a basket of assets, which can include both fiat and non-fiat currencies, whereas EMTs are solely backed by a single fiat currency.[14]

The second phase took effect at the end of 2024, extending MiCA's reach to all other types of cryptoassets and related services, including those not covered in the first phase. This phase also applied to entities offering cryptoasset services to EU clients and provided a grace period for existing cryptoasset service providers to register.

To support the implementation of MiCA, the European Securities and Markets Authority (ESMA) and the European Banking Authority are expected to develop further delegated acts and guidelines. These will cover a wide range of regulatory technical standards (RTS) and implementing technical standards (ITS), including the authorization of cryptoasset service providers, the management of conflicts of interest, and trade transparency.

4.3. United Kingdom

The United Kingdom took a holistic view of the need for digital asset policies. It launched a variety of programs, culminating in October 2023 when HM Treasury delineated its regulatory framework for fiat-backed stablecoins, signaling intentions to incorporate the Financial Market Infrastructure Special Administration Regime for pivotal entities within the digital settlement assets domain, especially those deemed systemic.

Simultaneously, the UK's legislative cornerstone Financial Securities and Markets Act was reissued in a new format, with a variety of digital asset references and key definitions. This reissuance also conferred on HM Treasury and the financial regulatory bodies the authority to revamp regulations of digital assets settlement for stablecoins, alongside their payment systems. This legislative development laid the groundwork for subsequent, now long-awaited, secondary legislation that would elaborate on these regulatory approaches in greater detail.[15]

[14]See Ashurst (2023b) for details on the implementation phases.

[15]In November 2024, the FCA started publishing a series of documents on crypto regulation, including the FCA Crypto Roadmap, which contains key dates for the expected publication of a set of regulations for crypto in the United Kingdom, to be completed by 2026.

Another policy modification launched in September 2023 to fortify the AML measures with the implementation of the FATF's Travel Rule for cryptoassets. This mandate requires cryptoasset exchange providers and custodian wallet providers to collect, verify, and disseminate information pertaining to certain transactions.

Furthermore, October 2023 saw the introduction of new controls regarding financial promotions involving cryptoassets. These measures include prohibitions on investment incentives, the institution of a cooling-off period for novice crypto investors, the imposition of mandatory risk warnings, the requirement for annual client categorization, and the imposition of rigorous standards for the approval of promotions. The Financial Conduct Authority acted swiftly against instances of non-compliance, issuing a multitude of alerts on the first day of the new regulations' implementation.

To sustain all of these measures, the England and Wales Law Commission (2023a) embarked on a proposal addressing personal property rights and the legal status of digital assets to proactively integrate these assets into its financial regulatory framework (see the box titled "United Kingdom: The Case for a New Legal Status"). By striking a balance between fostering innovation and ensuring rigorous oversight, these measures aim to preserve market integrity and safeguard consumer interests.

4.4. India

India's regulatory approach to what it defines as virtual digital assets (VDAs) has evolved significantly in recent years and continues to do so. Like many other countries, in 2023 India integrated VDAs into its legal system by amending its core AML regulation with the introduction of virtual asset service providers (VASPs), as envisioned by the FATF (see India Ministry of Finance 2023).

India's regulatory approach has faced challenges. In 2018, the Reserve Bank of India imposed a ban on entities dealing with VDAs, reflecting concerns about financial stability and illicit activities. The Indian Supreme Court subsequently overturned this ban in 2020 (Saha 2024), leading to a reassessment of regulatory strategies.

According to Field (2024), the Securities and Exchange Board of India has proposed to oversee digital assets classified as securities, including activities such as initial coin offerings. Likewise, the public is under the impression that the Reserve Bank of India (RBI) views private digital currencies as a macroeconomic risk (Field 2024). RBI addressed concerns related to financial stability and monetary policy, as well as the creation of a central bank digital currency (Mills 2024).

The Department of Economic Affairs is tasked with formulating the overarching policies for the digital asset sector. As of February 2025, the anticipated consultation paper has not yet been formally published (Asoodani 2025).

Recent official statements suggest that the government continues to reassess its position, taking into account evolving international perspectives and emerging regulatory models. Economic Affairs Secretary Ajay Seth noted that India is revisiting its stance on virtual assets in response to shifting global attitudes, indicating a flexible and adaptive approach to formulating a comprehensive regulatory framework (Ohri 2025).

A regulatory framework for digital assets is expected from the International Financial Services Centres Authority (IFSCA), the regulatory body established to oversee and develop financial products, services, and institutions within the International Financial Services Centre, a special economic zone in the state of Gujarat. As of December 2024, IFSCA (2024) has stated that it does not regulate crypto exchanges, cryptocurrencies, or related virtual assets issued within the Gujarat International Finance Tec-City (GIFT City). In September 2023, however, IFSCA created an Expert Committee on Asset Tokenization to explore and provide recommendations on this subject.[16] These efforts aim to establish clear regulations for tokenizing real and physical assets, including a thorough examination of the legal validity of smart contracts and other related aspects. According to certain market players, IFSCA already has projects in its regulatory sandbox for tokenization of real estate, bonds, and fund units (Binance Square 2024).

4.5. Mainland China

As of January 2025, mainland China continues to maintain stringent regulations on cryptocurrency activities, viewing digital assets as a threat to financial stability (CMS 2024). On 15 September 2021, the People's Bank of China, the Office of the Central Cyberspace Affairs Commission, the Supreme People's Court, the Supreme People's Procuratorate, the Ministry of Industry and Information Technology, the Ministry of Public Security, the State Administration for Market Regulation, the China Banking and Insurance Regulatory Commission, the China Securities Regulatory Commission, and the State Administration of Foreign Exchange jointly issued the Circular on the Further Prevention and Handling of the Speculation Risk in Virtual Currency Trading (Yinfa [2021] No. 237; the "Circular"). It declared all cryptocurrency transactions illegal, reaffirming the country's unwavering stance against cryptocurrency-related activities (Wen 2022). This issuance marked the first significant update to mainland China's AML law since its adoption in 2007 (Katte 2024).

On 1 September 2023, a report entitled "Identification of the Property Attributes of Virtual Currency and Disposal of Property Involved in the Case" was published by a People's Court in China, which conducted a thorough analysis of the legal status of virtual assets. This analysis concluded that within the current legal framework, virtual assets are recognized as legal property, affording them protection under the law. The report further acknowledged the economic attributes of virtual currencies, categorizing them as property. It also examined

[16]Further details on the Expert Committee on Asset Tokenization are available at https://ifsca.gov.in/IFSCACommittees.

the appropriate methodologies for the disposition of virtual assets implicated in legal proceedings (Jha 2023; Yingzi 2022). This perspective aligns with previous court decisions in mainland China. For instance, in May 2022, the Shanghai High People's Court recognized Bitcoin as virtual property subject to property rights, affirming that individual ownership of cryptocurrencies is legally protected (Wang and Yang 2022; Yingzi 2022).

