



UK
FINANCE

In partnership with

 OliverWyman

UNLOCKING THE POWER OF SECURITIES TOKENISATION

How the UK can lead digital
transformation and consolidate
its role as a global financial centre



ABOUT UK FINANCE

UK Finance is the collective voice for the banking and finance industry. Representing more than 300 firms across the industry, it seeks to enhance competitiveness, support customers and facilitate innovation. Our primary role is to help our members ensure that the UK retains its position as a global leader in financial services. To do this, we facilitate industry-wide collaboration, provide data and evidence-backed representation with policy makers and regulators, and promote the actions necessary to protect the financial system. UK Finance's operational activity enhances members' own services in situations where collective industry action adds value. Our members include both large and small firms, national and regional, domestic and international, corporate and mutual, retail and wholesale, physical and virtual, banks and non-banks. Further information is available at www.ukfinance.org.uk.

UK Finance Key Contacts

Conor Lawlor

Managing Director, Capital Markets & Wholesale Policy
conor.lawlor@ukfinance.org.uk

Kevin Gaffney

Director, Capital Markets & Wholesale Policy
kevin.gaffney@ukfinance.org.uk

Yvonne Deane Harte

Principal, Capital Markets & Wholesale Policy
yvonne.deaneharte@ukfinance.org.uk

Alberto Sicari

Analyst, Capital Markets & Wholesale Policy
alberto.sicari@ukfinance.org.uk

ABOUT OLIVER WYMAN

Oliver Wyman is a global leader in management consulting. With offices in more than 70 cities across 30 countries, Oliver Wyman combines deep industry knowledge with specialised expertise in strategy, operations, risk management, and organisation transformation. The firm has more than 6,000 professionals around the world who work with clients to optimise their business, improve their operations and risk profile, and accelerate their organisational performance to seize the most attractive opportunities. Oliver Wyman is a business of Marsh McLennan [NYSE: MMC]. For more information, visit www.oliverwyman.com. Follow Oliver Wyman on Twitter @OliverWyman.

Oliver Wyman Key Contacts

Lisa Quest

Partner, Head of UK and Ireland, Co-Head of the Public Sector and Policy Practice Europe
lisa.quest@oliverwyman.com

Jason Ekberg

Partner, Oliver Wyman
jason.ekberg@oliverwyman.com

Ben Reeve

Partner, Oliver Wyman
ben.reeve@oliverwyman.com

Elizabeth Hoyler

Engagement Manager, Oliver Wyman
elizabeth.hoyler@oliverwyman.com

Emma Orcutt

Associate, Oliver Wyman
emma.orcutt@oliverwyman.com

Leo Sizaret

Senior Consultant, Oliver Wyman
leo.sizaret@oliverwyman.com

Brian Toperesu

Senior Consultant, Oliver Wyman
brian.toperesu@oliverwyman.com

TABLE OF CONTENTS

Foreword	2
Executive summary	4
1. The UK's position today	7
1.1 State of tokenised securities issuance	7
1.2 The key enablers of securities tokenisation	8
1.3 Learning from other jurisdictions	11
2. Why tokenisation (and the UK's position on it) matters	14
2.1 The impact of tokenisation	14
2.2 Where are the benefits of tokenisation unlocked?	16
3. Next steps for the UK	21
3.1 How the tokenised securities market might be structured	21
3.2 The operational roadmap for the UK	22
3.2.1 Mission One — Enable innovation and experimentation, underpinned by legal and regulatory certainty	24
3.2.2 Mission Two — Foster a flourishing UK digital market by promoting interoperability and safe innovation at scale	28
3.2.3 Mission Three — Become a leader in global standards for the tokenised securities market	29
4. Conclusion	30
Acknowledgements	30
Disclaimer	31

FOREWORD

Technological innovation can provide a greater level of access to a broader range of financial products and services if harnessed in the right way. Many countries and economies around the world are approaching technological innovation as a key driver for growth within financial markets. In the absence of continued action, the UK risks falling behind more forward-leaning jurisdictions. Establishing the UK as a leader in the tokenisation of the capital markets must be a key imperative to protect our international competitiveness as a global financial centre. It is a top priority for UK Finance.

We welcome the government's recent focus on the tokenisation of regulated securities, which can support a regulatory regime that enables dynamic international cooperation advocating for proportional, outcomes-focused, and technologically neutral regulation. As regulation evolves, we must clearly distinguish between unbacked cryptocurrencies and applications of distributed ledger technology to real world assets, such as equities and bonds. This report specifically addresses the second category.

We would like to thank the stakeholders, market participants, companies, and our members across the market that gave us their time. This report brings together thought-provoking perspectives from around 30 interviews and working sessions with the industry—representing wholesale banking participants, capital market services and infrastructure providers, Ministers and government officials, regulators and other trade bodies, to build a common understanding of how the tokenisation of real assets using blockchain technologies will impact financial markets. We had a great responsibility to reflect on those views and show leadership in the recommendations reached. We would like to thank Oliver Wyman for its support on this journey.

We have also researched what other jurisdictions are doing. As findings emerged from Oliver Wyman's global research reach, conclusions drawn were tested and refined with our membership.

If the recommendations of this report are embraced, the UK can quickly consolidate its leadership and protect the financial services industry's ability to grow and innovate. This report is not the final word. Coalescing industry standards and interoperability will require close collaboration and urgent concerted action with government, regulators, market participants, and other trade and professional bodies.

I believe the conversation around securities tokenisation is just the beginning of a much wider digital transformation — including everything from digital money to digital identification. This is a pivotal moment for the international community to build the necessary infrastructure to ensure that these innovations are rolled out safely and achieve their truest potential. This report can be a guide to shepherd us from our current moment towards a more advanced, innovative financial market, with the UK at the helm.

Bob Wigley
Chairman of UK Finance



FOREWORD

Digital assets have the potential to transform the way capital and financial markets work, and this transformation is worth pursuing given the benefits the technology introduces. Tokenisation allows assets (including those traditionally illiquid, like real estate) to be accessed by more investors and “fractionalised” such that investors can own a portion if they cannot otherwise afford the whole. There are also operational efficiencies (such as the potential for instant settlement). This report goes into more detail as to the benefits that can be unlocked, but the message is clear: the tokenisation of financial assets through distributed ledgers and blockchain technologies has tremendous potential to shift the way assets are managed and leveraged.

Yet tokenisation, while exciting, must be approached in a thoughtful and considerate way to maximise potential. There must be close collaboration between government and industry to develop a regulatory regime that can encourage innovation, the eventual interoperability of solutions, and the development of supranational standards that will govern industry activity globally.

This is not a nice-to-have.

The UK is already home to one of the world’s global financial centres and it has deep capital markets. Ensuring its markets remain world-class, and underpinned by the technology that will power markets of the future, is key for its competitiveness. While the country has made strong momentum around legal and regulatory frameworks for tokenised securities, as well as HM Treasury’s exploration of applying DLT to the debt issuance process, more can and should be done to plant a flag and signal to the industry that the UK government is taking this seriously. There is otherwise a risk that innovative firms will move elsewhere.

This report offers a path forward for the UK that builds on existing strengths, learns from others, and gets out ahead of other jurisdictions in this area. To do this, the report addresses three key questions:

1. **What is the UK’s position today?** What is the UK’s current positioning on securities tokenisation relative to other jurisdictions? What are the key enablers observed elsewhere, and what can the UK learn from them?
2. **Why does tokenisation (and the UK’s position on it) matter?** What benefits can be achieved if the UK embraces this technology?
3. **What are the next steps for the UK?** What steps does the UK need to take, both in the short term and over the next few years, to embrace this opportunity?

Lisa Quest
Partner, Head of UK and Ireland
Co-Head of the Public Sector and Policy Practice Europe
Oliver Wyman



EXECUTIVE SUMMARY

There is a growing consensus among capital markets participants that tokenisation (the digital representation of real financial assets) can transform the financial system, and the UK should be at the centre of this transformation.

Tokenisation refers to the digital representation of financial assets using distributed ledger technology (DLT). This report focuses on tokenisation of securities including vanilla flow instruments (equities, bonds, loans, and money markets), traditionally illiquid products (such as real estate), and structured finance.¹ It includes securities issued natively on the blockchain, as well as “hybrid” models.² Potential benefits of tokenisation include increased operational efficiencies (e.g., instant settlement as a potential outcome), access to new asset classes (by tokenising traditionally illiquid assets), lower transaction costs, lower asset servicing costs, and the ability to better manage certain risks, such as counterparty risk (via immutable data and programmable smart contracts). These benefits have yet to be realised at scale as the markets, globally and in the UK, are in such early stages. Indeed, tokenised issuances are still a fraction of traditional securities issuance. Estimated digital bond issuances in recent years are less than 1%, for example, of the \$20.6 trillion issued globally in long-term fixed income instruments in 2021.³ The UK still has time to establish itself as a leading hub for tokenised securities. To do so, government and industry must act now in partnership to ensure that the UK tokenisation market is world leading. Failure to act will result in the UK losing an opportunity to consolidate its position as a top global financial centre.

The UK has built positive momentum around tokenisation from a legal and regulatory perspective especially, but issuance activity has been minimal in the UK.

Legislation in civil law jurisdictions such as France, Switzerland, and Luxembourg, for example, have provided clarity around the treatment of digital assets, and initial issuances have followed. The UK is exploring legal reforms to support digital assets, including tokenised securities.

English common law already puts the UK on a strong legal footing, as outlined in the summaries of existing law within the UK Jurisdiction Taskforce’s Legal Statements⁴ on cryptoassets and smart contracts, on digital dispute resolution rules, and digital securities. The Law Commission has also shown thought leadership in its recent final report on digital assets. The report confirms that English and Welsh law is supportive of digital assets (including tokenised securities) within the UK. The Law Commission further recommends two areas of statutory reform. Firstly, that legislation should confirm the existing common law position that digital assets are capable of attracting personal property rights. Secondly, that statute should clarify the digital securities models falling within scope of the existing Financial Collateral Arrangements (No.2) Regulations (FCARs), and provide a framework for crypto-token collateral arrangements outside of FCARs’ scope.⁵ The Financial Conduct Authority (FCA) has also already clarified that tokenised securities fall within the regulatory perimeter.

1 Currently, industry tokenisation activity is concentrated in flow products, but illiquid products are where many industry participants feel the most significant value can be unlocked over the longer term. Fund tokenisation has also been described as a compelling opportunity.

2 In this paper we use the term “tokenised securities” to include securities that are digital representations on DLT of existing traditional securities, as well as securities issued only on DLT that have new features (such as programmability) and that are dependent on the design of each token. Some in the industry refer to the latter as “security tokens,” but we adopt the definition put forward by HMT in their consultation on a “Future Financial Services Regulatory Regime for Cryptoassets”, i.e. any cryptoasset which uses a technology such as DLT to support the recording or storage of data and already meets the definition of a specified investment under the Financial Services and Markets Act 2000 (Regulated Activities) Order 2001, and is therefore already subject to regulation. We exclude tokens which are issued alongside a traditional bond to authenticate and verify, e.g. ESG credentials. Refer to recommendations around terminology under Mission One. “Hybrid” models of tokenisation exist where only part of the securities lifecycle is tokenised. The most extensive forms of tokenisation — which are also the furthest from the current models in financial markets — are “native” models where the entire lifecycle is on the blockchain. In a native model, the asset is legally recognised in its digital form (rather being a “mirror” of an existing security) and custodied on-chain.

3 Source for long-term fixed income issuance: 2022 SIFMA Capital Markets Fact Book. Estimates of digital bond issuance vary and depend on the transactions in scope, as well as data availability. Issuance estimations based on publicly available data, company press releases and ICMA’s compendium of New FinTech Applications in Bond Markets. The same caveats apply as summarised in Figure 2.

4 Refer to the UK Jurisdiction Taskforce (UKJT) legal statements on digital dispute resolution rules in May 2020 [here](#), cryptoassets and smart contracts in May 2021 [here](#), and the legal statement on digital securities in February 2023 [here](#).

5 See the Law Commission’s 2023 final report on Digital Assets [here](#).

There is, however, recognition that the current UK regulatory regime could adapt to allow for greater flexibility in implementing tokenisation initiatives. There are welcome efforts already underway in the UK. The Financial Services and Markets (FS&M) Act, outlined upcoming reforms, including those allowing His Majesty's Treasury (HMT) to introduce financial market infrastructure (FMI) regulatory Sandboxes for DLT projects. The FMI Sandbox will launch later this year. There has also been a consultation from HMT on the "Future Financial Services Regulatory Regime for Cryptoassets"⁶, and the FCA is expected to consult on a future regime for custody of tokenised securities. The Prudential Regulation Authority (PRA) is also in the process of clarifying accounting and prudential requirements for cryptoassets (including tokenised securities) and has noted the Basel Committee for Banking Supervision (BCBS) 545 standard published last year.⁷ The Bank of England (BoE) is exploring digital cash solutions including — through its real-time gross settlement (RTGS) upgrade — encouragement of private sector digital cash solutions, and potentially through its own wholesale central bank digital currency (CBDC).⁸ These efforts are welcome, especially as prudential requirements and digital cash solutions were consistently noted as key enablers for market innovation. Further steps to increase the flexibility of the regulatory framework will build on these activities and give further confidence to industry to increase investment and participate.

While the UK may be behind some other jurisdictions with regards to tokenised securities issuances, it is not irrevocably so.

2022 saw a range of tokenisation initiatives launched across the globe — reflecting the emergence of tokenisation as an area of focus for the wholesale banking community — but these initiatives were largely experimental. Additionally, most initiatives so far have tokenised specific parts of the lifecycle (a so-called "hybrid" approach). While there have been tokenised security issuances, there have been no instances where the security is tokenised end-to-end across the entire lifecycle (e.g., including using the security as collateral after issuance). Pioneering initiatives, however, such as the European Investment Bank (EIB) digital bond issuances are meaningful steps forward and there is growing interest for large-scale native issuances in the future. The market infrastructure in other leading jurisdictions is still largely reliant on traditional approaches that involve multiple intermediaries. The UK still has time to catch up and learn from other jurisdictions, furthering the momentum it has already built.

Several lessons can be learned as to how other jurisdictions are approaching tokenisation.

Efforts must span legal and regulatory frameworks, market infrastructure, and government support to trial new models and applications of the technology. Leading jurisdictions have focused first on putting in place the legal and regulatory frameworks that give industry participants the confidence to interact with tokenised securities. They have brought together industry participants to innovate and set clear rules of the road, thereby incentivising and fostering safe innovation to support growth.

The tokenisation market could evolve along three structures:

- The first market structure (characterised by siloed ledgers) is one of experimentation where the industry and regulators grow comfortable with the technology in a wholesale environment.
- A second market structure is where previously siloed ledgers become interoperable and wholesale institutions begin to use these technologies to tokenise previously illiquid assets.
- A third market structure is when ledgers become universal, and all financial instruments are tokenised.

To support the UK market's development, there are three "missions" that the UK government and industry should urgently pursue.

Each mission introduces activities that the UK can undertake immediately. Efforts to achieve these missions will kick off positive "feedback loops" that will make it easier for the UK to achieve and maintain its role as a global leader in securities tokenisation. See **Figure 1**. These missions are:

1. These missions are:
 - **Mission One:** Enable innovation and experimentation, underpinned by legal and regulatory certainty.
 - **Mission Two:** Foster a flourishing UK digital market by promoting interoperability and safe innovation at scale.
 - **Mission Three:** Become a leader in global standards for the tokenised securities market.

If the UK acts with focus and commitment, it can become a global hub for securities tokenisation.

There is an opportunity for the UK to distinguish itself from peers by moving beyond issuance faster, building a critical mass of liquidity in secondary markets, and then unlocking significant value in use cases across the securities lifecycle. This is also a matter of competitiveness. A strong and dynamic market is a strategic and economic priority for the UK. This means creating the right conditions to encourage new companies to raise capital and grow, as well as providing support to more mature companies that need to evolve. Accordingly, there is a need to simplify and streamline operational processes through, for example, introducing technology like tokenisation that improves efficiency. This will require considered, thoughtful collaboration across all stakeholders (public and private); a committed and pragmatic approach to investment in market infrastructure; and setting and achieving milestones for progress, holding everyone to account. Given that the UK is already a top global financial centre, UK Finance believes it must take steps to protect this position, maintain its competitiveness, and realise the promise that tokenisation offers.

