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# Digital Gilt Roadmap

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## 1. Introduction

UK Finance and its members are proud of the UK's position as a leading global financial centre. Leading and setting standards on the tokenisation of our capital markets will be a key enabler and driver of the UK's competitiveness story going forward. Our work is propelled by industry consensus that tokenisation will have a transformational impact on financial markets, bringing benefits to institutions, infrastructure providers and consumers.

UK Finance commends the ambition HM Treasury has shown with its design of the upcoming Digital Securities Sandbox. We see the launch of a UK government-backed program focused on the issuance of digital sovereign debt instruments as the key next step towards realising this broader vision.

We are pleased by the Chancellor's intentions, as expressed in the [Spring Budget 2024](#) to continue to examine, and engage with firms on, the possible applications and benefits of applying Distributed Ledger Technology (DLT) to a sovereign debt instrument.

This roadmap aims to provide a blueprint on how the UK could lead with a successful digital gilt issuance. We hope that it will support discussions between government, the Debt Management Office, HM Treasury, regulators and wider industry stakeholders.

For the purposes of this paper, we use "digital gilts" to refer to digital sovereign debt instruments that would include digital Treasury bills and digital gilts of varying tenors.

The views of market participants have been instrumental in shaping the content of this paper. UK Finance has conducted meetings and interviews with its members, as well as roundtable discussions with the investor community and custodian community.

Issuing a UK digital gilt now presents clear imperatives and benefits (*see chapter three*) in the context of modernising the UK capital markets. The implementation of DLT in traditional capital markets, particularly through securities tokenisation, has primarily aimed at enhancing operational efficiencies by automating processes and leveraging smart contracts across the end-to-end securities lifecycle. Initiatives such as the Digital Securities Sandbox assist with this journey by allowing new entrants and existing Financial Market Infrastructure (FMIs) to interact with the Digital Securities Sandbox on similar terms and use technological efficiencies. The work of the UK Asset Management Taskforce will also prove instructive.

Several jurisdictions have already embarked on this journey, highlighting the importance of the UK demonstrating its seriousness and commitment to building digitalised capital markets. By issuing a digital gilt, the UK can signal its readiness to embrace technological advancements and position itself as a leader in the evolving landscape of financial innovation.

A digital gilt program will moreover serve as one pillar among many aimed at building UK capital markets fit for the future. It will contribute to fostering greater transparency, efficiency, and accessibility in the market, while also enhancing liquidity and promoting broader market participation.

Overall, the issuance of a UK digital gilt represents a strategic step towards modernising the capital markets infrastructure, aligning with global trends, and positioning the UK as a hub for innovation in finance. It underscores the government's commitment to leveraging technology to drive economic growth and competitiveness in the digital age.

In recent months, from discussions with the financial services industry, policymakers, and regulators, we can identify four key building blocks that will facilitate and enable the issuance of a UK digital gilt, namely: (i) Intent and Adoption, (ii) Digital Infrastructure, (iii) Legal and Regulatory Framework, and (iv) Operating Model (**see chapter four**).

In this paper, we outline two possible approaches for the issuance of digital gilts (**see chapter five**):

1. An “Evolutionary” approach, and
2. A “Big Bang” approach.

Many solutions and different business models, which each harness technological advances, are reflected in the two approaches outlined above. Nonetheless, it is important to note that this paper does not advocate for one approach over the other. Each approach shares the same objective and presents its own set of benefits and requirements, ultimately contributing to maintaining the strength and stability of the UK gilt market.

The overarching goal is to establish a robust and widely adopted UK digital gilt market characterised by optimal levels of liquidity, efficiency, and stability. Repurchase agreements (repos) will be instrumental in achieving liquidity within this market, serving various critical functions such as providing short-term funding, facilitating market making, supporting collateral management, and serving as a tool for monetary policy operations.

Furthermore, attaining a sufficient degree of legal and regulatory clarity is imperative to instil confidence and drive greater adoption of digital instruments among market participants in the UK. While commendable progress has been made in this regard, including the recent publication of the Law Commission's Digital Assets report, it is evident that further efforts are necessary to address remaining challenges and uncertainties.

In addition to providing greater legal and regulatory clarity, other measures will be essential for enhancing liquidity and market adoption within the UK digital gilt market.