In 2024, the Supreme People's Court of China, along with the Supreme People's Procuratorate, undertook a revision of their interpretation of the AML Law. This revision extended the definition of money laundering to encompass transactions involving virtual assets, thereby formally recognizing such transactions as recognized methods of money laundering (Katte 2024).

On 27 December 2024, mainland China instituted new regulations mandating that banks monitor and report on high-risk foreign exchange and cryptocurrency transactions, with the objective of mitigating illegal cross-border financial activities. The State Administration of Foreign Exchange (SAFE) recently disseminated a notice directing banks to meticulously track transactions associated with underground banking, cross-border gambling, and illicit cryptocurrency activities (People's Republic of China 2024).

These developments suggest that, notwithstanding the rigorous regulatory framework concerning cryptocurrency trading and related financial services, the judicial system in mainland China recognizes the property characteristics of virtual assets and supports the legal entitlements of individuals to possess such assets. This dual approach allows mainland China to maintain stringent control over its financial system and monetary policy by restricting the integration of decentralized cryptocurrencies into the broader economy while respecting individual property rights by acknowledging personal ownership of digital assets.

4.6. Singapore

Singapore, widely known for innovation in finance, has taken a pragmatic approach to establishing the legal status of digital assets. Although the government has not issued new laws, various resolutions from Singaporean courts have affirmed legalities for digital assets. One ruling of particular importance came from Singapore's High Court in 2023,[17] specifically addressing a declaration that cryptocurrency payments wrongfully transferred (by a fintech firm from one investor account to another) were held on constructive trust. This implied that digital assets can be classified as "things in action," like the personal property rights for the UK proposal, and therefore token owners' rights are most likely enforceable in a Singaporean court. This ruling offers much-needed clarity on the legal status of cryptoassets and ensures that traditional common law principles can be applied to safeguard parties' cryptoassets in relevant cases (Cramer 2023).

[17]See ByBit Fintech Ltd v. Ho Kai Xin and others [2023], SGHC 199.

In parallel, the Monetary Authority of Singapore (MAS) has systematically developed and refined a regulatory framework centered around the Payment Services Act (PSA), which has undergone amendments to broaden its scope to encompass various dimensions of digital payment tokens (DPTs) and associated services.

The amended PSA incorporates all the key measures expected in financial services, including the custody of DPTs, the facilitation of transactions between DPT accounts, and the execution of cross-border money transfers involving DPTs irrespective of whether these transactions directly involve the receipt of money within Singapore. Notably, as of April 2024, there is clear guidance for service providers to segregate customer assets from their own and safeguard them in trust accounts, implying fiduciary duties and the consequential rights attached to this legal status (Monetary Authority of Singapore 2024).

Moreover, entities presently engaged in these activities are compelled to notify MAS and apply for a license within predetermined timeframes to ensure the legality of their continued operations. Recent updates to the regulatory framework also spell out specific guidelines for asset management, the maintenance of accurate records, and the establishment of robust systems aimed at protecting customer assets.

These regulatory initiatives underscore Singapore's dedication to fostering a secure and resilient environment for digital asset transactions while promoting the expansion of its digital economy. Through its continuous adaptation of the regulatory framework in response to the dynamic landscape of digital finance, MAS exemplifies a proactive stance in regulatory oversight within this rapidly evolving sector.

4.7. United Arab Emirates

The United Arab Emirates (UAE) has developed distinct regulatory frameworks for digital assets, reflecting its unique complexity in jurisdictions. The UAE itself consists of diverse jurisdictional structures, with multiple emirates and financial centers, and yet distinct and interrelated regulatory frameworks. These frameworks aim to promote innovation within the digital asset sector while ensuring investor protection and maintaining market integrity.

The UAE policies for cryptoassets are primarily overseen by federal authorities, notably the Securities and Commodities Authority (SCA) and the Central Bank of the UAE (CBUAE). Their frameworks govern activities related to virtual assets and embed the necessary elements of AML standards. Two key regulations are the SCA's Crypto Assets Activities Regulation (CAAR) and the CBUAE's Payment Token Services Regulation.

Issued in 2020, CAAR provides guidelines for the offering, issuance, listing, and trading of cryptoassets within the UAE. It mandates that VASPs—the entities

engaging in these activities—obtain the necessary licenses from the SCA, with all the usual consequences for regulated firms.

The Payment Token Services Regulation prohibits parties from performing payment token services within the UAE or directing such services to persons in the UAE unless licensed or registered with the SCA. It also restricts the issuance and use of certain types of tokens, such as algorithmic stablecoins and privacy tokens. The CBUAE has also approved the AE Coin, a stablecoin directly linked to the UAE currency at par and with controls by the CBUAE (Gulf News 2024).

Solely for the Emirate of Dubai, the Virtual Assets Regulatory Authority (VARA) regulates all crypto activities, excluding the financial free zone of the Dubai International Financial Centre (DIFC) (see Kandathil 2024). VARA's sole purpose is the regulation of virtual assets, which under the applicable law are defined as a "digital representation of value that may be digitally traded, transferred, or used as an exchange or payment tool, or for investment purposes."[18] VARA's regulatory framework is activity based, including licensing requirements and compliance standards. It is a deliberate policy choice to focus on the services provided by VASPs rather than on specific types of tokens (Reed Smith 2023a).

The Dubai Financial Services Authority (DFSA), operating within the DIFC, introduced a "Crypto Token regime," enabling financial services firms to offer services for crypto tokens (see Kandathil 2024). These services are defined as a medium of exchange or for payment or investment purposes, excluding investment tokens or other types of investments (Dubai Financial Services Authority 2022).

Unlike VARA, the DFSA's regulatory framework is asset-centric, focusing on specific crypto tokens that fall within its scope. The DFSA maintains a list of recognized crypto tokens, which currently comprises tokens such as Bitcoin, Ether, Litecoin, Toncoin, and Ripple. This approach ensures that only approved tokens are permitted within the DIFC (Sullivan, Dougall, Lightstone, and Doench 2024). In early 2024, the DIFC enacted the Digital Assets Law No. 2 of 2024, defining the legal characteristics of digital assets within its jurisdiction for the purposes of property law and giving certainty on how digital assets can be controlled, transferred, and managed by relevant parties (Shanahan and Pirbhai 2024).

The Emirate of Abu Dhabi is home to the Abu Dhabi Global Market (ADGM), a financial free zone with its own legal and regulatory framework, which has been particularly proactive in regulating digital asset activities through its Financial Services Regulatory Authority (FSRA). As early as 2018, ADGM introduced a comprehensive framework to regulate spot cryptocurrency asset activities, encompassing exchanges, custodians, and other intermediaries.

[18]See the Government of Dubai Virtual Assets Regulatory Authority, "Law No. (4) of 2022 Regulating Virtual Assets in the Emirate of Dubai" (2022), https://rulebooks.vara.ae/rulebook/law-no-4-2022-regulating-virtual-assets-emirate-dubai, p. 2.

This framework addresses key risks associated with cryptocurrency activities, including money laundering, consumer protection, and technology governance.