6 The FS&M Act defines "cryptoassets" broadly to mean "any cryptographically secured digital representation of value or contractual rights that a) can be transferred, stored, or traded electronically, and b) that uses technology supporting the recording or storage of data (which may include decentralised ledger technology)". This definition includes tokenised securities as described in this report. Refer to footnote 2 for further detail on definitions as well as the recommendations around terminology under Mission One. Source: Future Financial Services Regulatory Regime for Cryptoassets (HMT, 2023).

7 Source: Letter from Sam Woods "Existing or planned exposure to cryptoassets." (PRA, 2022) and Prudential Treatment of cryptoasset exposures (BCBS, 2022).

8 Source: The Digital Pound: a new form of money for households and businesses? Consultation Paper. (BoE, 2023). In the consultation, the BoE refers to its omnibus account policy and notes is already accepting an application for an operator that uses DLT.

Figure 1: Overview of key recommendations by mission

	Short term — Next 18 months	Medium term — 18 months to five years
<p>Mission One Enable innovation and experimentation, underpinned by legal and regulatory certainty</p> <p>■ Immediate priority actions</p>	HMT should urgently roll out the first FMI Sandbox for the use cases identified as most pressing.	Parliament, the BoE, and HMT should, in line with recommendations from the Law Commission, (i) provide statutory clarity on the digital securities models that already fall within scope of existing collateral regulations and (ii) provide a statutory framework for collateral arrangements (such as those relating to crypto tokens) not currently provided for under existing regulations.
	HMT should urgently further define the roadmap for the FMI Sandbox, including a view of how it will prevent cliff-edge effects when the Sandbox ends.	The BoE and the PRA should clarify capital requirements for tokenised securities in light of the BCBS 545 standard, while also accounting for potential concerns around fragmentation of liquidity.
	HMT, the FCA and the PRA should continue to distinguish terminology around tokenised securities, cryptoassets, and the underlying DLT, and ensure that usage is not conflated or misinterpreted by industry.	HMT should clarify that regulation of tokenised assets will not be conflated with the regulation that already applies to existing financial services and processes that use DLT infrastructure (such as an internal DLT-based books and records system).
	HMT, the FCA, and the BoE should provide further flexibility on Central Securities Depositories Regulation (CSDR) and any provisions to allow industry participants to navigate the requirements to use a CSD.	The FCA, the PRA and the BoE should decide which, if any, other regulatory standards or concepts need to be amended to support tokenised securities.
	HMT and the BoE should continue to support the development of digital cash solutions to enable the settlement of transactions.	
	HMT, via the Debt Management Office, should issue a digital gilt within the FMI Sandbox.	
	HMT and the FCA should take further actions beyond the issuance of a digital gilt (including public statements) that encourage experimentation with tokenised securities and further participation in the Sandbox.	
	HMT, the PRA, and the FCA should support further two-way engagement between industry participants (including firms' own legal experts), regulatory representatives, and other legal experts specialising in digital assets and securities tokenisation.	
<p>Mission Two Foster a flourishing UK digital market by promoting interoperability and safe innovation at scale</p>	HMT, the FCA, and the BoE should support industry participants as they convene and develop voluntary standards for tokenised securities.	The Law Commission, Parliament, the UK Jurisdiction Taskforce, the FCA, and HMT should provide legal and regulatory clarity around custody arrangements for tokenised securities.
	HMT should explore if there is industry appetite for a shared, national infrastructure for tokenised securities.	HMT should consider developing a principles-led approach to the application of the Client Assets Sourcebook (CASS) rules.
		HMT should promote the UK as a centre of excellence on tokenised securities and other digital assets.
<p>Mission Three Become a leader in global standards for the tokenised securities market</p>	The UK government should lean on its existing strengths and experiences to foster discussion and collaboration around supranational standards for securities tokenisation.	
	HMT should collaborate and partner with leading jurisdictions and connect to their pilots or Sandboxes.	

1. THE UK'S POSITION TODAY

The UK has built positive momentum around tokenisation, including some flagship legislative initiatives in recent months.⁹ Most industry participants, however, still feel it is behind relative to other jurisdictions. Tokenised securities issuance is one metric that can be used to measure a jurisdiction's progress, but other factors that are prerequisites to scaling up a tokenised securities market — such as legal and regulatory reforms, the necessary market infrastructure, and government support for innovation — are also extremely important. When looking at these factors, the UK is making progress and the perception of it being “behind” could be quickly addressed so long as the UK commits to the recommendations being put forward in this report, increasing the pace, coordination, and visibility of its efforts. The UK can learn from the experience of other jurisdictions' experimentation to improve the development of its own market, but it will also need projects of its own to develop the skills and infrastructure for later stages of the market's development.

1.1 STATE OF TOKENISED SECURITIES ISSUANCE

There has been minimal tokenised securities issuance activity in the UK, especially compared to other jurisdictions. Many of the issuances globally have been in digital bonds. See Figure 2 for further detail. The number and diversity of issuers, as well as the value of digital bond issuance has grown in recent years. These issuances are estimated at less than 1% of the \$20.6 trillion that was issued in long-term fixed income instruments in 2021.¹⁰ Across the globe, Singapore, Hong Kong, and European peers such as Switzerland, France, Germany, and Luxembourg have been home to high-profile digital bond issuances, supported by legal and regulatory clarifications that attracted both private and public sector led initiatives. In Switzerland, digital bonds have been issued on the Swiss-regulated SDX exchange.^{11,12} France facilitated issuances on Ethereum,^{13,14} a public blockchain, as well as the tokenisation of multiple investment funds. Siemens recently issued a digital bond in Germany using the public Polygon blockchain.¹⁵

Figure 2: Indicative digital bond issuance activity across select jurisdictions (non-exhaustive, as of end May 2023)

Metrics	Global financial centres		European peers				Regional (non-EU) centres			
	UK	US	Switzerland	France	Germany	Luxembourg	Singapore	Hong Kong	Brazil	UAE (Dubai)
Digital bond issuance	N/A	N/A	-\$630 Mn	-\$260 Mn	-\$105 Mn	-\$170 Mn	-\$2,030 Mn	-\$100 Mn	N/A	N/A

Given data limitations, these estimates should be treated as indicative and non-exhaustive. Estimates reflect rounded values. “N/A” denotes minimal estimated issuance activity. Source: ICMA's compendium of New FinTech Applications in Bond Markets, publicly available news articles, and press releases. Estimates exclude commercial paper (including Schuldsheins and promissory notes), as well as other asset classes (such as real estate or tokenised funds). If an issuance event does not specify a monetary value, such as within its press release, it is not included. As applicable, local currencies were converted to USD using exchange rates as of June 2023.

9 This includes the planned FMI Sandbox to be launched later this year, the publication of the Law Commission consultation and June 2023 report on digital assets, and the publication of the UK Jurisdiction Taskforce's legal statement earlier this year regarding the issuance and transfer of digital securities under English private law. Refer to the section “Learning from other jurisdictions” for further detail.

10 Source for long-term fixed income issuance: 2022 SIFMA Capital Markets Fact Book. Estimates of digital bond issuance vary and depend on the transactions in scope, as well as data availability. Issuance estimations based on publicly available data, company press releases and ICMA's compendium of New FinTech Applications in Bond Markets. Same caveats apply as summarised below Figure 2.

11 Source: Benvenuta Lugano! The city of Lugano issues its first native digital bond on SDX with ZKB as Sole Lead Manager (SDX, 2023).

12 Source: UBS launches world's first native digital bond with intended dual listing and trading on SIX digital exchange and SIX swiss exchange (SIX, 2022).

13 Source: Société Générale issued the first covered bond as a security token on a public blockchain (SocGen, 2019). Reflects one example.

14 Source: EIB issues its first ever digital bond on a public blockchain (EIB, 2021). Reflects one example.

15 Source: Siemens issues its first digital bond on blockchain (Siemens, 2023).

Luxembourg was home to a recent digital bond issuance by the EIB earlier this year, issued on private blockchains (further discussed below).^{16,17} In Asia, Singapore facilitated private digital bonds as well as the tokenisation of investment funds, and Hong Kong created the first government-backed tokenised green bond.¹⁸ France and Singapore also stand out for their tokenisation of securities beyond bonds, which has thus far consisted mainly of investment funds. In April of this year, UBS executed a cross-border intraday repo trade on Broadridge's Distributed Ledger Repo platform.¹⁹ There has also been activity by industry participants in the UK. UK FinTechs, for example, have been involved in pilot debt transactions. In February 2022, Santander (acting as investor) and NatWest (acting as dealer and issuer) announced the successful completion of a proof of concept involving the issuance of a tokenised security on a public blockchain, where the payment leg was conducted through a new, DLT-enabled payments system.²⁰ Last November, JP Morgan's UK Entity and DBS Bank in Singapore completed an intraday repo transaction.²¹ In December, HQLA^x, Fnality, Santander, Goldman Sachs and UBS completed a proof of concept delivery versus payment repo settlement.²² These are just a few examples. It is also worth noting that key digital issuances elsewhere have had a UK nexus and have benefitted from UK expertise. HSBC provided the DLT platform on which the first pound sterling digital bond was issued by the EIB in Luxembourg in January 2023. This issuance has demonstrated a clear market for sterling-denominated digital securities.

1.2 THE KEY ENABLERS OF SECURITIES TOKENISATION

Several enablers must be present to support growth of the tokenised securities market and drive competitive advantage for a jurisdiction.

Enablers can be further detailed as follows:

- Legal clarity.** Legal frameworks define the legal rights and obligations associated with a tokenised security. Clear and supportive laws can give industry participants the confidence to issue, trade and hold tokenised securities. Legal frameworks — be it a civil or common law approach — therefore impact the speed at which tokenisation activity takes place. A common law approach — as in the UK — can be flexible to new innovations given its principles-based approach to law and reliance on precedent set by judges which can be applied to new scenarios. Precedence, however, may take time to be established and its underlying direction may be uncertain. Civil law jurisdictions, by contrast, depend on codified statutes. This means those jurisdictions can provide immediate clarity to industry participants on the rules, as well as signal progress internationally. On the downside, civil law can be prescriptive and might age as technology advances. New and untested statutes are subject to unforeseen consequences that may create longer-term constraints of their own. Many legal experts repeatedly emphasised that the flexibility of English common law was a major benefit for the UK when it comes to securities tokenisation, and that these benefits need to be made clearer to many industry participants who perceive civil law jurisdictions (such as France, Switzerland, and Luxembourg) as being

more advanced. As discussed later in this section, the UK's current legal framework is already in good standing to accommodate tokenised securities even if legal precedent must still be established over the medium term.

- Regulatory clarity.** Clear, well-defined regulation, predictable supervisory processes, and prudential frameworks for tokenised securities are other enablers and necessities for securities tokenisation. Regulation of tokenised assets — just as regulation for traditional securities — flows from the definitions under applicable regulation. Regulatory categorisation shapes requirements around disclosure and reporting; safeguards and obligations to protect investors; and relevant guardrails regarding the promotion of investable opportunities, to name a few examples. Industry participants consistently noted the importance of a regulatory framework that is both flexible (i.e., able to respond to emerging technologies in a way that sufficiently manages the risk) and efficient (i.e., working across regulatory bodies to streamline requirements and reduce duplication), as well as the need for clear regulatory boundaries.
- Trusted market infrastructure.** The development of the tokenised securities markets will require financial market infrastructure that is adapted and designed specifically to support issuance, trading, and post-trade activities of a tokenised security. There are multiple ways that the industry can engage with tokenisation technology (so-called "participation models", refer to section 2.2), and the industry has not completely converged on what the target state for the market will look like (e.g., multiple vs single ledgers; permissioned vs permissionless networks; national vs supranational voluntary standards). Regardless of what the end state looks like, some adaptation of market infrastructure will be required for securities tokenisation activity to take place. The adapted infrastructure will need to accommodate the storage of digital assets (custody); the use of a form of digital cash to settle transactions involving tokenised securities; convergence on industry standards, including technical standards that determine how the security interacts with the underlying blockchain/DLT platform; and guardrails to ensure the transactions are performed in a safe and trusted manner, such as through verifiable credentials that support Know Your Customer and anti-money laundering requirements (KYC/AML). It is worth noting also that measuring and managing ESG issues is increasingly important to financial institutions and investors. Given industry's sustainability and decarbonisation commitments, energy consumption must be considered as infrastructure evolves.

¹⁶ Source: EIB innovates further with Project Venues, the first euro-denominated digital bond on a private blockchain (EIB, 2022).

¹⁷ Source: EIB issues its first ever digital bond in pound sterling (EIB, 2023).

¹⁸ Source: HKSAR Government's Inaugural Tokenised Green Bond Offering (HKMA, 2023).

¹⁹ Source: UBS executes first cross-border intraday repo trade on Broadridge distributed ledger repo platform (Broadridge, 2023).

²⁰ Source: Fnality celebrates completion of landmark DvP proof of concept (Fnality, 2023).

²¹ Source: DBS: First bank in Asia to complete intraday repurchase transaction on a blockchain based network (DBS, 2022).

²² Source: Fnality and HQLA demonstrate together with Banco Santander, Goldman Sachs and UBS, the first cross-chain repo swap pilot across Corda and Enterprise Ethereum (HQLA^x, 2022).

-
- **Government support.** The public sector should guide innovation by setting out a clear and supportive roadmap for tokenisation and encouraging the public and private sectors to collaborate on needed infrastructure and standards. This requires a consistent tone and clarity of vision across different government departments (including clarity of definitions²³), as well as a wealth of government-backed initiatives that focus on tokenisation and its key enablers. There must also be ways for firms to safely experiment with the underlying technology, such as through regulatory pilots, where market participants might test new technologies and practices while temporarily modifying or disapplying certain legislations for specific use cases.
 - **Leading jurisdictions have invested in each of the above mentioned enablers to support securities tokenisation activity.** See a summary of key activities to date in **Figure 3** across select jurisdictions. Switzerland, France, Germany, and Singapore have made the most concrete progress across all enablers. The UK, by comparison, has many initiatives in flight but some are less mature than those in other markets. Momentum is building, however, and industry participants are eager to move as fast and prudently as possible to develop the tokenised securities market in the UK.

²³ Many jurisdictions, including the UK, use the term cryptoassets holistically to include all types of assets that use DLT and cryptography. When using the term cryptoassets it is important to clarify the specific tokens being referred to. Otherwise, there is a risk of conflating a broad range of asset types which may require different legal and regulatory treatments. Cryptoassets for example may include exchange tokens, utility tokens, security tokens, non-fungible tokens, stablecoins, asset-referenced tokens, commodity-linked tokens, algorithmic tokens, governance tokens, and fan tokens. (See the HMT consultation on the “[Future Financial Services Regulatory Regime for Cryptoassets](#)” for further detail on this non-exhaustive list.) Additionally, terminology around digital assets may also confuse if not clearly defined. In their 2023 paper on digital assets, the Law Commission — a statutory independent body that reviews the law of England and Wales and recommends reform where needed — defined digital assets as “any asset that is represented digitally or electronically.” Refer to recommendations around terminology under Mission One.