The Bank of England will play a pivotal role in this endeavour, leveraging its authority and expertise to implement policies and initiatives aimed at fostering market liquidity, promoting investor confidence, and driving widespread adoption of digital instruments (*see chapter six*).

Overall, achieving the goal of building a vibrant and widely adopted UK digital gilt market will require concerted efforts from various stakeholders, including financial institutions, FMIs, regulatory bodies, and the central bank. By working collaboratively and proactively addressing key challenges, the UK can position itself as a global leader in digital finance and capitalise on the opportunities presented by technological innovation.

We envision this paper as a practical tool for planning how a successful UK digital gilt program can be created, that fosters a level playing field, and supports the Debt Management Office in delivering on the government's financing needs (*see chapter seven*).

Issuing a digital gilt signifies a strong commitment to adopting digitalisation within the UK economy. This significant step will work together with other critical objectives and strategies to shape the long-term future of UK capital markets. It marks the commencement of a dialogue aimed at navigating the evolving landscape of digitalisation and ensuring the continued prosperity of the UK financial ecosystem. For other recommendations on how the UK can enhance its competitiveness on a global scale, please see our recent [UK Capital Markets: Building on Strong Foundations](#) report.

We welcome feedback and look forward to further collaboration in shaping the future of UK capital markets.

***We are grateful to EY and to Monica Gogna, Partner, Head of Financial Institutions Law Group, Pierre Pourquery, Partner, Head of Capital Markets Consulting and Muneeb Shah, Director, Head of Digital Assets Technology for their assistance in preparing this roadmap.***

### ***Recipients***

This digital gilt roadmap is addressed to the government and relevant regulatory authorities of the United Kingdom (including the Economic Secretary to the Treasury, HM Treasury, the Debt Management Office, the Bank of England and the Financial Conduct Authority) and their advisors and UK Finance members and was submitted in April 2024.

### ***About UK Finance***

UK Finance is the collective voice for the banking and finance industry. Representing 300 firms, we're a centre of trust, expertise and collaboration at the heart of financial services. We seek to enhance competitiveness, support customers and facilitate innovation, championing a thriving sector and building a better society.

The financial services industry plays a vital and often underappreciated role enabling individuals, families and communities to achieve their ambitions in a safe and sustainable way – through home ownership, starting a new business or saving for retirement. The sector is fundamental to people’s lives, and we are proud to promote the work it is doing to support customers and businesses up and down the country.

Further information is available at: [www.ukfinance.org.uk](http://www.ukfinance.org.uk)

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### **Disclaimer**

This report was submitted to government in April 2024 and is accurate as at that date. 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. This report does not represent investment advice. Readers should do their own research and take advice before taking any action. We make no comment on digital assets as an investment class.

### **EY Qualifications**

*This paper is not intended to constitute legal advice in relation to any specific scenario outlined within it and may not be relied upon as such. Readers will need to take independent legal,*

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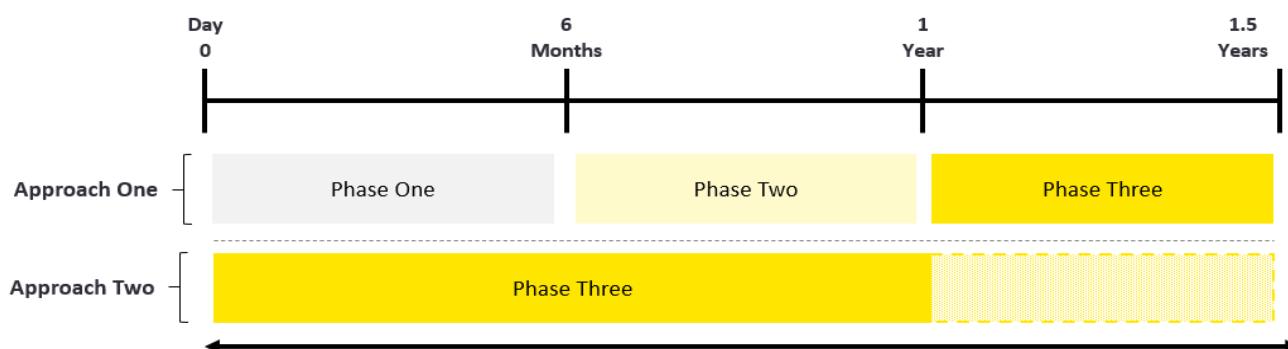


## 2. Executive Summary

There are many commercial and technical options available to facilitate the issuance of a UK digital gilt. Through our discussions across industry (including UK Finance members, representatives from the investor community and FMIs) we have narrowed down these multiple options into two main approaches that could be considered by HM Treasury and the Debt Management Office.