ADGM's approach aims to integrate digital assets into its broader financial services ecosystem, fostering innovation while maintaining robust regulatory oversight (Abu Dhabi Global Market 2018). In December 2024, the FSRA released a new regulatory framework for stablecoins, making them a distinct regulated activity. The goal is to minimize stablecoin value risks through strict reserve asset rules, independent audits, transparent disclosures, capital requirements, and guaranteed redemption rights (Abu Dhabi Global Market 2024).

Although the UAE wishes to establish itself as a prominent jurisdiction in the realm of digital assets, its variety of approaches may not be conducive to doing so. For example, a VASP operating in/from Dubai requires a license from VARA that is also, by default, with the SCA for the scope of servicing the wider UAE. But those operating out of any other Emirates must be licensed by the SCA to do so. Again, the CBUAE explicitly prohibits merchants from accepting virtual assets as payment unless specific conditions are met, such as the use of a licensed payment token. But the ADGM regulation of stablecoins does not extend to the CBUAE licensing regime, and therefore they are categorized as Foreign Payment Tokens.

4.8. Hong Kong SAR

In 2023, Hong Kong SAR was recognized as the most "crypto-ready jurisdiction" globally for its proactive approach to developing the virtual asset sector (V. Chan 2024). Perhaps this recognition is the good result of its government policy, as envisioned by the Financial Services and the Treasury Bureau (FSTB) of the Hong Kong SAR Government back in October 2022. This policy acknowledged that virtual assets "may not fit squarely into the current private property law categories or definitions in Hong Kong" (Government of the Hong Kong Special Administrative Region 2022, p. 4). It also indicated a willingness to reevaluate property rights pertaining to tokenized assets in the future (see V. Chan 2024), which occurred in a court case a year later.[19]

In terms of the regulatory framework, the regulations governing virtual assets in Hong Kong SAR primarily revolve around two distinct licensing regimes for virtual asset trading platforms (VATPs). One is under the Securities and Futures Ordinance (Cap. 571) for VATPs dealing in at least one "security" token, and the other is under the Anti-Money Laundering and Counter-Terrorist Financing Ordinance (Cap. 615) for VATPs dealing in non-security tokens such

[19]In the landmark case of Re Gatecoin Limited (in liquidation) [2023] HKCFI 91, the Hong Kong Court of First Instance applied the four criteria for "property" from National Provincial Bank v. Ainsworth [1965] AC 1175 and ruled that cryptocurrencies meet the criteria to be considered "property" under Hong Kong law and can be held on trust.

as Bitcoin and Ether.[20] These regimes operate side by side and impose various requirements on licensed platforms, including token due diligence, investor protection, client asset custody, and AML/CFT measures.[21]

Beyond trading platforms, other virtual asset activities are also being brought under regulation. Over-the-counter (OTC) virtual asset services will require licensing, reflecting concerns about potential fraud and money laundering (PwC 2024). The Hong Kong Monetary Authority (HKMA) is developing a proposed licensing regime for stablecoin issuers, requiring fully backed reserve assets and a minimum paid-up share capital. Launched in March, the HKMA's stablecoin issuer sandbox attracted significant industry interest and formal applications from well-prepared institutions (D. Chan 2024).

Meanwhile, the HKMA and the Insurance Authority have issued or adapted licenses for virtual banks (Hong Kong Monetary Authority 2025) and virtual insurers (V. Chan 2024), respectively, under a broadly technology-neutral approach that applies existing supervisory standards to these new market entrants.

4.9. United States

The US market for digital assets is as relevant for global business as it is complex because of ingrained legalities. Built on a layer of state versus federal jurisdictions, securities versus commodity agency realms, and opposing political views, the legal status of a digital asset is anything but established. Given the many political changes underway in the United States as of this writing in January 2025, we propose an inexhaustive view of what trends may occur.

4.9.1. Legal Status

In 2019, the state of Wyoming introduced the Digital Assets Act[22] to bring digital assets under its secured transactions law.[23] This act defines a digital asset as a representation of economic, proprietary, or access rights stored in a computer-readable format, encompassing digital consumer assets, digital securities, and virtual currency.[24]

In 2022, amendments made to the Uniform Commercial Code (UCC) recommended that US states update their commercial laws that oversee the transfer of digital assets, including cryptocurrency, digital tokens, and NFTs. With the introduction of Article 12 "Controllable Electronic Records" (CERs),

[20]See Cap. 571 "Securities and Futures Ordinance," www.elegislation.gov.hk/hk/cap571, and Cap. 615 "Anti-Money Laundering and Counter-Terrorist Financing Ordinance," www.elegislation.gov.hk/hk/cap615.

[21]Pre-existing VATPs benefited from a transitional "non-contravention period" until 31 May 2024, with "deemed licensed" status granted to those that applied for a license by 29 February 2024.

[22]United States, Wyoming Statutes, Title 34, Chap. 29, sect. 101(a)(i).

[23]Uniform Commercial Code (UCC), art. 9, as adopted in Wyoming: Wyoming Statutes, Title 34.1.

[24]United States, Wyoming Statutes, Title 34, Chap. 29, sect. 101(a)(i).

the UCC aims to deal with the transfer of property rights in digital assets that can be controlled while excluding those not amenable to such control.

The Article 12 definition excludes digital assets already governed by other commercial laws—for example, asset-backed tokens that are deemed securities—while still facilitating the negotiability of CERs by enhancing the security interest priority for parties who achieve control over these digital assets. CER control is intended as the capability of a person to derive full benefit from the asset. It assumes that others are prevented from accessing the asset and from transferring its control to another party. This control may be established through such mechanisms as cryptographic keys or multi-signature wallets (McGowen 2023).

Several important changes were also implemented in other sections of the UCC to account for the distinct nature of digital assets. These changes include the creation of new classifications for intangible property and adjustments to rules regarding priority and control. The updates are designed to align the legal framework with the digital era, as well as to resolve issues related to ownership, transfer, and security interests in digital assets (Feldman 2024).

Article 12 also addresses how competing interests in a digital asset are to be resolved, an issue of growing concern in the Web3 space. In theory, the amendments will now be introduced for consideration by individual states. With the US political landscape changing so rapidly, however, there may be drastic repercussions on digital asset policies at the federal level.

4.9.2. Federal Agencies

At the end of January 2025, newly inaugurated President Donald Trump issued an executive order titled "Strengthening American Leadership in Digital Financial Technology," aiming to bolster the US position in the digital asset and financial technology sectors. The order emphasized supporting the responsible growth of digital assets and blockchain technology, safeguarding individual rights to access and use public blockchain networks, and promoting the development of lawful dollar-backed stablecoins to maintain the US dollar's sovereignty. It also sought to ensure fair access to banking services and provide regulatory clarity through technology-neutral frameworks. Notably, the order prohibited the establishment or use of central bank digital currencies within the United States, citing concerns over financial stability, individual privacy, and national sovereignty (White House 2025).

At the same time, the acting chair of the US SEC, Mark T. Uyeda, officially announced the establishment of a specialized cryptocurrency task force (US Securities and Exchange Commission 2025). The primary objective of this task force is to formulate a comprehensive and coherent regulatory framework for digital assets for the US securities regulator. The task force seeks to depart from the SEC's historical focus on enforcement actions, which have often resulted in ambiguity. Rather, it intends to prioritize the development of

unequivocal regulatory guidelines, facilitate practical registration processes, create coherent disclosure frameworks, and allocate enforcement resources with prudence.