Figure 3: Heat map of activity across enablers in key jurisdictions (non-exhaustive, as of June 2023)

Peer type	Peer	Legal framework Clarity around legal status and rights associated with tokenised securities	Regulatory environment Regulatory clarity around treatment of tokenised securities	Market infrastructure Market infrastructure to support lifecycle of tokenised securities	Governmental support Additional support that can help to increase liquidity within the market
Global financial centres	UK	<ul style="list-style-type: none"> Law Commission recommendations for legal reform; UKJT legal statement helping to provide legal clarity 	<ul style="list-style-type: none"> Launch of FMI sandbox by end of 2023 and planned consultation in advance FCA to launch consultation on a potential custody regime 	<ul style="list-style-type: none"> Minimal issuance activity Some tokenisation activity across FMI providers 	<ul style="list-style-type: none"> Bank of England committed to supporting private sector digital cash solutions and expects RTGS upgrade to realise many benefits associated with a CBDC
	USA	<ul style="list-style-type: none"> High degree of fragmentation across the country, with different laws across states 	<ul style="list-style-type: none"> Digital assets regulatory framework launched in the Gillibrand-Lummis Crypto Bill (2022), but not yet in force 	<ul style="list-style-type: none"> Minimal issuance activity Some tokenisation activity across FMI providers 	<ul style="list-style-type: none"> BIS collaboration with the Federal Reserve, the New York Fed and MAS to develop wholesale CBDC (Project Cedar x Ubin)
European	Switzerland	<ul style="list-style-type: none"> DLT Act (2021) regulates decentralised digital ledger technology 	<ul style="list-style-type: none"> FINMA published Initial Coin Offerings (ICO) guidelines and a supplement on stablecoins 	<ul style="list-style-type: none"> Growing issuance activity SDX digital exchange as trading venue for tokenised securities 	<ul style="list-style-type: none"> Swiss central bank completed CBDC pilot in collaboration with five commercial banks (Project Helvetia), integrated within the SDX platform
	France	<ul style="list-style-type: none"> 2018 legal reform on use of DLT to represent and transmit financial securities Mandatory DASP registration with the AMF with optional licensing ahead of MiCA 	<ul style="list-style-type: none"> Launch of EU's DLT pilot regime commenced in March 2023 	<ul style="list-style-type: none"> Growing issuance activity France an increasingly attractive headquarter location for many cryptoasset firms 	<ul style="list-style-type: none"> Banque de France (BDF) built a permissioned proprietary DLT (DL35) to settle securities with a wholesale CBDC Multiple BDF experiments on wholesale CBDC
	Germany	<ul style="list-style-type: none"> Electronic Securities Act (2021) allows for digital bond issuance Planned Financing for the Future Act to enable corporations to issue electronic shares registered on DLT 	<ul style="list-style-type: none"> Launch of EU's DLT pilot regime commenced in March 2023 	<ul style="list-style-type: none"> Growing issuance activity, including from KfW Germany's state-owned bank 	<ul style="list-style-type: none"> Deutsche Bundesbank currently exploring digital euro CBDC via its "trigger" solution
	Luxembourg	<ul style="list-style-type: none"> Admitted tokenised securities onto its Securities Officials List to recognise digital assets as securities 2019 legal reform recognising token transfers via the blockchain 	<ul style="list-style-type: none"> The Commission de Surveillance du Secteur Financier (CSSF) incorporated tokenised securities into the AMF/CTF Act to regulate money laundering risk around digital assets 	<ul style="list-style-type: none"> Growing issuance activity, such as from the European Investment Bank 	<ul style="list-style-type: none"> Banque centrale du Luxembourg and BDF jointly conducted a successful wholesale CBDC initiative
Regional (non-EU) centres	Singapore	<ul style="list-style-type: none"> Securities and Futures Act provides characteristics that lawyers can use to determine if an asset is a security or non-security digital token 	<ul style="list-style-type: none"> MAS published guidance on digital token offerings 	<ul style="list-style-type: none"> Growing issuance activity ADDX digital exchange as trading venue for tokenised securities (part of SGX) 	<ul style="list-style-type: none"> MAS' sponsored Project Guardian, an initiative to test the feasibility of asset tokenisation Collaboration for wholesale CBDC (Project Cedar x Ubin) Tokenisation included as part of financial services industry transformation roadmap
	Hong Kong	<ul style="list-style-type: none"> Planned Virtual Asset Service Provider (VASP) licensing regime Recognised potential future review of property rights for tokenised assets 	<ul style="list-style-type: none"> Collaboration with the BIS to pilot a tokenised green bond issuance Hong Kong Monetary Authority plans to regulate stablecoins by no later than 2024 	<ul style="list-style-type: none"> Growing issuance activity Some tokenisation activity across FMI providers 	<ul style="list-style-type: none"> Hong Kong Monetary Authority has experimented with wholesale CBDCs, including project mBridge
	Brazil	<ul style="list-style-type: none"> Virtual Assets Law establishes guidelines for virtual asset services and providers 	<ul style="list-style-type: none"> Central Bank of Brazil confirmed to be the regulator for virtual assets 	<ul style="list-style-type: none"> Minimal issuance activity 	<ul style="list-style-type: none"> Commitment from the Central Bank to launch a CBDC by 2024, noting potential future link for tokenised assets
	UAE (Dubai)	<ul style="list-style-type: none"> Law No. 4 of 2022 on the Regulation of Virtual Assets (VAL) establishes a legal framework for virtual assets 	<ul style="list-style-type: none"> Virtual Assets Regulatory Authority (VARA) set up to regulate digital assets Launched a regulatory framework on investment tokens, which includes security tokens 	<ul style="list-style-type: none"> Minimal issuance activity Some tokenisation experimentation across FMI providers 	<ul style="list-style-type: none"> UAE central bank completed wholesale CBDC pilot

■ High degree of activity ■ Moderate activity ■ Nascent/limited

1.3 LEARNING FROM OTHER JURISDICTIONS

As it develops its approach, the UK can learn from other jurisdictions that have to date experimented more extensively with tokenisation and issued more tokenised securities. This will help it achieve a position of leadership. The key lessons for the UK are:

- Legal and regulatory clarity, and ensuring the industry understands this, is a foundational step in enabling the market to begin issuing tokenised securities and expand to other use cases.
- Industry experimentation is important, and the public sector has a critical role to play in supporting it.
- Industry participants respond positively to public sector involvement in tokenised securities initiatives.

Legal and regulatory clarity, and ensuring the industry understands this, is a foundational step in enabling the market to begin issuing tokenised securities and expand to other use cases.

Some jurisdictions have sought to provide immediate clarity around digital asset legal definitions and operational rules through the creation of legislation. In so doing, industry participants have been attracted to these jurisdictions. France, Germany, Switzerland, and Luxembourg (all civil law jurisdictions) have, for example, established digital asset laws that clarify the treatment of security tokens. Germany's 2021 Electronic Securities Act enabled the issuance of digital bonds, by recognising a new category of electronic securities that include those securities registered in a "crypto securities register", referring mainly to DLT.²⁴ Switzerland's DLT Act enables ledger-based securities to be represented on a blockchain and provides legal clarity around custody. Specifically with regards to custody, Switzerland's amendments address the segregation of cryptoassets in the case of bankruptcy, and allow supervised institutions to hold cryptoassets off-balance sheet. The DLT Act further clarifies that only custody in omnibus accounts of cryptoassets that serve as a means of payment would require an additional license. The Luxembourg Law in 2020 provided legal clarity around the transfer of ownership of tokenised assets, following which the EIB issued its digital bonds there. Ahead of MiCA, the EU-wide regulation on markets in cryptoassets,²⁵ the Autorité des Marchés Financiers (AMF) in France (the French securities regulator)

made Digital Asset Service Provider (DASP) registration mandatory for digital asset custody providers and trading platforms, and also offers optional licensing.²⁶ The French Parliament also introduced a third regulatory regime, reinforced registration, which allows the AMF to have stricter oversight of DASPs.²⁷ Changes such as these have made Paris a destination for many key major digital asset providers. EU member states²⁸ are also publishing their own provisions in response to the EU's regulation on a pilot regime for market infrastructure based on DLT.²⁹

In contrast to the jurisdictions mentioned above, the UK has addressed its evolution in a manner more tailored for common law. There is a deep and growing body of work supporting the development of UK common law with regards to tokenised securities.

Because the UK is a common law jurisdiction, its progress on establishing legal frameworks for tokenised securities may appear less "visible" to industry participants than if it were enacted in primary legislation, as many European peers in civil law jurisdictions have done (see above). Legal experts consulted for this report said that the recent legal statement published by the UKJT on the issuance and transfer of digital securities under English private law³⁰ — building on the foundational work of the Law Commission³¹ and the Law Society³² — is a watershed moment for the UK's legal framework on securities tokenisation.

English [and Welsh] law is already fit for purpose. It is a misconception that is driving people to use law in other jurisdictions.

Specialist lawyer in digital assets and fintech

²⁴ Siemens cited the 2021 reform as a key enabler to the issuance of its digital bond in Germany. Refer to the press release linked in footnote 15.

²⁵ Source: Regulation of the European Parliament and of the Council on Markets in Cryptoassets and amending directive (EU) 2019/1937 (European Commission, 2020). MiCA refers to Markets in Cryptoassets.

²⁶ Refer to the AMF website for resources to register and obtain a DASP license [here](#).

²⁷ Source: France Imposes New Regulatory Regime on Digital Asset Service Providers Seeking to Access the French Market (Kramer Levin, 2023).

²⁸ Italy, for example, has proposed amendments to streamline FinTech experimentation. Refer to further detail on Italy's provisions published in March 2023 in their Official Gazette [here](#). Spain also published their provisions in their Official State Bulletin in March 2023, as another example.

²⁹ Source: Regulation (EU) 2022/858 on a pilot regime for market infrastructures based on distributed ledger technology, and amending regulations (EU) No 600/2014 and (EU) No 909/2014 and Directive 2014/65/EU (European Commission, 2023).

³⁰ Source: Legal statement on the issuance and transfer of digital securities under English Private Law (UKJT, 2023). Private law refers to the regulation of individuals within the UK's legal system. It includes contract law for example.

³¹ The Law Commission (LC) championed common law of England and Wales and proposed targeted statutory legal reforms to confirm that English and Welsh law is supportive of digital assets (including tokenised securities) within the UK. The LC has recommended two areas of statutory reform. Firstly, that legislation confirm the existing common law position that digital assets are capable of attracting personal property rights. Secondly, regarding collateral, that statute (i) clarifies that certain digital securities models fall within scope of the existing Financial Collateral Arrangements (No.2) Regulations (FCARs) and (ii) provides a framework for crypto-token collateral arrangements outside of FCARs' scope. Source: Digital Assets: Final Report (Law Commission, 2023).

³² Source: Blockchain Legal and Regulatory Guidance: Third Edition (Law Society, 2023).

The legal statement highlights that many digital bond use cases, particularly those involving permissioned, centrally managed blockchains or DLT-based systems where all participants are contractually bound to a common rulebook, are unproblematic and unlikely to give rise to novel legal issues. The statement indicates that digital equity securities of UK companies are more challenging than debt securities because of the need to comply with requirements in the Companies Act 2006 for share transfer and registration, but the UKJT notes no impediment in principle to using a permissioned ledger, so long as it is designed to capture and provide in hard copy the needed statutory information. This statement is significant because industry participants and legal advisors can refer to it when understanding how English private law can accommodate the issuance of tokenised bonds and equities on permissioned ledgers. Although not legally binding, the statement provides a position that both courts and lawyers can reference before legal precedent has been established. The statement builds on previous UKJT legal statements on digital assets and tokenised securities. The first was launched in 2019 and clarified that a smart contract held the same legal status as a traditional contract. In 2021, the UKJT published its Digital Dispute Resolution Rules (2021) to support arbitration of on-chain digital relationships and enable timely and cost-effective resolution of commercial disputes, especially those involving digital asset technology. A digital gilt issuance could also potentially help to establish legal precedent. In the interim, more work is required to raise awareness among industry participants (and their legal advisors) of the UKJT legal statement and the recommendations from the Law Commission, as well as thought leadership from the Law Society and City of London Law Society.

Industry participants have highlighted that the current UK regulatory regime will need to adapt to account for tokenisation technology and the pain points that are currently inhibiting the market from developing further. While tokenised securities (typically classified as “security tokens” by HMT and the FCA) are regulated as traditional securities in the UK as “specified investments” under the Financial Services and Markets Act 2000 (Regulated Activities) Order 2001 (RAO), there are challenges with the current approach.

If we want this market to scale, it cannot be a wild west. This market needs predictability, resilience, and some standards of safety and soundness [that law and regulation provide]. We cannot compromise on those.

Global sell-side firm

Examples of regulatory obstacles given the existing commercial landscape in the UK:

- Requirements from UK CSDR to use a central securities depository (CSD) if tokenised securities are to be traded on a trading venue, as there is no CSD that is recognised under UK CSDR that clears tokenised securities;
- The complexity of finding a suitable custodian that complies with existing Client Asset Sourcebook (CASS) rules for some tokenisation structures.
- Perceived lack of clarity around capital treatments in light of the BCBS 545 standard³³ (which left room for debate as to the categorisation boundaries) and how it will be implemented and interpreted in the UK (though this is also the case in other jurisdictions such as the EU and US).

The UK government is already making progress to explore potential reforms. The PRA has previously issued commentary on capital treatment of cryptoassets.³⁴ When implementing the BCBS standard, the UK would do well to ensure that it takes a risk-sensitive approach and uses a high degree of precision to provide certainty to the market. The FCA will consult on a future regime for custody of tokenised securities.³⁵ This builds on existing FCA guidelines for security tokens (PS19/22).³⁶ The FMI Sandbox³⁷ being launched later this year — co-sponsored by HMT, the Bank of England (BoE), and the FCA — will allow HMT and regulators to modify or disapply legislation so participants can experiment with DLT in securities markets. It will also, crucially, enable both regulators and industry participants to further identify where the regulation does not currently facilitate activities related to tokenised securities. If the Sandbox does not in the end have hard limits on transaction sizes, it will also mean it is theoretically unconstrained. Market participants have however voiced concerns that the path out of the Sandbox, to scale businesses under new rules, is not yet clear. Even the term “Sandbox” may well understate HMT’s ambition to allow scalable business models and use cases to evolve and seamlessly graduate. As highlighted in the recommendations, there is value in HMT urgently further clarifying the use cases it plans to focus on in the Sandbox. There is also value in HMT advising on how the operation of this FMI Sandbox will differ from prior regulatory Sandboxes.

33 The Basel Committee on Banking Supervision (BCBS) has published BCBS545, its final standard on the prudential treatment of banks’ digital asset exposures. In this, banks are required to classify digital assets across two groups: Group 1 (including tokenised traditional assets and cryptoassets with effective stabilisation mechanisms) and Group 2 (including stablecoins, unbacked cryptoassets). As a member of the BCBS, the UK is still due to implement its interpretation of the BCBS545 standard into its regulatory framework in line with the implementation deadline of 1st January 2025. Source: Prudential Treatment of Cryptoasset Exposures (BCBS, 2022).

34 Refer to further detail on the PRA letter from Sam Woods linked in footnote 7.

35 As outlined in HMT’s consultation on the “Future Financial Services Regulatory Regime for Cryptoassets”: Refer to the HMT consultation in footnote 23. Refer to footnote 2 for further detail on definitions as well as the recommendations under Mission One.

36 Source: Guidance on cryptoassets: feedback and final guidance to CP 19/3 (FCA, 2019).

37 Refer to further detail on the FMI Sandbox in the Financial Services and Markets (FSM) Act [here](#) and the reference in HMT’s consultation on the “Future Financial Services Regulatory Regime for Cryptoassets”.

Industry experimentation is important, and the public sector has a critical role to play in supporting it.

A leading example of public sector-enabled innovation in collaboration with industry participants is in Singapore.

The Monetary Authority of Singapore (MAS) supported Project Guardian (PG). PG explored the use of tokenised assets within institutional decentralised finance (DeFi) protocols and highlighted the importance of several enablers for a tokenised securities ecosystem.³⁸ First, PG highlighted the need for shared standards — specifically around business logic and token structure — to enable interoperability between tokenised securities. It also illustrated the need for digital cash; PG settled tokenised assets with a form of digital money. PG also illustrated the importance of a fit-for-purpose custody solution, as it enabled the tokenisation of assets as well as custody of those assets. KYC/AML capabilities and other guardrails were also required to ensure trading occurred with trusted counterparties via DeFi protocols which were repurposed for institutional use. The project required market participants across institutions to collaborate including issuers, custodians, and traders.

Industry participants have noted that the UK is at a key juncture in terms of enabling experimentation and establishing shared standards around safety and compliance, business logic, and token structure for interoperability. Some industry participants have convened to complete proof-of-concept on-chain issuance and settlement of bonds in the UK.³⁹ The FMI Sandbox presents a key opportunity for industry participants to experiment. Over the medium and longer term, it will also enable industry to converge on standards (including technical and legal) and the eventual interoperability of solutions. The FMI Sandbox, like the EU DLT pilot regime, is expected to let the private sector explore new technical solutions, business models, and ways to commercialise these innovations at scale.

Industry participants respond positively to public sector involvement in tokenised securities initiatives.

When asked “who” the leading jurisdictions are, industry participants consistently highlight those whose governments have made visible commitments to support securities tokenisation. One of the most salient examples in Europe is the EIB digital bond issuances. Since 2021, the EIB has issued four digital bonds in collaboration with major investment banks including Goldman Sachs and HSBC. This activity has signalled to the market that the EU is committed to experimenting with new technologies and driving demand for a tokenised securities infrastructure. Europe is not the only jurisdiction that has attracted attention. Other governments and central banks have committed resources, sponsorship, and support for relevant initiatives related to securities tokenisation and its key enablers. MAS in Singapore has, for example, outlined how it plans to build a safe and innovative tokenised securities ecosystem in its industry transformation roadmap.⁴⁰ Collectively, these initiatives point to the importance of public institutions supporting the industry by providing clarity of their commitment.

The UK government has given some indications of its commitment to tokenisation and its enablers. Industry now requires action from government to enable industry participants to move ahead with confidence. The BoE is exploring digital cash solutions — including through its RTGS upgrade and encouragement of private sector digital cash solutions (including their Omnibus Account Policy), and potentially through its own wholesale CBDC (though it recognises this solution would take longer to deliver than other alternatives and therefore may not be the priority).⁴¹ In addition, the Innovation Hub established by the Bank for International Settlements (BIS) is working to monitor the assets and liabilities of fiat — backed stablecoins through Project Pyxtrial⁴². The BIS Project mBridge also seeks to connect jurisdictional digital currencies in a single common technical infrastructure.⁴³ These are all meaningful steps forward.

38 Source: Project Guardian (MAS, 2022).

39 In 2022, Santander and NatWest announced the completion of a proof-of-concept issuance of an on-chain tokenised bond issuance with NatWest as the dealer and issuer for the pilot transaction, Santander as the investor, and Finality as the settler. Refer to footnote 20.

40 Source: Financial Services Industry Transformation Map 2025 (MAS, 2022).

41 The BoE has noted that establishing a new wholesale CBDC platform could enable a wide range of technical capabilities, but it will also require a long lead time. The BoE is therefore focused on upgrades to the RTGS service (via the RTGS Renewal programme) which provides central bank money in electronic form for wholesale settlement. It has also committed to enabling private sector innovation, such as through its Omnibus Account Policy, and notes it is already accepting an application for an operator that uses DLT. Source: The Digital Pound: a new form of money for households and businesses? Consultation Paper (BoE, 2023) and the article Bank of England publishes policy for omnibus accounts in RTGS (Bank of England, 2021).

42 Source: BIS Innovation Hub consolidates expansion, announces priorities for 2023 (BIS, 2023).

43 Source: Project mBridge: Connecting economies through CBDC (BIS, 2022).

2. WHY TOKENISATION (AND THE UK'S POSITION ON IT) MATTERS

The UK has made positive momentum around securities tokenisation and can continue to learn from the success of other jurisdictions. This is important because the shift of assets to distributed ledgers will likely transform financial markets and, if the UK doesn't rapidly become a market leader, the UK's position as a top global financial centre may change.

2.1 THE IMPACT OF TOKENISATION

Estimates vary around the degree of impact that tokenisation will have on financial markets, but there is growing consensus that it could be transformational. The EU, for example, previously estimated that clarifying regulatory and legislative frameworks in key areas pivotal for the future development of cryptoassets (which include tokenised securities) could result in potential added value to the EU's financial sector of between EUR 27 to 55 billion annually.⁴⁴ HSBC estimated that digital assets would represent 5 to 10% of global assets by 2030.⁴⁵ Citi Global Perspectives and Solutions forecasted USD 4 to 5 trillion of outstanding tokenised securities by 2030, coming from debt instruments, fund products, securities financing, and collateral.⁴⁶ Another study demonstrated that there was an opportunity for freed financial resources well beyond USD 100 billion that could be redeployed to generate incremental returns.⁴⁷ A straw poll of a few sell-side firms focused on digital asset initiatives earlier this year suggested that between 25–50% of private assets and funds (such as private equity and hedge funds) could move on-chain by 2030. The scale and the variation of these estimates show the potential for industry-wide change as well as uncertainty of the actual impact.

There is growing consensus among industry participants that securities tokenisation can unlock a wide range of benefits compared to traditional models. These include:

- **Unlocking capital:** Tokenisation allows assets, including illiquid assets, to be accessed by more investors and to be traded. If sufficient liquidity can then be created, it increases the velocity of an asset as it moves through the financial system, unlocking trapped capital for investors.
- **Fractionalisation:** Tokenisation also enables fractionalisation whereby investors can purchase fractions of an asset. This has the potential to increase access to investors (including potentially retail investors).
- **Risk management:**
 - Tokenisation can support risk management more broadly. Because DLT can enable atomic (i.e., simultaneous and instantaneous) settlement of transactions on a 24/7 basis, tokenisation has the potential to eliminate or reduce counterparty risk, bankruptcy risk, and performance risk by shortening the settlement time for transactions to which two or more counterparties are otherwise bound. Such reduction of risk may further result in increased efficiency by reducing the market and liquidity risks and operational burdens associated with collateral.
 - Whilst tokenisation will reduce or eliminate many risks, new risks are introduced by technology that industry participants will need to safeguard against. These risks include the risk of “fat-finger errors” which could strain trading controls; new cyber security concerns; or other operational risks such as the interoperability between DLT platforms. New risks aside, the potential benefits are significant.

⁴⁴ For the assessment, legislative and regulatory interventions assessed include those relating to the definition of a common framework for cryptoassets, cyber-resilience, and the establishment of a comprehensive data strategy. Cryptoassets are defined as a type of digital asset that depends primarily on cryptography and DLT and are private by nature. The types of cryptoassets in scope for the paper are investment-type tokens which give ownership rights and/or entitlements similar to dividends and can include tokenised securities; payment/exchange-type tokens (such as a cryptocurrency); initial coin offerings which are used by start-ups and investors to collect funding; utility-type tokens which grant access to a good or services; and hybrid cryptoassets, such as virtual backed cryptocurrencies like stablecoins. Source: Emerging risks in cryptoassets Regulatory and Supervisory Challenges in the area of

⁴⁵ Source: Beyond asset tokenisation: the evolving role of asset servicing (HSBC, 2023).

⁴⁶ Source: Money, Tokens, and Games: Blockchain's Next Billion Users and Trillion in Value (Citi Global Perspectives and Solutions, 2023).

⁴⁷ Source: Impact of DLT on Global Capital Markets (GFMA, 2023).

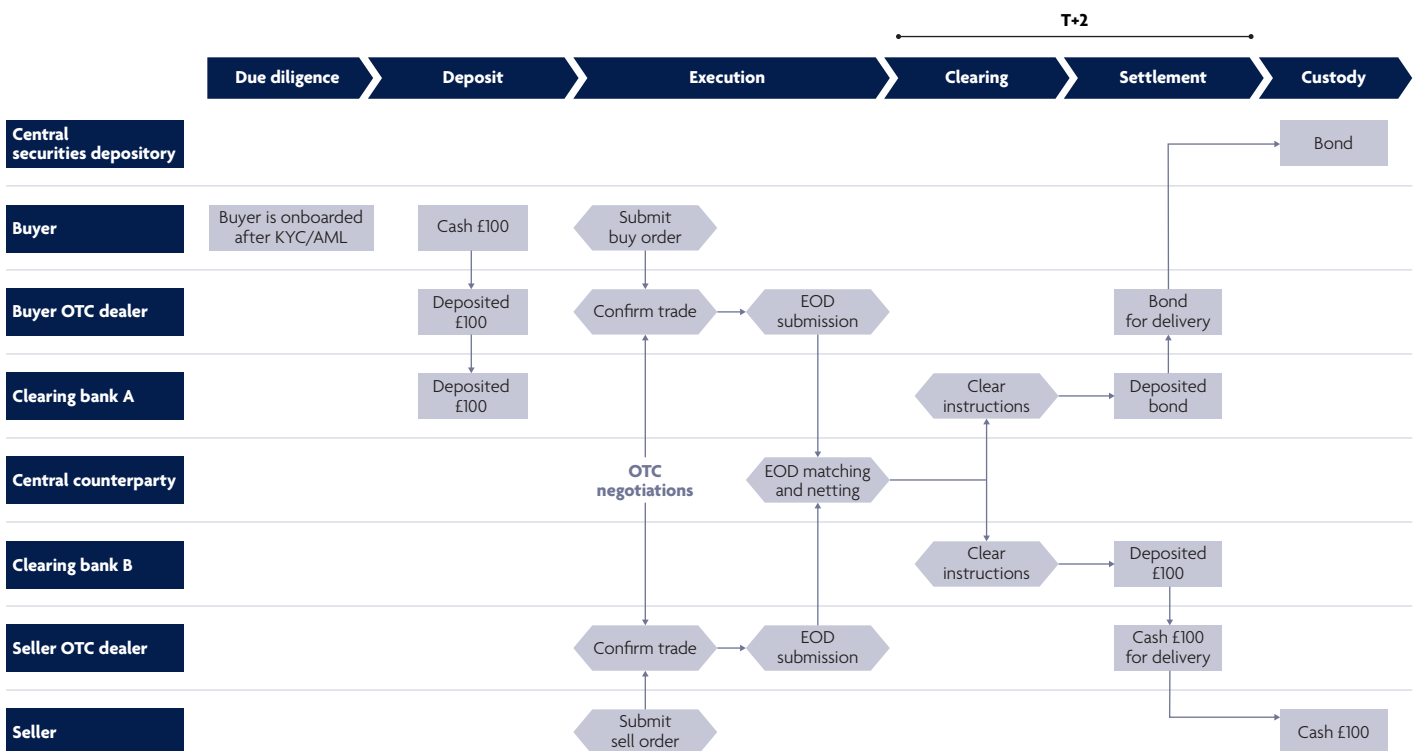
Enabling these benefits to be realised in the UK will help improve the country's overall competitiveness. If UK capital markets are to remain successful, then UK industry must evolve safely into a new technology-driven and innovative environment. The benefits that tokenisation can bring to industry — including fractionalisation, unlocked capital, and improved risk management as described above — can help to further this objective, while also helping to reduce frictions in UK capital flows.⁴⁸

Market participants on the buy-side and sell-side — including broker dealers, market makers, custodians, and investors — value the operational efficiencies that can come from tokenisation.

Previous analysis highlighted by the EU estimated that widespread use of DLT in the EU could result in annual cost savings of up to EUR 4 billion in the area of reporting and “several billion” in the European derivatives market over time in relation to clearing, settlement, collateral management and other intermediary functions. Potential efficiency gains in the EU cash equity market alone were then estimated between EUR 270 and 540 million annually.⁴⁹ Many of these benefits have been demonstrated in pilots already launched in the market. When the Hong Kong Monetary Authority partnered to issue a tokenised green bond, they observed reduction in settlement time from five days to one day.⁵⁰

Singapore Exchange (SGX) cites a 60% reduction in settlement time on their blockchain-enabled bond issuance platform, as compared to a traditional scenario with a non-tokenised security.⁵¹ **Figure 4** and **Figure 5** highlight an illustrative process flow for a traditional bond purchase versus a tokenised one. A tokenised bond purchase may require fewer intermediaries and can be conducted instantaneously, underscoring the value-add it can provide from an efficiency perspective. It can also ensure that compliance procedures, such as KYC and AML requirements, can be executed in an automated way, and that onboarding procedures are simplified. Each customer record on the distributed ledger would, for example, have all the events and data for a customer in one dataset. This means there could be instant access to accurate customer data. A smart contract designed with business logic could then rely on this data to automate initial transactions as well as ongoing monitoring. Asset servicing costs could also be reduced.

Figure 4: Illustrative process flow for a traditional bond purchase



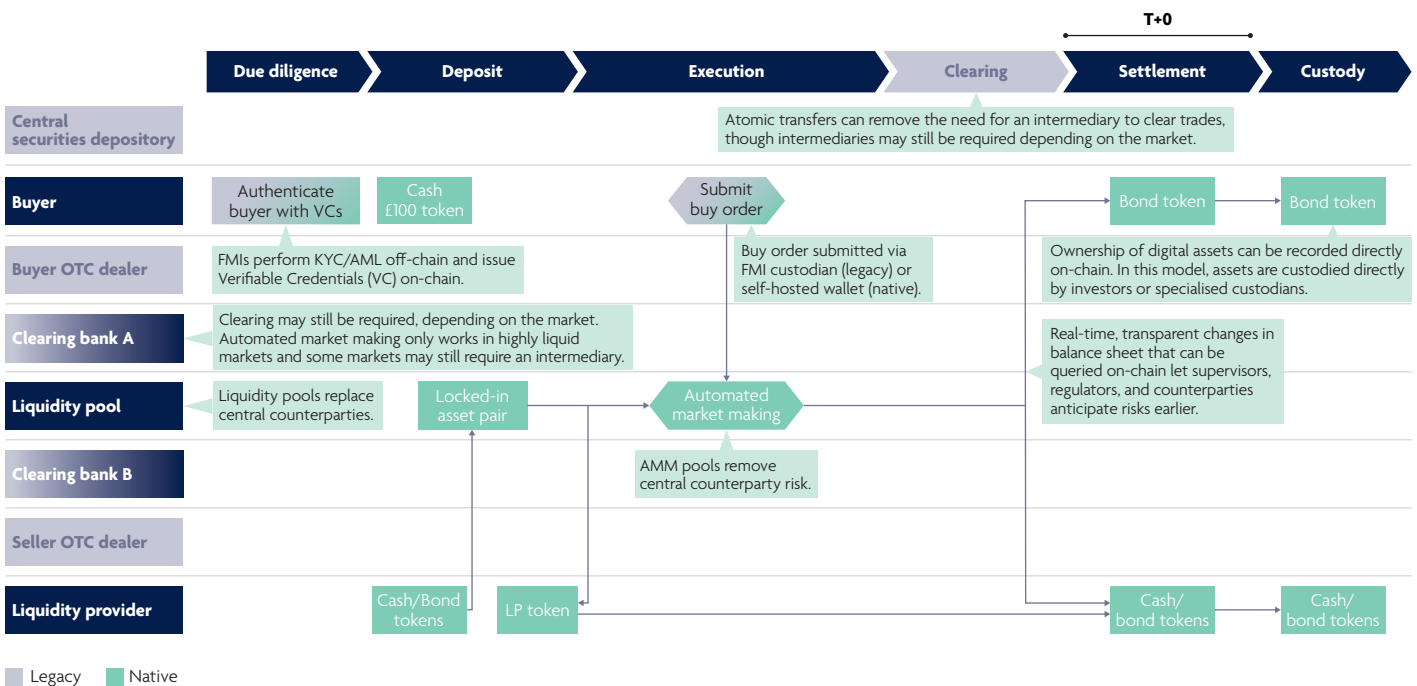
48 Previous UK Finance work has identified areas of focus to improve the competitiveness of UK capital markets. Refer to the May 2023 report *UK Capital Markets: Building on Strong Foundations*.

49 The EUR 4 billion figure represents the maximum cost saving potential assuming fully automated reporting systems throughout all areas of the financial system enabled by DLTs. Source: Impact Assessment — Proposal for a Regulation of the European Parliament and of the Council on a pilot regime for market infrastructure based on distributed ledger technology. (European Commission, 2020).