At the time we concluded this research in February 2025, a bipartisan bill titled the Guiding and Establishing National Innovation for U.S. Stablecoins Act of 2025 (GENIUS Act) had reached the US Congress. It represents a significant step toward establishing a comprehensive regulatory framework specifically for the asset class of "payment stablecoins." The GENIUS Act seeks to resolve longstanding disputes regarding the balance of state and federal oversight of stablecoin issuers. The act defines a stablecoin issuer as a permitted entity that may operate as a subsidiary of an insured depository institution, an uninsured trust bank, or a nonbank entity, subject to regulatory approval.

The proposed GENIUS Act addresses some of the financial stability concerns with stringent reserve, liquidity, and risk management requirements, ensuring that all stablecoin issuers maintain one-to-one backing of their digital assets with liquid reserves. The bill also clarifies that payment stablecoins are not securities, although their classification as commodities remains ambiguous. Notably, it limits the Federal Reserve's role in direct oversight, shifting much of the regulatory authority to the Office of the Comptroller of the Currency and state-level regulators. Moving forward, the bill faces deliberation in Congress, where competing legislative proposals, regulatory agency feedback, and bipartisan negotiations will shape its final form. If enacted, the GENIUS Act could become a defining piece of legislation governing the intersection of digital assets and the traditional banking system (DavisPolk 2025).

The US government's overarching goal appears to be leading the digital asset market and therefore imprinting a regulatory landscape, theoretically to safeguard investors, promote capital formation, and nurture innovation (US Securities and Exchange Commission 2025). This initiative, however, involves extensive collaboration with SEC staff, the general public, stakeholders from industry, members of Congress, and various federal agencies. It is therefore premature to make firm statements on what the framework for asset tokenization might look like in the near future.

5. REGULATORY SANDBOXES AND TOKENS

This section introduces the concept of regulatory sandboxes, explores sandboxes for digital assets, and examines key features of regulatory sandbox initiatives in key markets such as United Kingdom, the EU, Singapore, and Switzerland.

5.1. Regulatory Sandboxes and Their Use

The introduction of regulatory sandboxes in financial services marked a significant shift of regulatory agencies toward embracing innovation while ensuring market stability and consumer protection. Initially pioneered by the UK's Financial Conduct Authority, the concept quickly gained global traction, with such jurisdictions as Singapore, Switzerland, and the EU, among others, adopting similar frameworks. According to data from the Cambridge Centre for Alternative Finance, research suggests that more than 80 sandboxes exist around the world (Cambridge Centre for Alternative Finance n.d.).

The idea behind a regulatory sandbox is simple: Provide industry with a controlled environment for testing technology innovations applied to financial services that may or may not fit the current regulatory framework. This approach equips the industry with an environment for testing innovation, often on real consumers, under the supervision of a regulatory authority. Likewise, it provides the regulator with a risk management framework for innovation but also an opportunity to study industry enhancements up close—and subsequently create or modify its regulations. The approach allows for the fine-tuning of regulations in response to the fast-paced technological advancements in finance, ensuring that the legal framework supports growth and innovation without compromising the financial system's integrity.

No two sandboxes are the same, but most aim to provide a testing platform for innovative products and services (Bains and Wu 2023). The classification spectrum is somewhat wide and becomes more complex as technology does, but some features are common across borders. For example, most sandboxes include the opportunity for live-testing tokenized products or services on real consumers. Participants have a limited amount of time to prove their business model, and they act under the regulator's supervision throughout the testing period. Several legal restrictions, mostly client related, are put in place, and the testing entity keeps reporting to the regulator in a manner not dissimilar from that of an authorized firm (Bains and Wu 2023).

Regulatory Genome Data Analysis for Crypto Regulations

The Regulatory Genome Project (RGP) at the University of Cambridge is a collaborative initiative dedicated to refining and promoting an open information structure tailored to facilitate the systematic organization and comparative analysis of global financial regulations. At its core is the Cambridge Regulatory Genome (CRG), an innovative information architecture designed to categorize financial regulations across jurisdictions effectively.

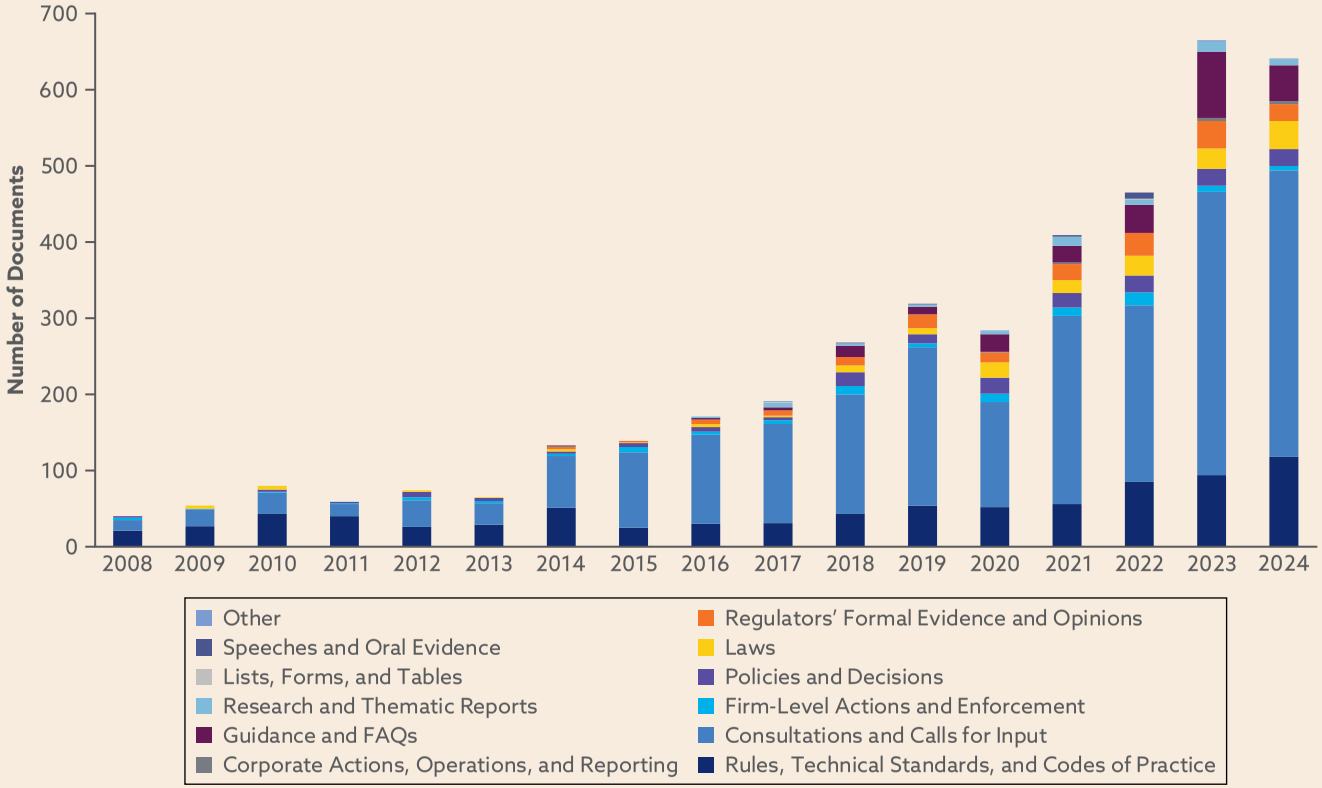
The RGP benefits from the innovative research at Cambridge Judge Business School and RegGenome regulatory data, a regulatory data technology company. The CRG analysis allows the mapping and matching of regulatory text to specific principles and recommendations of standard-setting bodies. Using proprietary AI technology, the documents are further classified for their text in specific topics as related to crypto by AI technology.