50 Source: Tokenised Bond: Huge Potential to be Unlocked (HKMA, 2023).

51 Source: SGX CDP makes available Marketnode's DLT-enabled direct-to-depository service for debt issuers (SGX, 2022).

Figure 5: Illustrative process flow for a potential native (tokenised) bond purchase



Note: 1) The process illustrated above for a buyer would be similar for a seller who would convert a bond to cash via a liquidity pool. 2) This is an illustration of one potential use case scenario. Different markets have different requirements. Automated market markets (AMM), as illustrated in Figure 5, work in highly liquid markets and where markets are not one-sided. In circumstances where counterparty risk may remain, there will be a need for a party to support clearing that risk. In other words, the need for intermediaries in some cases remains and a fully disintermediated model may not always be appropriate.

Where to start — which assets are tokenised first?

Industry participants agree that tokenisation will enable heightened liquidity across new and existing asset classes, but opinion is mixed as to which asset classes present the most value.

- Most industry participants believe that tokenised bonds are a good place to start to build comfort in the technology and illustrate its potential, a point evidenced by market activity to date.
- Investors suggest there is a market for tokenised private assets such as private equity, debt, and fund products. Some investor participants engaged by UK Finance advised that the tokenisation of money market funds presents compelling opportunities.^{52,53}
- Whilst the industry may start with more straightforward securities such as bonds, there is consensus that much of the potential of tokenisation will be unlocked with long-dated, highly intermediated, and complex products with lower liquidity (such as real estate).⁵⁴

With regards to illiquid assets in particular, there are many potential benefits. The transformation of illiquid real estate investment into “tokens”, for example, means that a direct investment in a property can be fractionalised, leading to a higher liquidity (so long as the asset is in demand). Fractional ownership of these tokens allows access

for a broader investor base, and transactions are more efficient and at lower cost. Finally, smart contracts enable straight-through processing for a wide variety of steps — including compliance, document verification, and trading — which lowers the possibility for errors and reduces the need for manual input.

2.2 WHERE ARE THE BENEFITS OF TOKENISATION UNLOCKED?

The model of tokenisation implemented will determine how much value it can unlock. Securities can be recorded on blockchains/ distributed ledgers (i.e., “tokenised”) to different degrees. Creating a token that represents an existing off-chain security would be the simplest incremental change to existing financial systems. These are referred to as “hybrid” models of tokenisation because only part of the security lifecycle is tokenised, such as transfers of ownership or market making. The most extensive forms of tokenisation — which are also the furthest from the current models in financial markets — are “native” models where the entire lifecycle is on the blockchain. In a native model, the asset is legally recognised in its digital form (rather than being a “mirror” of an existing security) and custodied on-chain. The “source of truth” for information related to the asset, such as the asset’s owner and

52 Refer, for example, to Hamilton Lane and KKR in the US who enabled investors to access investment funds on public blockchain networks.
 53 In Singapore, multiple funds have tokenised access to the fund via tokenisation platforms such as ADDX. In 2021 the ADDX tokenised an allocation to a global private equity fund. Some funds, while not tokenised themselves, are also using blockchain to process transactions and record share ownership.
 54 One study of 270+ institutional investors underscored this view. Source: Celent 2022 Survey of Global Institutional Asset Managers, Asset Owners, and Hedge Funds (Celent, 2022).

beneficiaries of cashflows, sits on the ledger.⁵⁵ The assets live on-chain, such that there is little to no need for an off-chain representation of the asset's digital form. The assets are interoperable with other assets that use the same network and can potentially also be used on other networks, via mechanisms such as “bridges” and “wrapping” of the asset, to the extent that they are demanded on these other networks. Interoperable assets in their digital form can be used on-chain across the securities lifecycle, from issuance and trading to post-trading activities and use as collateral.⁵⁶

Proposed levels of market disintermediation are not the focus of this paper. Depending on the tokenisation model adopted, the intermediaries involved, and the level of disintermediation will be different. See **Figure 6** for a summary view, distinguishing between native models with fully on-chain processes, minimally on-chain and hybrids in between. **Figure 6** illustrates that:

- Outside of a digitally “native” model, the participants involved in the trade of a financial asset remain the same as today. Market participants interact with tokenised securities on permissioned and typically siloed ledgers. These ledgers are run by established financial institutions and augment, rather than disrupt, existing processes.
- In a “native” model by contrast, industry participants may play a different role or may be disintermediated by smart contracts. An exchange, for example illustrated in **Figure 7**, may no longer be required in a “native” model during the execution stage of the trade lifecycle. A buy order would be submitted and market making would be handled by autonomous smart contracts. Clearing, settlement and custody stages would also be different compared to traditional models today.

A fully decentralised model is just one example of how the market may evolve, and there is no certainty that this will be the outcome. Another model would maintain intermediaries, such as custodians and exchanges, especially where the regulatory framework does not allow for self-custody.⁵⁷

When deciding on the appropriate regulatory approach to tokenisation, UK public authorities must also be mindful of the benefits and risks involved with public versus private blockchain models. Tokenised fund shares issued, recorded, and transferred solely on a private, permissioned blockchain managed by one or more trusted financial institutions may achieve both the efficiencies and risk reductions described above. Tokenised securities issued on a public blockchain, on the other hand, raise specific regulatory and compliance questions. In the case of tokenisation with private, permissioned blockchains, nodes are either run entirely within the bank or by a limited number of trusted financial institutions, and permissions to access the blockchain and permissions to purchase shares are closely managed. In light of guidance⁵⁸ and rulings⁵⁹ by the prudential regulators in the United States, a number of questions have been raised regarding the feasibility and compliance of tokenised units of authorised funds on a public blockchain, including issues concerning anti-money laundering,

sanctions, and qualified investors. Tokens on a public blockchain may be freely traded between pseudonymous parties, and solutions are needed to limit purchasers and holders to only those who fit the qualified investor criteria who are eligible to purchase such shares in the fund. Additionally, the issuer might only be able to KYC the initial holder of the tokenised share and the redeemer of the tokenised share. Solutions are required to ensure compliance with anti-money laundering and sanctions screening requirements for the intervening transactions of the tokenised share that occur between individuals or entities other than the initial holder and redeemer. White-listed contracts are one potential way to prevent non-KYC'd participants from buying tokens on a public blockchain.

If you tokenise an existing security, it needs to be for a specific purpose.

Global buy-side firm

To use this technology, we need to see how it will lead to increased revenues, lower costs, or lower risks. It's as simple as that.

Global sell-side firm

Many industry participants, especially on the buy-side, stress the importance of tokenising assets (such as existing securities) to solve a specific problem. Industry participants agreed the key benefits of tokenisation will come from activities that take advantage of the tokenised security's form, after the security has been issued. Put differently: issuing a tokenised security has limited value for the secondary market if it (i) cannot be traded, (ii) used as collateral to obtain financing or (iii) used in a repo transaction for the secured borrowing and lending of cash. As such, there is a clear need to explore how tokenisation can be applied across the lifecycle of the assets. Some of the key benefits of tokenisation for each lifecycle stage are described below:

- **Issuance.** Tokenised securities can be issued directly to the end investor, lowering costs. By being fully digital, tokenisation can streamline manual and burdensome operational processes. It also has the potential to reduce the number of intermediaries involved. Industry participants have highlighted, however, that fewer intermediaries may not be suitable in every situation. Faster issuance speeds, subject to regulatory requirements, could also allow for real-time market conditions to be reflected. A properly managed, permissioned platform may be used to assist parties to meet regulatory requirements applicable to the tokenised securities (e.g., limiting potential investors to only those pre-qualified and have passed KYC controls), thereby further reducing operational burdens and costs.

55 A smart contract is defined consistent with the definition put forward by the Law Commission in their 2023 report on digital assets: computer code that, upon the occurrence of a specified condition or conditions, is capable of running automatically according to pre-specific functions. A smart legal contract is a legally binding contract in which some or all of the contractual terms are defined in and/or performed automatically by a computer programme.

56 With regards to collateral management, new platforms are emerging to support the mobility of collateral using distributed ledgers. One example is HQLAx.

57 Self-custody refers to services that give owners direct control of their assets by safekeeping one (or multiple) private keys. These keys cryptographically unlock assets that are controlled by a set of public and private keys on a blockchain, similar to a username and password for an online account.

58 Refer, for example, to the Joint Statement on Liquidity Risks to Banking Organizations Resulting from Crypto-Asset Market Vulnerabilities. (Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, and Office of the Comptroller of the Currency, 2023).

59 Refer, for example, to the FRB Order No. 2023-02, Order Denying Application for Membership re Custodia Bank, Inc., Cheyenne, Wyoming, Federal Reserve System (FRB, 2023).

Figure 6: Different participation models for securities tokenisation — illustrative

Models and nature of token	Due diligence	Execution	Clearing	Settlement	Custody
Native: Business processes on-chain 1. End-to-end tokenisation <ul style="list-style-type: none"> Digital form is equivalent to asset 	Trust anchors* incl. Exchange (or members)	Liquidity pool, auto. market makers	N/A <i>Illustrative only. The need for intermediaries may still remain.</i>	DA wallet (custodian or self-hosted)	DA wallet (custodian or self-hosted)
Hybrid: Value transfer via add-on rail 2. Pure record of ownership tokenisation <ul style="list-style-type: none"> Record of ownership of custodied assets, digital form is therefore equivalent to asset 	Exchange (or members)	Exchange	Clearing house	Clearing bank	Custodian bank
Hybrid: Asset services via process step swap 3. Value tokenisation <ul style="list-style-type: none"> Digital asset (DA) owners own the value of the asset 					
Analog: BAU 4. Traditional financial markets					

Off-chain FMI Custodians DA-native infrastructure

Figure 7: Trade lifecycle impact across different participation models — illustrative

Models and nature of token	Due diligence	Execution	Clearing	Settlement	Custody
Native: Business processes on-chain 1. End-to-end tokenisation <ul style="list-style-type: none"> Digital form is equivalent to asset 	Trust anchors* Trust anchors conduct due diligence and issue verifiable credentials	Liquidity pool & Auto. Market Maker Receive trade orders, define asset price using smart contract and confirm trade	N/A <i>Illustrative only. The need for intermediaries may still remain.</i>	Self-hosted wallet Transfer tokens directly between counterparties' digital wallets	Self-hosted wallet Hold tokens inside wallets owned and controlled by the receiver
Hybrid: Value transfer via add-on rail 2. Pure record of ownership tokenisation <ul style="list-style-type: none"> Record of ownership of custodied assets, digital form is therefore equivalent to asset 	Exchange (or members) Conduct due diligence on market participants	Exchange Receive trade orders, match and confirm opposite trade orders when available	Clearinghouse Tokens are transferred, without netting or reconciliation processes	Clearing bank Deliver assets to accounts based on ownership of token	Custodian bank Entrust assets to custodian
Hybrid: Asset services via process step swap 3. Value tokenisation <ul style="list-style-type: none"> Digital asset (DA) owners own the value of the asset 	Exchange (or members) Conduct due diligence on market participants	Exchange Receive trade orders, match and confirm opposite trade orders when available	Clearinghouse Tokens are transferred, without netting or reconciliation processes	Clearing bank Digital registry of asset ownership updated based on tokens	Custodian bank Entrust assets to custodian
Analog: BAU 4. Traditional financial markets	Exchange (or members) Conduct due diligence on market participants	Exchange Receive trade orders, match and confirm opposite trade orders when available	Clearinghouse Reconcile trades, update accounts, and net off assets for transfer	Clearing bank Deliver assets to accounts based on netted balance	Custodian bank Entrust assets to custodian

Same as BAU Changed from BAU

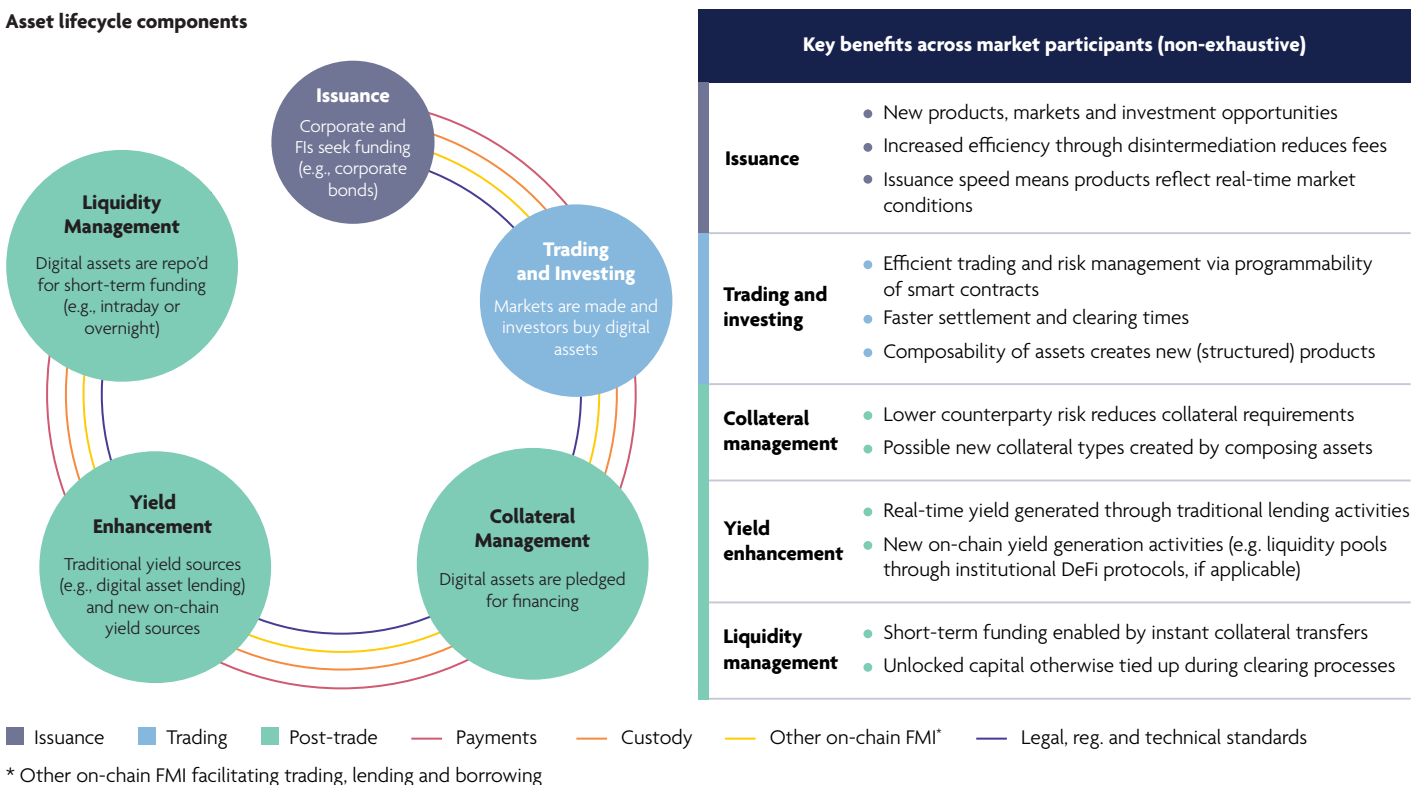
*Trust anchors refer to entities that verify and issue verifiable credentials to entities wishing to participate in a network.

- Trading and investing.** In their token form, securities can be transferred near instantly, significantly shortening the traditional clearing and settlement cycles, and settled atomically (where possible and appropriate for a given product or market)^{60,61}, reducing counterparty risk, bankruptcy risk, and performance risk for regular transfers. Such reduction in risk may further reduce the operational burdens and the market risks associated with collateral. Atomic settlement may further reduce the risks borne by intermediaries and clearing entities by simultaneously settling transactions across a chain of parties, providing better protection for parties than deliver versus payment (DvP) and receiver versus payment (RvP) settlement methods which only protect bilateral transactions. The programmability of tokenised securities also allows steps in the trade lifecycle to be executed by smart contracts, swapping traditional counterparties for transparent smart-contract protocols that react programmatically, and automating certain risk management practices.
- Post-trading.** Tokenised securities, for post-trading purposes, are fast-moving assets that can be used in various ways. They unlock capital that was previously needed as collateral by reducing settlement times and counterparty risks. As yield instruments, they can be lent or used as liquidity, generating revenues in real-time. As instruments to manage liquidity, they can be used to borrow short-term funding, such as intraday repurchase agreements (repos). Most industry participants believe that post-trade use cases will provide the most benefits, with some members noting high potential in the ability to collateralise more asset types and tokenise funds.

Figure 8 illustrates potential use cases for tokenisation across the asset lifecycle and notes key benefits expected by industry participants.

Despite the expected value that post-trade use cases can provide, no jurisdiction has yet deployed at scale a native model where the entire asset lifecycle occurs on-chain. Initiatives observed in leading jurisdictions are still relatively immature, and they are still largely reliant on traditional, business as usual approaches (e.g., with multiple intermediaries). Refer to Figure 9 for a summary of select notable initiatives across the globe. As this figure illustrates, there is still a range of initiatives, and none are fully native (i.e., end-to-end asset lifecycle occurring on-chain). The UK still has time to establish itself as a leading location for tokenised securities. To do this, the UK will need to deliver on three missions to support market growth, as detailed in the following section. Much of this will involve providing regulatory clarity around tokenised securities across all stages of the asset lifecycle. Figure 10 highlights relevant regulatory considerations applicable at each step. See section 3 for further detail.

Figure 8: Benefits of key uses cases across the asset lifecycle (issuance, trading and investing, and post-trade)



60 Atomic settlement refers to the simultaneous settlement of assets to achieve delivery versus payment or payment versus payment transactions, whereby assets are linked to ensure the transfer of an asset only occurs if the others are simultaneously transferred. Source: On the future of securities settlement (BIS, 2020).

61 The US and Canada expect to move to a “T+1” standard by 2024, which will require most trades to settle the day after the trade. The UK, via its Accelerated Settlement Taskforce, is also exploring a move to this standard, as well as “any other future developments” to the settlement lifecycle, such as T+0 as would be the case for atomic settlements. Source: UK Government Accelerated Settlement Taskforce (UK Government, 2022).

Figure 9: Mapping of select initiatives to participation models (non-exhaustive)

Native	<p>EIB digital sterling bond (2023, EIB)</p> <ul style="list-style-type: none"> • Bond issued on HSBC Orion private blockchain which serves as the record of legal ownership, provides an operational framework to manage the floating rate instrument and its lifecycle events • Public blockchain gave investors transparency while keeping anonymity 	<p>EIB digital bonds (2021/22, EIB)</p> <ul style="list-style-type: none"> • Two bonds issued and settled using DLT <ul style="list-style-type: none"> – One (2021) was issued on Soc Gen's tokenisation platform – Another (2022) was issued on Goldman Sachs' tokenisation platform • Settled using a representation of central bank money 	<p>Project Guardian (2022, MAS, JPN, DBS, SBI)</p> <ul style="list-style-type: none"> • Bank deposits and government bonds tokenized to become digital bearer assets • Institutional DeFi used to trade tokens 	
	<p>SocGen digital covered bond (2019, SocGen)</p> <ul style="list-style-type: none"> • SocGen issued security tokens on public Ethereum backed by corporate and home loans • Public blockchain gave investors transparency while keeping anonymity • Used tokens as collateral in open DeFi protocol • SocGen was the sole investor in the tokens 	<p>Santander digital bond (2019, Santander)</p> <ul style="list-style-type: none"> • Bond issued and settled with tokenised cash on public Ethereum • Coupon payments also digitised 	<p>HKSAR tokenised green bond (2023, HKSAR)</p> <ul style="list-style-type: none"> • Bond issued on private blockchain • Settled select processes on a private blockchain (incl coupon payment) 	
	<p>Project Ion (2022, DTCC)</p> <ul style="list-style-type: none"> • Used DLT platform to settle equities • Runs in parallel to DTCC's classic settlement system which remains the definitive record 	<p>UBS digital bond (2022, UBS)</p> <ul style="list-style-type: none"> • Payment for the bond is settled on DLT • Dual listed and traded on SDX and SIX Swiss Exchange (SIX) • Bond is purchased via SDX member banks 		
	Hybrid			

Figure 10: Select key legal and regulatory considerations across the asset lifecycle

Asset lifecycle stage	Selection of key regulatory and legal considerations	Selection of relevant regulation and legislation
Issuance	<ul style="list-style-type: none"> • Property rights: Will there be statutory reform to recognise digital assets as property rights? 	<ul style="list-style-type: none"> • In their 2023 digital assets report, the Law Commission recommends legislation to confirm the existing common law position that digital assets attract personal property rights.
	<ul style="list-style-type: none"> • Capital requirements: How will the PRA interpret the BCBS 545 standard, and also combat concerns for fragmented liquidity? 	<ul style="list-style-type: none"> • Capital Requirements Regulation 2013 (CRR)
Trading and investing	<ul style="list-style-type: none"> • Use of a central securities depository (CSD): Will there be provisions in the regulation around requirements to use a CSD? Will messaging standards be compatible with DLT systems? 	<ul style="list-style-type: none"> • Central Securities Depositories Regulation (CSDR) • Markets In Financial Instruments Directive 2014 (MiFID II)
	<ul style="list-style-type: none"> • Digital cash and settlement finality: What digital cash solutions can enable settlement of the transactions? How can settlement finality protections be ensured? 	<ul style="list-style-type: none"> • Uncertificated Securities Regulation 2001 (USR) • Financial Markets and Insolvency (Settlement Finality) Regulations 1999 (SFR)
	<ul style="list-style-type: none"> • Custody arrangements: What are the legal and regulatory requirements around custody arrangements? 	<ul style="list-style-type: none"> • Client Asset Sourcebook Rules (CASS)
Collateral management, yield enhancement and liquidity management	<ul style="list-style-type: none"> • Collateral: How might a collateral regulatory regime interact with existing regimes for mainstream collateral arrangements? 	<ul style="list-style-type: none"> • In their 2023 digital assets report, the Law Commission recommends that statute confirm the digital securities models that already fall within scope of existing collateral regulations and provide a framework for the collateral arrangements currently outside of scope (such as those relating to crypto tokens). • Financial Collateral Arrangements (No. 2) Regulations 2003 (FCAR)

3. NEXT STEPS FOR THE UK

Tokenisation represents a substantial market opportunity for industry participants and the UK is already building strong momentum around legal and regulatory frameworks, as well as other initiatives (such as the FMI Sandbox). To unlock the full potential of tokenisation, more needs to be done. Government and industry need to align around a roadmap to ensure that the UK's financial services industry remains globally competitive and that the tokenised securities market evolves at pace.

3.1 HOW THE TOKENISED SECURITIES MARKET MIGHT BE STRUCTURED

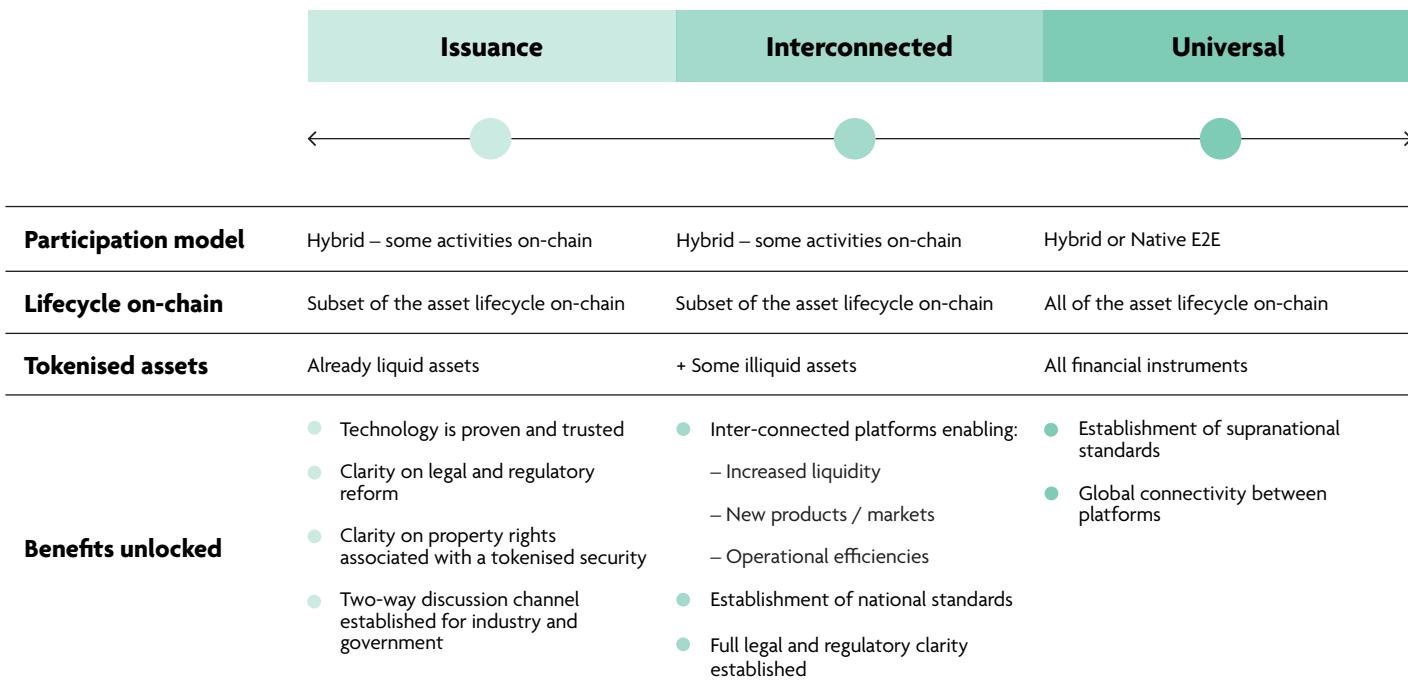
The tokenised securities market may evolve along several different structures. In time, the market will need to decide what the target structure should look like (e.g., with a universal or interconnected ledger, using native end to end (E2E) tokenisation process or a hybrid one). See **Figure 11** and a summary below for key structure types:

- In the first structure (“siloeed”), industry participants experiment to prove the technology adds value and improves the existing status quo. In practice, this stage results in multiple individual market participant initiatives with different firms investing in their own solutions on siloeed ledgers for a disparate range of use cases. The focus is likely to be in predominantly liquid asset classes where efficiency gains can be made (such as bonds) and on issuance (rather than other lifecycle use cases).

- In the second structure (“interconnected”), industry participants use the technology in earnest with a broader range of asset classes and use cases, and previously siloeed ledgers shift towards an interoperable ecosystem which means less fragmented liquidity. Here, market participants focus more on less liquid asset classes and use cases that unlock a wider range of tokenised securities which may be used as collateral.
- In the third structure (“universal”), the market expands across a full suite of tokenisation use cases and asset classes. This could be a hybrid model (with some lifecycle activities occurring off-chain), or a full native E2E model where all activities occur on-chain.

In the short-term, government and industry need to support the siloeed market structure while also setting up the enablers for other market structures. Leading jurisdictions — such as Singapore, Switzerland, and Luxembourg — have already built momentum in the siloeed model and are moving towards an interconnected one. It is therefore not enough for the UK government to focus only on enabling industry experimentation in siloeed ledgers. Efforts must also start to prepare for more interconnected, or even universal, ledgers. Underpinning all of this must be an effort to demonstrate to industry the public sector commitment towards fostering a broader tokenisation ecosystem.

Figure 11: Overview of potential network structures



3.2 THE OPERATIONAL ROADMAP FOR THE UK

For the UK to keep up and position itself as a global leader as the tokenisation market scales, it will need to achieve three missions.

Each mission has actions that the UK government can start immediately, building on existing efforts already underway, though the first mission (enabling innovation and experimentation) may be a lesser focus over the long-term as the market scales to a broader set of use cases.

- Mission One:** Enable innovation and experimentation, underpinned by legal and regulatory certainty.
 - Current UK status: in progress. The planned FMI Sandbox will help provide regulatory certainty and encourage experimentation, and it will have most impact if it focuses on the most pressing use cases for industry and the regulatory “sticking points” that are currently preventing the market from conducting initial issuances and then scaling. The work by the UKJT and the Law Commission will go a long way to provide legal certainty for industry participants. There also needs to be more awareness across the industry on the UKJT’s legal statements.
- Mission Two:** Foster a flourishing UK digital market by promoting interoperability and safe innovation at scale.
 - Current UK status: yet to be started, though there is recognition that there is a need to ensure siloed solutions are interoperable, and that legal and regulatory reforms may be required to support use cases beyond issuance (such as posting a tokenised security as collateral and/or collateral arrangements). The FCA is planning to consult on a new custody regime for tokenised securities, and the Law Commission’s 2023

digital asset report has drawn the distinction between “non-custodial intermediated holding arrangements” and “custodial intermediated holding arrangements.”

- Mission Three:** Become a leader in global standards for the tokenised securities market.
 - Current UK status: yet to be started, though the UK is already a convener in key forums that could be used to establish standards to support interoperability of networks on a global scale. The UK should therefore put itself in a position to lead the thinking in international forums.

Efforts to achieve these missions will kick off positive feedback loops that make it easier for the UK to achieve and maintain its role as a leader in securities tokenisation. Confirming the legal status of tokenised securities, for example, will ensure that the UK legal community can comfortably advise clients and issue clean legal opinions. This will, in turn, encourage more industry participants to experiment with these technologies in the UK. Experimentation and a clear roadmap for the sandbox will signal internationally and domestically that the UK government is committed to supporting a flourishing market for tokenised securities, which may encourage firms experimenting abroad to do so instead in the UK.

The following recommendations are aimed across arms of government, regulators, the UK’s legal community and other market participants to ensure the missions are reached. See **Figure 12** for a summary view.

Figure 12: Overview of key recommendations by mission

	Short term — Next 18 months	Medium term — 18 months to five years
<p>Mission One Enable innovation and experimentation, underpinned by legal and regulatory certainty</p> <p>■ Immediate priority actions</p>	HMT should urgently roll out the first FMI Sandbox for the use cases identified as most pressing.	Parliament, the BoE, and HMT should, in line with recommendations from the Law Commission, (i) provide statutory clarity on the digital securities models that already fall within scope of existing collateral regulations and (ii) provide a statutory framework for collateral arrangements (such as those relating to crypto tokens) not currently provided for under existing regulations.
	HMT should urgently further define the roadmap for the FMI Sandbox, including a view of how it will prevent cliff-edge effects when the Sandbox ends.	The BoE and the PRA should clarify capital requirements for tokenised securities in light of the BCBS 545 standard, while also accounting for potential concerns around fragmentation of liquidity.
	HMT, the FCA and the PRA should continue to distinguish terminology around tokenised securities, cryptoassets, and the underlying DLT, and ensure that usage is not conflated or misinterpreted by industry.	HMT should clarify that regulation of tokenised assets will not be conflated with the regulation that already applies to existing financial services and processes that use DLT infrastructure (such as an internal DLT-based books and records system).
	HMT, the FCA, and the BoE should provide further flexibility on Central Securities Depositories Regulation (CSDR) and any provisions to allow industry participants to navigate the requirements to use a CSD.	The FCA, the PRA and the BoE should decide which, if any, other regulatory standards or concepts need to be amended to support tokenised securities.
	HMT and the BoE should continue to support the development of digital cash solutions to enable the settlement of transactions.	
	HMT, via the Debt Management Office, should issue a digital gilt within the FMI Sandbox.	
	HMT and the FCA should take further actions beyond the issuance of a digital gilt (including public statements) that encourage experimentation with tokenised securities and further participation in the Sandbox.	
	HMT, the PRA, and the FCA should support further two-way engagement between industry participants (including firms' own legal experts), regulatory representatives, and other legal experts specialising in digital assets and securities tokenisation.	
<p>Mission Two Foster a flourishing UK digital market by promoting interoperability and safe innovation at scale</p>	HMT, the FCA, and the BoE should support industry participants as they convene and develop voluntary standards for tokenised securities.	The Law Commission, Parliament, the UK Jurisdiction Taskforce, the FCA, and HMT should provide legal and regulatory clarity around custody arrangements for tokenised securities.
	HMT should explore if there is industry appetite for a shared, national infrastructure for tokenised securities.	HMT should consider developing a principles-led approach to the application of the Client Assets Sourcebook (CASS) rules.
		HMT should promote the UK as a centre of excellence on tokenised securities and other digital assets.
<p>Mission Three Become a leader in global standards for the tokenised securities market</p>	The UK government should lean on its existing strengths and experiences to foster discussion and collaboration around supranational standards for securities tokenisation.	
	HMT should collaborate and partner with leading jurisdictions and connect to their pilots or Sandboxes.	