The current analysis of the RGP database for crypto regulations is composed of 17 jurisdictions (Australia, Bahamas, Bermuda, British Virgin Islands, Canada, Cayman Islands, EU, France, Hong Kong SAR, Ireland, Luxembourg, Portugal, Singapore, Spain, UAE, United Kingdom, and United States), and it assembles more than 4,018 distinct policy documents, categorized by type of legal instrument (laws, regulations, guidance, etc.).

As illustrated in **Exhibit 2**, the data indicate that most policy documents have been issued in the last five years. These have been mostly consultations, and they focused on IOSCO Recommendation 4 (Client Order Handling), which relates to fairness in trading and requirements for compliance of systems, and Recommendation 5 (Market Operation Requirements), with a focus on pre- and post-trade disclosures.

Further detailed analysis of the documents' content, using CRG standards, suggests that regulators are primarily concerned with risks related to cryptoasset exchange rules, requirements for brokers operating on exchanges, risk assessments of cryptoassets, and custody/wallet requirements. **Exhibit 3** provides an illustration.

Exhibit 2. Number of Documents by Publication Date



Source: Regulatory Genome Project.

Exhibit 3. Content Breakdown by Specific CRG Tag

Source: Regulatory Genome Project.

5.2. Sandboxes for Digital Assets

For financial regulators and policymakers, the creation of a regulatory sandbox tailored to DLT is the latest form of this type of forward-thinking initiative. This setup is particularly beneficial for understanding the nuanced implications of blockchain applications in the infrastructure for finance, ranging from tokenization of assets to smart contracts and decentralized finance platforms.

The characteristics mentioned for regulatory sandboxes sprang to life in the context of financial asset-backed blockchain matters, specifically to provide a testing environment for infrastructure, intermediaries, and securities on a blockchain. Multiple jurisdictions are currently running such programs, with various degrees of effectiveness.

Exhibit 4 summarizes the important aspects of various digital sandbox initiatives undertaken thus far in the United Kingdom, the EU, Singapore, and Switzerland.

5.2.1. UK Digital Securities Sandbox (DSS)

In December 2024, HM Treasury introduced new legislation to launch the UK Digital Securities Sandbox (DSS), a cornerstone of the United Kingdom's strategy to position itself as a global leader in the adoption and innovation of cryptoasset technologies and investment opportunities. The DSS aims to enable certain financial market infrastructure providers and market participants to trial the use of new technology such as DLT in capital markets.

The Bank of England (BoE) and the Financial Conduct Authority (FCA) are working together to operate the DSS. Firms applying to the DSS can perform activities usually carried out by central securities depositories, such as issuing, maintaining, and settling financial securities. Moreover, they can combine these activities with those of a trading venue, which can lead to the creation of innovative business models. The UK authorities envision real digital securities trading in the DSS, such as equities, corporate and government bonds, money market instruments, fund units, and even emissions allowances. The scope of the DSS, however, excludes the trading and settlement of derivatives contracts and of "unbacked cryptocurrencies," such as Bitcoin and Ethereum (Bank of England 2024).

The DSS will provide temporary waivers or modifications of legal requirements that may otherwise restrict the use of such technology. As certain requirements are waived or modified, it could pave the way for significant advancement of the digital capital markets. But such progress is not meant to forgo the safeguarding of financial stability. Because of the experimental nature of the technologies involved at large scales, the BoE will set limits on the amount of securities that can be issued in the DSS.

Exhibit 4. Digital Sandbox Characteristics by Region

Aspect	United Kingdom	European Union	Singapore	Switzerland
Regulatory framework	Digital Securities Sandbox (DSS)	DLT Pilot Regime	FinTech Regulatory Sandbox, Sandbox Express, Sandbox Plus	Fintech Regulatory Sandbox, Unregulated Sandbox, Innovator License
Regulatory bodies	BoE and FCA	ESMA	MAS	FINMA
Eligibility criteria	A UK-based entity that plans to engage in trading, notary settlement, and maintenance activities related to asset issuance, trading, settlement, or maintenance.[a]	DLT Multilateral Trading Facility (DLT MTF); DLT Settlement System (DLT SS); Combined DLT Trading and Settlement System (DLT TSS); Temporary Authorizations for New Entrants.[b]	Any firm looking to apply technology in an innovative way to provide new financial services that are regulated by MAS.[c]	The Unregulated Sandbox enables accepting public funds up to CHF1 million without oversight. The "banking license light," or Innovator License, allows accepting public funds up to CHF100 million.[d]
Key characteristics	The DSS enables regulators to decide how to permanently amend the current trading and settlement regime to incorporate new technologies. It allows operators, for the first time, to merge settlement activities with those of a trading venue within a single legal entity. The Sandbox is available to UK-registered firms and runs for five years.[b]	The DLT Pilot Regime provides a controlled environment for DLT market infrastructures to develop and test DLT-based business models for up to six years.[e]	The FinTech Regulatory Sandbox facilitates technology innovation in financial services, later introducing Sandbox Express for quicker market testing. Sandbox Plus enhances support for firms with innovative products, expanding eligibility to early technology adopters and offering a streamlined application process with financial grants. Sandbox Express allows market testing within 21 days for eligible applicants.[a]	Fintech start-ups can utilize the Unregulated Sandbox to test market acceptance. The Innovator License is available to various companies, particularly in payments and blockchain, and provides a cost-effective way to launch and grow a fintech business model in the market.[d]

[a]Bank of England (2024).

[b]European Securities and Markets Authority (2023a).

[c]Monetary Authority of Singapore (2021).

[d]Baker McKenzie (2020).

[e]Freshfields (2023).

The DSS is structured into stages with increasing levels of permitted activities, allowing firms to advance through a series of checkpoints. This structured approach helps manage financial stability risks and could lead to a new regulatory framework if firms meet set standards. Additionally, the DSS will enable regulators to assess and potentially revise the current regulations framework governing securities to accommodate new technological advancements.

The BoE and FCA clearly want to promote the application of new technology, such as distributed ledgers, and improve the efficiency of post-trade processes. If implemented successfully, the adoption of the DSS could result in significant savings and cost-effective protocols for UK financial market participants.

5.2.2. EU DLT Pilot Regime

The EU Distributed Ledger Technology Pilot Regime came into effect on 23 May 2023, with the establishment of the DLT Pilot Regime (the DLT Regulation; see Eur-Lex 2022) and the associated guidelines published by ESMA (the DLT Guidelines; see European Securities and Markets Authority 2022). It allows trading, clearing, and settlement of DLT-based transferable securities within the meaning of Art. 4(1)(44) of Financial Instruments Directive II 2014/65/EU (MiFID II) on a multilateral trading facility (MTF) within the meaning of the directive.

The regime is designed to be accessible for both existing financial market participants and new entrants, provided they meet certain criteria. To participate, entities must apply for specific permissions to operate DLT-based market infrastructure—namely, a DLT Multilateral Trading Facility (DLT MTF), a DLT Settlement System (DLT SS), or a DLT Trading and Settlement System (DLT TSS). The regime aims to enable market infrastructure operators to test the application of DLT in the issuance, trading, and settlement of tokenized financial instruments. Interested potential participants must submit an application, and once approved, they will be granted a temporary authorization to operate a specific DLT market infrastructure, also known as DLT MI. As part of the program, firms can apply to be exempted from certain requirements under the Markets in Financial Instruments Regulation (MiFIR), MiFID II, and/or Central Securities Depositories Regulation (CSDR). These exemptions are significant because they allow firms to experiment with DLT in a way that would otherwise be prohibited or subject to regulatory ambiguity.

For instance, DLT MIs might receive exemptions from certain transaction reporting requirements under MiFID II, provided they maintain comprehensive records accessible to competent national authorities. Similarly, DLT SSs may be exempt from requirements related to dematerialization and securities accounts, subject to adequate compensatory measures that safeguard the integrity of transactions and financial instruments (Ashurst 2023a).

The application process requires detailed information submission to the national-level authorities, including business plans, technical descriptions of the DLT to be used, and proposed operational models. Importantly, applicants must also outline how they intend to address potential risks and ensure investor protection. ESMA provides guidance, the DLT Guidelines, through standard forms, formats, and templates to streamline this process.

In April 2024, ESMA provided feedback to EU policymakers on the implementation of the DLT Pilot Regime, highlighting several key challenges (European Securities and Markets Authority 2024). A primary issue was the absence of central bank digital currencies, which complicates cash settlement processes. Although the regime allows for innovative solutions such as tokenized commercial bank money or e-money tokens, the misalignment with the authorization timelines of MiCA has hindered the availability of such settlement options. Additionally, uncertainties surrounding the use of self-hosted wallets as well as the specific roles and responsibilities in custody services have created ambiguity for potential applicants. Interoperability concerns between DLT and traditional market infrastructures, as well as among different DLT systems, further exacerbate the complexity, making it challenging for DLT multilateral trading facility operators to find compatible settlement systems.

ESMA also stressed that the current thresholds for DLT financial instruments are perceived as low, potentially undermining the competitiveness of the regime. The uncertainty regarding the duration of the DLT Pilot Regime also contributes to hesitancy among potential applicants; the perceived time limitations may deter investment in necessary infrastructure. In May 2024, the EU Commissioner for financial services reiterated EU support to the program and its ongoing work to clarify legal issues as the market signals their existence, while also stating that the regime has no expiration date.

In conclusion, the DLT Pilot Regime is a significant experiment in integrating emerging technologies within European financial markets. It offers a structured and regulated framework for exploring the benefits and challenges of DLT, potentially setting the stage for broader adoption and regulatory adjustments based on empirical evidence and operational experiences gathered during the pilot phase. Nevertheless, as of January 2025, only one DLT trading and settlement system is registered with ESMA.

5.2.3. Singapore Fintech Regulatory Sandbox

On 6 June 2016, the MAS published a consultation paper outlining proposed guidelines for the implementation of a "regulatory sandbox." This initiative allows both regulated financial institutions and non-financial players to explore and experiment with innovative financial technology (fintech) solutions within a controlled regulatory framework (Monetary Authority of Singapore 2022).

MAS launched Sandbox Express in August 2019 to provide insurance brokers and market operators with a quicker means of testing innovative financial services and products in pre-defined environments. In November 2021, MAS introduced Sandbox Plus, with three upgrades to its existing Fintech Regulatory Sandbox framework. These three upgrades consist of (1) an expansion of the eligibility criteria to include early adopters of technology innovation; (2) a simplified application process to provide more effective one-stop assistance for firms looking to introduce innovative products and services; and (3) participation in Deal Fridays, a platform for deal-making opportunities allowing sandbox companies to access the external investor community and benefit from the network, mentorship, and funding. Taken together, these enhancements aim to offer firms a more efficient solution for introducing innovative financial services or products.

The primary objective of MAS in introducing the regulatory sandbox is to foster an environment conducive to innovation in the financial sector.[25] This initiative seeks to position Singapore as a leading smart financial center by facilitating the integration of safe and innovative technologies into the financial industry. The sandbox serves as a testing ground for new financial services and technologies, allowing participants to evaluate their utility and market potential without the full spectrum of regulatory requirements typically applicable to financial entities.

Participants in the MAS regulatory sandbox include a range of entities, from established financial institutions to emerging fintech startups. These participants are afforded the opportunity to test innovative products and services, such as artificial intelligence–driven asset management tools, blockchain-based payment systems, and big data analytics for risk assessment. This flexibility includes temporary relaxations of certain regulatory requirements, such as those related to technology risk management, outsourcing guidelines, and the stringent requirements typically applied to new market entrants concerning capital adequacy and track records. Additionally, MAS is also running Project Guardian, which involves working with policymakers and the financial industry to test the feasibility of asset tokenization and decentralized finance applications.

In short, the MAS regulatory sandbox represents a significant step forward in Singapore's fintech landscape, reflecting a nuanced balance between regulatory oversight and the encouragement of innovation. By providing a structured yet flexible regulatory environment, MAS not only supports the growth of fintech within Singapore but also sets a benchmark for regulatory frameworks globally, promoting broader adoption of emerging technologies in the financial sector. This initiative aligns with Singapore's strategic vision of becoming a global leader in smart financial services, enhancing its competitive edge in the international financial marketplace.

[25]MAS is encouraging more fintech experimentation so that promising innovations can be tested in the market and have a chance for wider adoption, in Singapore and abroad (Monetary Authority of Singapore 2022).

5.2.4. Switzerland Fintech Regulatory Sandbox

The financial landscape of Switzerland has been shaped significantly through its innovative regulatory frameworks that are specifically customized for fintech companies. The Swiss Fintech Regulatory Sandbox is one of the vital components of this ecosystem, aimed at supporting new business models without the full burden of traditional financial regulations. In the resulting environment, emerging fintech startups can develop and test their products and services in a controlled yet flexible regulatory space (Flühmann and Hsu 2024).