3.2.1 MISSION ONE — ENABLE INNOVATION AND EXPERIMENTATION, UNDERPINNED BY LEGAL AND REGULATORY CERTAINTY

Industry participants need space to innovate and experiment with securities tokenisation (such as the FMI Sandbox), and legal and regulatory certainty. As already mentioned in this paper, the UK has been building strong momentum and progress is acknowledged in the recommendations below.

For the UK to achieve this mission, there are two problems that need to be solved:

- Limited understanding among industry participants as to the legal status and treatment of tokenised securities in the UK.** Industry participants need confidence that their tokenised security will have corresponding property rights as with a traditional security. This in turn requires the legal community — who will be called upon to give legal opinions — to understand that transacting in tokenised securities, or using new technologies, will not give rise to novel legal issues. There has already been a deep body of work around the applicability of English law to digital assets and tokenised securities that should be continued and expanded upon.⁶² To date, there has been a lag in industry awareness and understanding of this work and perception challenges can be enough to impede progress in the market's development. Greater confidence in providing legal opinions can become a core part of the market's maturing process and improve market disclosure of matters of fact that may otherwise be obscure or less understood. Real-world use cases will also help to build confidence in the legal framework — in many jurisdictions, sovereign issuances on DLT platforms have led the way.
- Lack of clarity among regulators, supervisors, and industry participants as to the regulatory reforms (including facilitative technical changes) that may be required to support a market for tokenised securities, though the FMI Sandbox is looking to address much of this.** Industry participants have highlighted some challenges associated with the current regulatory rulebook. Examples include: the CSDR and MiFID II rules that require use of a CSD; the need for securities settlement systems operated by CSDs to comply with certain international messaging standards (such as ISO 20022) that are not compatible with DLT arrangements; complexities associated with the current custody framework; references to “accounts”, “book entries”, “credits” and “debits” within existing legislation and regulation, when those concepts do not map neatly onto all DLT-based arrangements; and conflicts of law provisions under certain financial regulations (such as FCARs and SFRs) that apply to particular arrangements on the basis of location of the account or intermediary, when it is not clear how these will apply to tokenised securities on a blockchain. Many of these challenges can be addressed through legal structuring techniques, but they may restrict certain DLT models or features in practice.

Some industry participants highlighted the need for any regulatory reforms to be technology neutral. At the same time, others have pointed out that regulatory reforms should be sensitive to the features of particular technologies and deployments where these have implications as to the legal nature of the instrument or the relevant risk factors. The industry also recognises that many of the pain points with the current regulatory regime will need to be identified through experimentation in close collaboration with HMT, the FCA, and the BoE. Government-sponsored sandboxes — like the FMI Sandbox — are ideal forums for this.

Unless you are already doing a proof of concept or pilot scheme, it is very difficult to know the regulatory challenges without working in spaces alongside regulators.

Global sell-side firm

Steps the UK should take immediately:

- HMT should urgently roll out the first FMI Sandbox for the use cases identified as most pressing.** Technological innovations in the financial sector are developing fast. Capitalising on this represents a generational opportunity for the UK to proceed in the right way, protect the relevance of its capital markets and lead the world in this field. HMT is expected to launch a consultation on the FMI Sandbox. This would be a helpful forum to engage with industry on key design decisions, and detail on the application process, timelines and criteria for each stage would be welcome. Industry participants agreed that it could be helpful for the consultation to agree on the core use cases that the UK's tokenisation market should be built around initially, and the potential use cases that should be accounted for in the future as the market develops. It will be key for participants that they can move beyond the mere technology testing phase quickly. This prioritisation will ensure that regulatory modifications and exemptions are applied in a timely manner, and that learnings from the sandbox are made permanent at pace, by pushing through any permanent change to regulation for those firms to rely on when they exit. It will also ensure that the regulation is fit for purpose for the use cases that the market cares about most. Many industry participants agreed that use cases could evolve across four key use cases in particular:

 - Issuance of bonds.
 - Posting a tokenised security as collateral.
 - Tokenising funds and funds management.
 - Expanding into illiquid asset classes.

⁶² Refer to the section “Learning from other jurisdictions” for further detail.

- **HMT should urgently further define the roadmap for the FMI Sandbox, including a view of how it will prevent cliff-edge effects when the sandbox ends.** Under Clause 16 of the FSM Act, HMT can propose that arrangements under the FMI Sandbox be made permanent, meaning outcomes of the sandbox can result in permanent modification of the UK legislative or regulatory framework. This is an attractive feature of the sandbox; with the right resources, necessary rule changes can occur in tandem with its operation. Certain industry participants have expressed fears of cliff-edge effects following the closure of the sandbox where they would need to jump through several regulatory hurdles — including additional authorisation — to continue using the technology. While some uncertainty is inevitable and lessons will be learned through the operation of the sandbox, we recommend that HMT provides guidance to industry on how it envisions the sandbox to evolve and expand. Setting out in advance how a smooth ramp into authorisation will be provided, and how participants will graduate through the sandbox, will be helpful. Any modifications already identified through the EU DLT pilot scheme should be the baseline, with additional flexibility for participants in the sandbox. More widely, it would be useful for HMT to consider ways to encourage industry collaboration and participation in the sandbox.

We need to know there is an exit route from the sandbox.

Global sell-side firm

- **HMT, the FCA and the PRA should continue to distinguish terminology around tokenised securities, cryptoassets, and the underlying DLT, and ensure that usage is not conflated or misinterpreted by industry.** Many jurisdictions, including the UK, use the term cryptoassets holistically to include all types of assets that use DLT and cryptography. In its “Future Financial Services Regulatory Regime for Cryptoassets” consultation, HMT helpfully outlined a non-exhaustive glossary around the types of cryptoassets, which included exchange tokens, utility tokens, security tokens (of which tokenised securities can be classified), non-fungible tokens, stablecoins, asset-referenced tokens, commodity-linked tokens, algorithmic tokens, governance tokens, and fan tokens. The challenge with broad definitions such as these is that they might conflate tokenised securities, which are already subject to regulation, with other cryptoassets and activities that are not. Clearly signposting definitions, including through policy statements and any future regulatory consultations, will provide industry the clarity and confidence they require to participate in this market.

Steps the UK should take in the short term (the next 18 months):

- **HMT, the FCA, and the BoE should provide further flexibility on Central Securities Depositories Regulation (CSDR) and any provisions to allow industry participants to navigate the requirements to use a CSD.** Industry participants have highlighted that current CSD requirements under the UK CSDR⁶³ are particularly problematic for certain models of trading and settling tokenised securities. Current regulation requires security tokens meeting the definition of a “transferable security” under MiFID II that are traded on a trading venue to be recorded in book-entry form in a CSD. While this may be achievable for certain tokenised security structures (notably, where the tokenisation is carried out at the top tier level by a CSD), it may not be for other structures, for example where there is no legal operator capable of being authorised as a CSD. As part of the FMI Sandbox, HMT and the BoE should review UK CSDR requirements — particularly Article 2(1) (definitions), 3(2) (book-entry form), 16 (authorisation of a CSD) and 35 (messaging standards) — and the extent which these requirements can be adapted to account for DLT. We welcome efforts already taking place in this regard, including those by HMT as part of the FMI Sandbox.
- **HMT and the BoE should continue to support the development of digital cash solutions to enable the settlement of transactions.** Industry participants would welcome continued guidance about the ways in which digital cash will be enabled in the UK (e.g., through tokenised commercial bank money, interoperable DLT and core payments infrastructure, and/or CBDC); the regulatory standards to apply in each case; and capital treatment. Clarity is needed because, for example, the BIS’ Principles for Financial Market Infrastructure (#9) generally requires FMIs to settle a transaction in central bank money where practical and available.⁶⁴ Across financial regulation (such as FCARs, SFRs, and CSDR) there are also references to money, cash and pecuniary claims with no precise definitions attributed to them, making it challenging to see how these definitions map clearly to particular new digital forms of money (such as regulated stablecoins). Clarity should be provided on the forms of settlement that could be used including properly regulated digital forms of cash. Despite expectations outlined from the Bank’s Financial Policy Committee (FPC)⁶⁵ and the Bank’s consultation paper on CBDCs,⁶⁶ industry participants would feel more confident in making underlying investments in the tokenised securities market if the Bank were to offer further guidance and clarity around its expectations for digital cash (such as tokenised commercial bank money) used in the settlement of tokenised security transactions. There may also be necessary amendments to the financial regulations described above to provide clarity around the use of regulated stablecoins for the settlement of tokenised security transactions as well.

⁶³ Refer to The Central Securities Depositories (Amendment) (EU Exit) Regulations 2018 (UK Government, 2018), The Central Securities Depositories Regulations 2014 (UK Government, 2014), and The Central Securities Depositories Regulations 2017 (UK Government, 2017).

⁶⁴ Source: Principles for financial market infrastructures (BIS, 2012). An operator of a recognised payment system is required to have regard to PFMI 9 in its design and operation of the system (see s. 188, BA09).

⁶⁵ The FPC has set out expectations that stablecoins should be regulated to standards equivalent to those applied to traditional payment chains. It also outlines that stablecoins used as a “money-like instruments” should have standards equivalent to those that apply to commercial bank money, in terms of stability of value, robustness of legal claim and ability to redeem at par in fiat money.

⁶⁶ Refer to further detail on the BoE consultation paper and approach in footnote 41.

- HMT, via the Debt Management Office, should issue a digital gilt within the FMI Sandbox.** Digital bond issuances in Luxembourg, Switzerland, and Singapore (to name a few examples) have raised the profile of these jurisdictions. Many industry participants said these jurisdictions were currently the “go-to” places for securities tokenisation and digital assets more broadly. There is an opportunity for the UK government to further signal its commitment to tokenised securities through issuance of a digital gilt with secondary trading available within the FMI Sandbox that could help to encourage more liquidity within the market. Statements by HMT already indicate there may be appetite to explore this, with the then Economic Secretary to the Treasury saying that HMT will be “undertaking a programme of work to explore whether it is possible to apply DLT to the debt issuance process”.⁶⁷ This issuance could also serve as a high-profile piloting of the technology and standards under development in the FMI Sandbox.
- HMT and the FCA should take further actions beyond the issuance of a digital gilt (including public statements) that encourage experimentation with tokenised securities and further participation in the sandbox.** Industry participants will be encouraged to invest and experiment with securities tokenisation if there is more legal and regulatory certainty, but HMT could go even further to support and encourage experimentation. A digital gilt issuance — following the model set by sovereigns around the world, as discussed above — would mean public authorities can lead by example, showing commitment to the technology. Public statements countering misperceptions around tokenisation (e.g., to say that tokenisation is not crypto-currency) and raising awareness on the potential benefits to the broader ecosystem (such as the potential to more easily comply with KYC and AML requirements), could be useful. Efforts could also include launching additional sandboxes, in line with the powers granted in the FSM Act. A final suggestion could be that HMT and the FCA convene industry participants to identify constraints for adoption of tokenised securities (beyond legal and regulatory considerations) and outline potential solutions.
- HMT, the PRA, and the FCA should support further engagement between industry participants, regulatory representatives, and other legal experts specialising in digital assets and securities tokenisation.** Raising awareness on legal and regulatory treatment of tokenised securities where already defined will give industry participants confidence to invest and experiment in the market. Currently, there are differing levels of familiarity and confidence, which can lead to low participation. Many legal experts specialising in digital assets and tokenised securities, for example, expressed confidence that the UK’s legal framework could support tokenised securities, but in-house legal experts with less specialisation did not always share this view. Differing levels of familiarity are understandable given the recent volume of work around tokenised securities, as well as the ongoing consultations on regulatory reform and technical changes that may be required. Creating a forum whereby firms could raise legal and regulatory questions for clarification by regulators or legal experts (such as those in the UKJT or the Law Commission) would be extremely helpful. Another idea could be to promote the existing UKJT legal statement more broadly across the industry to raise awareness. These interventions should be prioritised early because they will encourage further market activity and differentiate the UK as a leading jurisdiction supportive of tokenisation initiatives.

Steps the UK should take in the medium term (18 months to 5 years):

- Parliament, the BoE, and HMT should, in line with recommendations from the Law Commission, (i) provide statutory clarity on the digital securities models that already fall within scope of existing collateral regulations and (ii) provide a statutory framework for collateral arrangements (such as those relating to cryptotokens) not currently provided for under existing regulations.** Industry participants highlighted the ability to use a tokenised security as collateral as a key area of opportunity for tokenisation. Legal and regulatory clarity around collateral management for some tokenised securities structures and collateralisation models is needed before some use cases can materialise at scale.⁶⁸ The Law Commission’s recent paper⁶⁹ recommends that statutory reform is required to provide for collateral arrangements with respect to crypto tokens and crypto assets. Legal experts also noted that further work may be required to clarify the collateral regulatory regime for tokenised securities, and how this interacts with existing regimes for mainstream financial collateral requirements as defined the Financial Collateral Arrangements (No. 2) Regulations 2003 (FCAR).⁷⁰ While some tokenised securities structures may fall squarely within the scope of the existing FCARs, there is some uncertainty as to the precise boundaries. Efforts to provide legal and regulatory clarity will necessarily be cross-departmental. Policymakers in HMT, the BoE and Parliament will need to collaborate, for example, with legal experts to define how private law will interact with the regulatory framework.

It’s a bit of a “coop-etition” [cooperation and competition]. You need to show firms that the value is big enough and that collaboration is worth it.

Global sell-side firm

⁶⁷ Source: Keynote Speech by John Glen, prior Economic Secretary to the Treasury, at the Innovate Finance Global Summit (UK Government, 2022).

⁶⁸ One example raised from a legal perspective relates to electronic trade documents. These documents are possessory and subject to conflict rules for physical goods, requiring compliance with the law where the asset is as well as the governing law where the security giver is. Recent case law suggest that this rule still applies in particular to the creation of a valid security. It is difficult to determine where an asset is located on a DLT, but there is a view among some that the UK Parliament is not allowing for agreement of location or a “common sense” approach. Singapore, to provide an alternative example, does.

⁶⁹ Refer to footnote 5.

⁷⁰ The ongoing UNIDROIT consultation (UNIDROIT Principles on Digital Assets and Private Law) is an opportunity for this work to inform the UK’s future approach. The consultation received final comments in February of this year.

- The BoE and the PRA should clarify capital requirements for tokenised securities in light of the BCBS 545 standard, while also accounting for potential concerns around fragmentation of liquidity.** While the PRA has previously issued commentary on capital treatment of cryptoassets, some industry participants highlighted uncertainty around capital requirements and the national interpretation of the BCBS 545 guidance. The BCBS 545 guidance blurred the distinction between cryptoassets, tokenised securities and the underlying DLT, potentially conferring crypto-asset-like treatment to tokenised securities by reference to the underlying technology. These are, however, important distinctions that give rise to significant differences in the risk profiles of different deployments of the technology. It is generally understood that some tokenised securities will be treated as “Category 1” with capital requirements based on those applicable under the existing Basel framework. But there are multiple conditions to Group 1 categorisation (and, within that Group 1a categorisation, which is required for qualification as eligible collateral or as high-quality liquidity assets). These conditions are onerous and, in some cases, unclear. If there is any introduction of additional counterparty risk, such as if a “wrapper” is introduced on a tokenised security as it traverses networks, this could imply that tokenised security is a “Category 2” asset which carries a 100% capital charge or 1250% Risk Weighting.⁷¹ If costly capital treatments were to be applied to tokenised securities that have wrappers issued around them, then industry participants may choose not to traverse those networks and avoid the increased counterparty risk and capital costs. The implication is that liquidity may remain fragmented across the market. More broadly, if capital requirements are even fractionally higher than those for traditional securities, then tokenised securities may never achieve an equal footing to traditional securities. Many UK Finance members think that the capital requirements for tokenised securities should be the same as for traditional ones. Dynamics such as these should be considered in the BoE’s and PRA’s directive and interpretation of BCBS guidance. In relation to the future development of prudential rules for custody of tokenised securities, we believe UK policymakers should take an off-balance sheet approach to custody of tokenised securities as set out in the BCBS 545 standards. It is essential that any capital and liquidity requirements associated with tokenised securities do not make custody unfeasible at scale for banks and prevent qualified institutions such as custodians from providing institutional-grade solutions that address identified risks of this novel asset class. We therefore believe that in keeping with the “same activity, same risk, same regulatory outcome” principle, custodied tokenised securities should not be treated as on-balance sheet and should be accounted for the same way other assets are treated.
- HMT should clarify that regulation of tokenised assets will not be conflated with the regulation that already applies to existing, regulated financial services that use DLT infrastructure (such as an internal DLT-based books and records system).** A financial institution’s adoption of a blockchain or DLT-based internal books and records system is a key example. In keeping with HMT’s core design principle of “same activity, same risk, same regulatory outcome” as outlined in their “Future Financial Services Regulatory Regime for Cryptoassets” consultation, this should not be subject to

additional regulation. The adoption and operation of such a system by any financial institution would have been subject to existing regulations governing internal books and records. The existing supervision and oversight of that financial institution adopting said system will also ensure that such a system does not pose additional risks when compared to a traditional books and records system. Firms should not be prevented from investing in assets solely because they have been recorded on the internal bookkeeping records of a financial institution as a token (“Book Entry Tokens”). Such assets should continue to be deemed as a traditional asset. Book Entry Tokens are not digital assets or cryptoassets; rather, Book Entry Tokens are the book entries of the financial institution, representing a record of, in the case of cash, the deposit liability of the financial institution has to its customers, and in the case of securities and non-cash assets, such assets the financial institution holds in custody for the benefit of its customers. Book Entry Tokens cannot leave the internal systems of the financial institution, posing no additional risk than book entries in existing, (non-DLT) electronic books and records systems in use today.

- The FCA, the PRA and the BoE should decide which, if any, other regulatory standards or concepts need to be amended to support tokenised securities.** We expect that the industry will determine many of the standards (such as technical standards) required to enable connectivity in the market, and that these will be voluntary and non-binding in many cases. In some situations, however, it may be required to amend existing regulatory standards, such as for activities related to custody or KYC/AML requirements. Another example is messaging standards outlined in Article 35 of the CSDR, which may need to be amended for applications to DLT. (See earlier recommendation.) The UK CSDR requires a messaging-based model for communications and compliance with international messaging standards, but it is not clear that requirements for messaging standards such as these are compatible with DLT systems (where communication does not generally involve messaging-based systems and for which there is a lack of international standards). Similarly, concepts of “book-entries” may not map neatly to DLT arrangements (see earlier recommendation as an example). The FCA, the PRA and the BoE should work with industry to understand where regulatory standards needed amending. The FMI Sandbox is again an ideal opportunity to do this.⁷²

⁷¹ Source: Prudential Treatment of cryptoasset exposures (BCBS, 2022).

⁷² Peer jurisdictions, such as the EU, have similarly noted the important of standards to ensure interoperability of solutions and connecting with existing market infrastructure. The European Supervisory Markets Authority has concluded “interoperability among different technologies should be tackled by the market” in the first phase of EU DLT pilot regime, and that regulators should discuss with industry how to achieve this. Source: Report on the DLT Pilot Regime (ESMA, 2022).

3.2.2. MISSION TWO — FOSTER A FLOURISHING UK DIGITAL MARKET BY PROMOTING INTEROPERABILITY AND SAFE INNOVATION AT SCALE

For the UK to achieve this mission, there needs to be market liquidity and a scaled-up, connected ecosystem for tokenised securities. While some fragmentation is to be expected in the early stages of the market's development, the UK can lead by looking ahead to support eventual interoperability of solutions. There are therefore two problems that need to be solved:

- **High level of market fragmentation in current state.** Many institutions are investing in their own tokenisation initiatives resulting in “walled gardens” where networks are used by independent market participants, and it is complicated to connect with existing elements of market infrastructure (such as trading venues). Technical standards differ between platforms, but there are also other complexities such as navigating the range of digital asset custodians available. On the buy side, for example, funds often operate as separate legal entities and therefore require distinct relationships with firms offering custody services. Custodians of digital assets, including tokenised securities, have different technical solutions that make it difficult (and costly) for financial intermediaries to understand how their assets are safeguarded and if custodian insolvency risk is adequately managed. One example of this difficulty is that legal contract terms across custodians are not standardised or drawn up as a financial institution might expect. Dynamics such as these make connectivity between banks, FMIs, issuers and the buy-side more difficult. Interoperability of liquidity (how to aggregate liquidity across buy-and-sell-side participants), and interoperability of custody (how to move the asset across the ecosystem) is critical, and industry participants generally agree that this does not exist currently within the UK.
- **Lack of standards to ensure interoperability and more complex use cases as the market evolves.** Liquidity will remain fragmented, and the market will not scale unless interoperability is “baked in” to the experiments and platforms that firms are investing in today. Defining technical and legal standards will be the way to ensure connectivity between solutions. In many cases these will need to be led by the industry, and as a first step standard setting should focus on where liquidity is most highly prized. Technical standards cover considerations around token structure (how a token formats and organises its attributes); token security (encryption, access control, authentication mechanisms); custody and safeguarding;

and compliance with regulatory requirements. Legal standards refer to how interpretations of common law and/or regulatory changes translate into the legal contracts of the tokenised security. Standards can be designed such that DLTs can be connected to one another over time, and that the market can smoothly expand into more complex use cases (such as the tokenisation of illiquid assets like real estate).

Steps the UK should take in the short term (the next 18 months):

- **HMT, the FCA, and the BoE should support industry participants as they convene and develop voluntary standards for tokenised securities.** This could potentially take the shape of an industry-led standards board which would convene and consult with the view of developing guidance that broader industry participants could adopt as additional use cases around securities tokenisation are enabled. As a first step, the standards board could review the range of existing voluntary standards that apply to tokenised securities today, and where industry participants feel standardisation is needed. It may also be a matter of amplifying and engaging with the work of global organisations — such as the Global Blockchain Business Council (GBBC) and the UK-based financial services division, GBBC Digital Finance — that provide industry thought leadership on voluntary standards to be adopted at scale. The standards could eventually be piloted in the FMI Sandbox.
- **HMT should explore if there is industry appetite for a shared, national infrastructure for tokenised securities.** There is no unanimous agreement across the market on the target market infrastructure for securities tokenisation. Some industry participants suggested that a shared, regulated infrastructure at a national level could be the target (such as a digital exchange, as observed in Switzerland or Singapore). Others observed that it was more important to have interoperable networks that could connect to each other, but no single exchange. It will be valuable for HMT (in partnership with the FCA, the BoE and the PRA) to convene industry participants on what the target structure should look like and if there is a role the public sector can or should play in supporting its development.

Steps the UK should take in the medium term (18 months to 5 years):

- **The Law Commission, Parliament, the UK Jurisdiction Taskforce, the FCA, and HMT should continue their efforts to provide legal and regulatory clarity around custody arrangements for tokenised securities.** Industry participants have highlighted the critical role of custody in supporting a scaled-up tokenised securities market. Standardised legal guidance and clarity around supervisory expectations with regards to custody can help market actors to navigate this complex landscape more effectively. Recommendations from the Law Commission⁷³, as well as a planned

⁷³ The Law Commission's 2023 report on digital assets draws a distinction between “custodial intermediated holding arrangements”, “non-custodial intermediated holding arrangements” and “non-holding arrangements” based on the legal consequences of such arrangements. The LC concludes that trusts can support a broad range of custodial intermediated holding arrangements, including where the underlying crypto-token entitlements are held on a consolidated unallocated basis for the benefit of multiple users. Refer to footnote 5 for the link.

FCA consultation on developing a custody regime for tokenised securities, are meaningful steps forward.⁷⁴

- **HMT should consider developing a principles-led approach to the application of the Client Assets Sourcebook (CASS) rules.** As highlighted above, we are supportive of HMT's proposal to use existing custody provisions in the CASS as a basis to adapt custody requirements for securities tokenisation. We believe there is a need for amending the current rules in relation to certain areas to account for their novel characteristics. The complexity inherent in the variations of cryptoassets (including tokenised securities), and the different applications of DLT (permissioned, permissionless etc), mean delivery of custody services has more unique considerations than for traditional assets. In this case, regulatory principles and standards — rather than detailed and prescriptive rules which may need to be adjusted with use cases — can help to achieve regulatory outcomes.
- **HMT should promote the UK as a centre of excellence on tokenised securities and other digital assets.** This will require continued coordination with other government departments across Whitehall and ensure teams are equipped with the knowledge and skills required to support a digital marketplace. Activities could include identifying the skills required to support securities tokenisation initiatives across government and then supporting policies (e.g., cross-department secondments) that would ensure all departments have the expertise needed. We would encourage the continued coordination between HMT, the BoE, the PRA and the FCA as they implement secondary legislation and regulation, and share lessons learned. Other key entities — such as the Department for Business and Trade (DBT) and the Centre for Finance, Innovation, and Technology (CFIT) — will also be key to coordinate with.

3.2.3 MISSION THREE — BECOME A LEADER IN GLOBAL STANDARDS FOR THE TOKENISED SECURITIES MARKET

The UK needs to ensure it is in the room and actively shaping discussions with other jurisdictions around the supranational standards that will enable interoperability of DLT networks over time. If the UK successfully builds a flourishing digital market with deep liquidity, it will also need to ensure its markets are connected to the global tokenised securities ecosystem. It should therefore play an active role in facilitating the establishment of supra-national standards that will enable interoperability of DLT networks as they evolve. Given the nascency of tokenised securities markets around the globe, supra-national standards are still in the early stages. There is an opportunity for the UK to establish itself as a leader by convening different jurisdictions to agree the path forward, and sponsoring initiatives to drive convergence.

Steps the UK should take in the short to medium term:

- **The UK government should lean on its existing strengths and experience to foster discussion and collaboration around supra-national standards for securities tokenisation.** This could include sponsoring projects through the London-based BIS Innovation hub, the Global Financial Innovation Network (GFIN), or embracing the FCA's current leadership role on International Organisation of Securities Commissions' (IOSCO's) Financial Taskforce Workstream on Crypto and Digital Assets⁷⁵ — as well as other bodies e.g., the BCBS, Financial Action Taskforce (FATF), and Financial Stability Board (FSB) — to drive tokenisation higher up the global policy agenda.
- **HMT should collaborate with other jurisdictions and connect to their pilots or sandboxes.** The UK can develop tokenisation standards with other jurisdictions that are also experimenting with the technology, such as Singapore or the EU for example. This would enable HMT to align its private-public initiatives, for example its regulatory sandbox, with related international initiatives and in effect pilot the standards that could form the basis of cross-border tokenisation ecosystem.

⁷⁴ In the HMT Consultation on the "Future Financial Services Regulatory Regime for Cryptoassets" published on 1 February 2023, it was noted that FCA expects to run a separate consultation on a new custody regime for security tokens. As with requirements around collateral, it is likely that close collaboration will be needed between legal experts, HMT and the FCA to define how private law can interact and inform new regulatory requirements for custody.

⁷⁵ Source: IOSCO Crypto-Asset Roadmap for 2022–2023 (IOSCO, 2022). Refer also to the IOSCO Policy Recommendations for Crypto and Digital Asset Markets released in May 2023.

CONCLUSION

Securities tokenisation has the ability to transform financial markets, and the UK has the opportunity to position itself at the centre of it. This opportunity is substantial and could reinforce the UK as a top global financial centre today and tomorrow. The industry agrees that technology offers a host of potential benefits for UK capital markets, including the opportunity to further develop skills in this area and to provide greater retail access to a wider range of asset classes. These benefits are yet to be realised at scale in any jurisdiction and a supportive ecosystem is required to unlock them. If securities tokenisation takes off — as many industry participants feel it will — then the UK risks falling behind if it does not quickly put in place the enablers that will help a tokenised securities market to develop, scale and thrive.

The UK can establish itself as a leading jurisdiction if it takes concerted action now to encourage experimentation, set standards that make platforms interoperable, and provide the legal and regulatory reforms necessary to support market scaling. All of this would lend itself to enhancing the UK's competitiveness, reinforcing its position as a leading global financial centre. The good news, set out in this paper, is that the UK has already established strong foundations, and benefits from a deep talent pool across the financial, regulatory, and legal sectors. UK government and policymakers are actively listening and engaging with industry on needed regulatory reforms. Work is underway on the FMI Sandbox and legal discussions are coalescing around how English law can broadly accommodate securities tokenisation. It is not a problem that minimal tokenised securities issuance activity has taken place in the UK, nor that the industry is only beginning to experiment. More can and should be done. Now is the time to really gather momentum, and further drive positive engagement between the UK government, regulators and industry participants to take this forward.

The future is now.

ACKNOWLEDGEMENTS

We would like to thank the contributors across the sector who generously made time for interviews and ensured that this work was industry-led. Special thanks to: Richard Hay, senior representative from the UK Jurisdictional Taskforce and Head of FinTech law at Linklaters; Charles Kerrigan, Finance partner and digital assets specialist at CMS; Cameron McKenna Nabarro Olswang LLP, for their contributions.

DISCLAIMER

No report on this topic will ever be complete or up to date, as the industry, technology, and legal and regulatory framework continue to develop and/or become more established. However, in this report, we have aimed to provide a resource that could be useful to the widest range of readers. To keep this report readable, we have deliberately simplified some of the technical content.

This report contains general information relating to blockchain technology and digital assets. It does not contain legal, tax, or regulatory advice and is not an endorsement of any business, technology, or product. Readers should do their own research and take advice before taking any action. We make no comment on digital assets as an investment class.

Oliver Wyman Report Qualifications/Assumptions & Limiting Conditions

Oliver Wyman was commissioned by UK Finance to write a report on securities tokenisation and the future for the UK. The primary audience for this report includes UK government and policymakers as well as industry participants.

Oliver Wyman shall not have any liability to any third party in respect of this report or any actions taken or decisions made as a consequence of the results, advice or recommendations set forth herein.

This report does not represent investment advice or provide an opinion regarding the fairness of any transaction to any and all parties, nor do they recommend any particular security, cryptocurrency, or digital asset. This report does not represent legal advice, which can only be provided by legal counsel and for which you should seek advice of counsel. Further, the legal and regulatory regime governing the digital assets industry is subject to significant uncertainty. As such, Oliver Wyman makes no representations regarding the acceptability or sufficiency of this report from a regulatory perspective. The opinions expressed herein are valid only for the purpose stated herein and as of the date hereof. Information furnished by others, upon which all or portions of this report are based, is believed to be reliable but has not been verified. No warranty is given as to the accuracy of such information. Public information and industry and statistical data are from sources Oliver Wyman deems to be reliable; however, Oliver Wyman makes no representation as to the accuracy or completeness of such information and has accepted the information without further verification. No responsibility is taken for changes in market conditions or laws or regulations and no obligation is assumed to revise this report to reflect changes, events or conditions, which occur subsequent to the date hereof.