The Swiss Fintech Regulatory Sandbox was introduced to address the limitations that fintech firms face under traditional regulatory frameworks, which often require stringent capital, liquidity, and organizational standards. Typically out of reach for most startups, such standards hinder companies' ability to innovate and grow in the early stages. In response, Swiss financial market regulators created two primary forms of regulatory sandboxes: the "Unregulated Sandbox" and the "Innovator License" (Baker McKenzie 2020).

The Unregulated Sandbox allows any entity, primarily fintech companies in their initial market testing phase, to accept up to CHF1 million without any specific conditions. These funds cannot be invested or accrue interest, however. Additionally, the company must inform all customers in writing that the business is not regulated by FINMA.

The Innovator License is available to companies that satisfy certain criteria related to capital adequacy, liquidity, and organizational structure. Similar to the Unregulated Sandbox, funds received from the public under this license cannot be invested or earn interest.

Participating in the sandboxes is a straightforward process. The Unregulated Sandbox requires no formal application. For the Innovator License, however, firms must submit detailed documentation about their business model, plan, and organizational structure to FINMA. The review process is thorough but typically takes a few weeks or months, depending on the complexity of the application and FINMA's workload.

As firms expand beyond the sandboxes, they may transition to applying for a full banking license. This progression demonstrates the success of the sandbox in nurturing fintech startups and preparing them to meet more rigorous regulatory requirements.

In conclusion, the Swiss Fintech Regulatory Sandbox offers a significant step toward integrating innovation within the financial sector's regulatory framework. It promotes fintech growth while aligning with broader financial stability and consumer protection objectives by providing structured yet flexible regulatory oversight.

5.2.5. United States

Some US federal agencies have developed what can be defined as initiatives to support fintech innovation rather than full regulatory sandboxes. The Consumer Financial Protection Bureau (2019), for instance, introduced the Compliance Assistance Sandbox, which enables businesses to test financial products and provides an opportunity for firms to develop consumer-friendly innovations in a manner consistent with existing regulations. Similarly, the Office of the Comptroller of the Currency (2019) launched the Innovation Pilot Program, specifically designed to facilitate financial institutions in exploring novel banking solutions within a structured compliance framework.

In the world of securities regulation, the CFTC launched LabCFTC in 2017 to provide testing space for emerging technologies, such as blockchain and smart contracts, particularly within commodities and derivatives markets. LabCFTC serves as a focal point for fintech innovation and ensures that the CFTC remains an effective and proactive regulator (Commodity Futures Trading Commission 2017). The SEC has a similar function in its Strategic Hub for Innovation and Financial Technology (FinHub), which fosters engagement between regulators and fintech companies seeking to navigate compliance challenges in securities markets (US Securities and Exchange Commission 2018).

Beyond federal initiatives, several US states have implemented their own regulatory sandboxes, often targeting fintech, cryptocurrency, and insurance innovation. Arizona pioneered the first state-led regulatory sandbox in 2018, offering companies a two-year window to test financial products with reduced regulatory constraints without full licensure, provided they comply with consumer protection standards (Arizona Attorney General's Office 2018). In 2021, Utah introduced a broader regulatory sandbox, distinct in its industry-agnostic approach, that allows businesses in various sectors to explore innovative models free from full regulatory obligations. Similarly, Wyoming, a state recognized for its progressive stance on blockchain and cryptocurrency regulation, launched a fintech sandbox in 2020 to align with its broader efforts to position itself as a hub for digital asset businesses. West Virginia and Nevada have also joined this movement, with West Virginia focusing on financial technology applications in banking, lending, and payments, while Nevada has developed a specialized sandbox for insurance technology firms.

Despite their potential benefits, these state-run regulatory sandboxes face several challenges. A key concern lies in the legal and regulatory uncertainty arising from variations between state and potentially new US federal frameworks. This fragmented approach can create inconsistencies, making it difficult for companies operating across multiple US states to comply with evolving regulatory requirements (Rossi Martins 2021).

6. CONCLUSION AND POLICY RECOMMENDATIONS

The need for clarity on the legal status and treatment of digital tokens

The evolving landscape of tokenization necessitates a legal and regulatory framework that provides clarity, fosters market confidence, and ensures interoperability across jurisdictions. Establishing the legal status of tokens is fundamental to fostering trust and enabling market expansion. Regulatory clarity reduces uncertainty, encouraging investment and innovation in tokenized assets. Furthermore, legal frameworks must define the links between real-world assets and their digital representations, particularly in terms of property rights. Such definition will ensure enforceability and reduce ambiguity in ownership claims.

The UNCITRAL Model Law on Electronic Transferable Records (MLETR) offers a robust foundation for integrating electronic rights into legal systems. Its principles can be leveraged to support tokenized assets. Developing explicit legal rights attached to tokens through legislative measures will provide greater certainty than relying on evolving court precedents. Such a proactive legal framework will reduce litigation risks and improve predictability.

Diverging regulatory approaches create friction in the adoption of tokenization across jurisdictions. The lack of harmonized case law and legislative frameworks complicates global transactions involving digital assets. UNIDROIT's work on digital assets and private law provides a valuable reference for addressing legal convergence challenges. Its principles can facilitate harmonization among diverse regulatory regimes.

The need for industry and regulators to establish rules and processes to facilitate network interoperability

In a digital world where decentralization is hailed as a key feature and benefit permitted by distributed ledger technology, a dichotomy is growing between public networks that embrace disintermediation and private networks that favor control and security. Interoperability will be key to understanding how these networks will work together across a multitude of jurisdictions or legal systems.

Interoperability for tokenized assets is the ability of different blockchain networks, operating within financial systems under their regulatory frameworks, to seamlessly communicate, transact, and enforce rules across jurisdictions. But true interoperability extends beyond technical compatibility—such as cross-chain communication protocols—to include legal and regulatory alignment. The latter should be not an overlapping of sets of rules but rather the alignment

of similar policy requirements in determining applicable laws and regulations. For tokenization to succeed, especially in fully decentralized protocols, harmonization of standards and clear legal frameworks for asset ownership will be key to cross-border transactions.

The need for harmonized rules on the regulatory treatment of digital assets at an international level, while clarifying the regulatory scope of respective agencies in each jurisdiction

The financial sector has reached some degree of harmonization in digital asset regulations, particularly in the areas of anti–money laundering, through international standards. These regulations can serve as a model for broader tokenization regulations. Although regulatory sandboxes offer an effective means of refining legal frameworks, they do not resolve fundamental property rights issues. The legal status of tokens must be firmly established outside experimental settings.

Despite cryptoassets being the epitome of unprecedented technical arrangements in financial transactions, the primary differences in judicial approaches toward digital asset regulation among the United States, the United Kingdom, Singapore, Hong Kong SAR, India, the United Arab Emirates, Europe, and mainland China stem from their respective legal traditions and existing regulatory frameworks. For instance, the United Kingdom, leveraging its common law system, has adopted a flexible approach by recognizing digital assets as a new category of personal property, ensuring adaptability in legal interpretations. Singapore and Hong Kong SAR align closely with the United Kingdom, recognizing digital assets as property under common law but not yet as a new category. India has taken an evolving but restrictive stance, initially banning cryptocurrencies and later imposing taxation and AML compliance measures without clear classification. Mainland China outright bans cryptocurrency transactions but paradoxically recognizes digital assets as property for legal protection in civil disputes. The UAE has comprehensive but differing rules under different regimes. Meanwhile, the EU has taken a comprehensive regulatory-first approach through MiCA, providing harmonized rules across member states and integrating the existing securities regulations. The United States, which has followed a fragmented approach with federal agencies, such as the SEC and CFTC, and state regulators.

The need to harmonize definitions used to qualify digital assets and how their property rights are recognized across jurisdictions

Despite jurisdictional disparities, a convergence trend is visible in the recognition of digital assets as property and in AML/CFT compliance mandates following the FATF's Travel Rule. The United Kingdom, Singapore,

and Hong Kong SAR have aligned in acknowledging cryptoassets as intangible property under common law principles, while the EU and UAE emphasize comprehensive licensing regimes. The IMF, FSB, and OECD advocate for cross-border harmonization, particularly in regulatory enforcement and investor protection. A global approach should focus on aligning definitions of digital assets, cross-border recognition of property rights, and interoperability among legal frameworks. Additionally, fostering mutual recognition agreements among jurisdictions, particularly in dispute resolution and tokenized asset classification, would enhance legal clarity and facilitate cross-border digital asset transactions.

The need for regulatory developments to stay adaptive and maintain technological neutrality, while regulators should be gearing up for stronger market surveillance capacities, including via enhanced disclosure requirements

Global regulatory cooperation should be prioritized to promote seamless tokenization frameworks across borders. Legislation must provide explicit recognition of property rights associated with tokenized assets to ensure enforceability. Institutions like UNCITRAL and UNIDROIT should be leveraged to create uniform rules for digital assets. Policymakers should adopt an adaptive regulatory approach that accommodates technological advancements while ensuring legal certainty. Moreover, stronger regulatory safeguards, including disclosure requirements and market surveillance, should be implemented to protect stakeholders in the token economy. By implementing these recommendations, jurisdictions can create an environment that fosters innovation while maintaining financial stability and legal integrity in the growing tokenized economy.

7. FUTURE RESEARCH

At this stage of the development of digital finance, CFA Institute is continuing to explore possible implications for capital market dynamics, industry practices, and regulation. We would like next to further examine the following areas:

- **The crucial issue of custody in the digital asset world and the necessity of applying existing principles related to client asset safekeeping.** Regulators are still grappling with determining whether specific rules need to apply to digital assets and the underlying blockchain technology. We would like to bring greater clarity to this debate and explore policy recommendations.
- **The implications of digital finance development for financial stability.** International organizations such as the Financial Stability Board have explored potential risks to financial stability related to cryptoassets. As the market develops and the range of digital instruments gains in depth and breadth, we believe investment professionals will need further analysis of the interconnection between the traditional and digital finance worlds, including the role played by leverage in the digital sector.

This question will continue to animate policy discussions among securities markets regulators, who are focusing on conduct matters and risk management, while prudential regulators and central banks will want to propose macro-prudential measures aimed at limiting the interlinkages with traditional financial institutions. CFA Institute would like to propose an analysis that could lead to policy recommendations to reconcile both positions.

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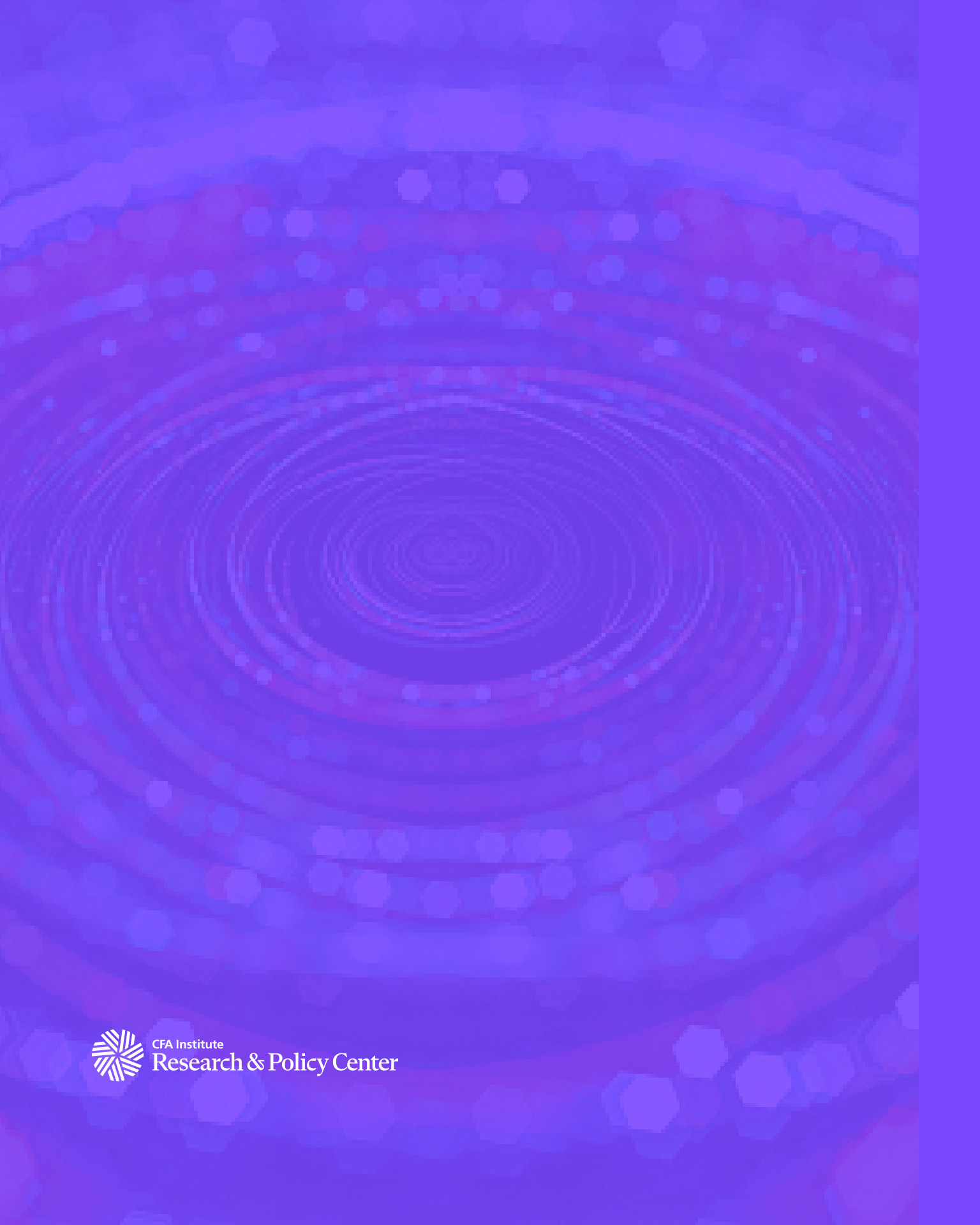
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