The two potential approaches<sup>2</sup> for the UK are outlined below, each with its own set of benefits and requirements:

- ▶ Approach one: An “Evolutionary” approach to be deployed in three phases over the next 18 months.
- ▶ Approach two: A “Big Bang” approach to be deployed within the next 12 to 18 months.



*Figure 1: Demonstration of two approaches for digital gilt issuance over the next 18 months*

- ▶ **Phase One (Approach one):** consists of issuing a three-month Treasury-bill (T-bill) that is an exclusively digital issuance with limited market participants. This could be facilitated by one gilt-edged market maker (GEMM) (where secondary capabilities are possible within the platform but not integrated with the broader secondary market ecosystem). Another option for the Debt Management Office to consider, where possible within the envisaged timelines, is for there to be a lead GEMM, within a small syndicate of GEMMs, using a single integrated DLT platform.
- ▶ **Phase Two (Approach one):** consists of issuing a medium-term digital gilt that is a digital issuance with multiple GEMMs participating and a wider group of investors than in phase one, but integration with existing off-chain secondary market infrastructure providing the facility to use the digital gilt as collateral in repo trading activities.

<sup>2</sup> A more detailed overview of approach 1 and approach 2 can be found in section 5 of this paper.

- ▶ **Phase Three (Approach one and two):** consists of issuing a medium-term or longer-term digital gilt that is a fully digital issuance (primary and secondary market infrastructure - including the use of the digital gilt as collateral in repo trading activities - will be on-chain) with multiple GEMMS participating and with access to a broad group of investors.

Both approaches share common goals and objectives, which include:

- ▶ Issuing a digital government bond issuance for a significant amount
- ▶ Issuing in the form of a digital gilt or a digital T-bill
- ▶ Ensuring full digitalisation throughout its lifecycle
- ▶ Using digital currency
- ▶ Leveraging the digital government bond issuance for repo and collateral purposes to enhance liquidity, attractiveness, and adoption levels
- ▶ Providing all the necessary facilities available in traditional markets in a digitalised environment

The two approaches set out in this paper do, however, diverge in their respective strategies to achieve these objectives. Each approach comes with its own set of advantages and drawbacks.

The “Evolutionary” approach aligns with the objective of promptly showcasing progress to the market. This approach has three phases which pave the way for incremental enhancements and complexity in subsequent issuances.

While the initial phases may not offer immediate differentiation compared to other peer jurisdictions, this evolutionary approach allows for leveraging momentum gained from initial phases, thereby potentially enhancing market acceptance, and understanding over time.

Conversely, the “Big Bang” approach presents an opportunity to showcase the potential of a fully functional digital gilt capital market (both primary and secondary market), including, at its outset, the integration of repos, which play a crucial role in enhancing liquidity within the sovereign bond market.

This “Big Bang” approach would present an enticing opportunity for the UK, as it promises to accelerate the nation's position in digitalisation and establish it as a leader among its peers, particularly considering this initiative hasn't been undertaken elsewhere. However, it is acknowledged that this approach will demand a strong commitment from both the Bank of England and the government and carries with it additional burdens to alter current legislation and regulations. Through our discussions, industry has acknowledged that while there may be anticipated technical and operational challenges in delivering the “Big Bang” approach, they are deemed manageable.

The primary obstacles lie in promptly establishing the requisite legal and regulatory framework to ensure the secure utilisation of digital gilts for repo and collateral purposes without compromising market integrity. Furthermore, significant adoption and maintaining an appropriate level of liquidity could pose additional challenges. To overcome these hurdles, the government and regulators must demonstrate unwavering commitment to provide market guarantees, risk acceptance and instil confidence.

Nevertheless, if speed is deemed crucial and there is a pressing need to swiftly demonstrate the UK's competitiveness, the “Big Bang” approach may not be the most optimal choice.

### The Future Outlook – a vision and timeline for the next six years

Beyond the first 18 months, the future outlook for UK capital markets will be shaped by having in place a longer-term vision that we can work towards. First, a decision must be made between the two proposed approaches. We note that inevitably there will be a

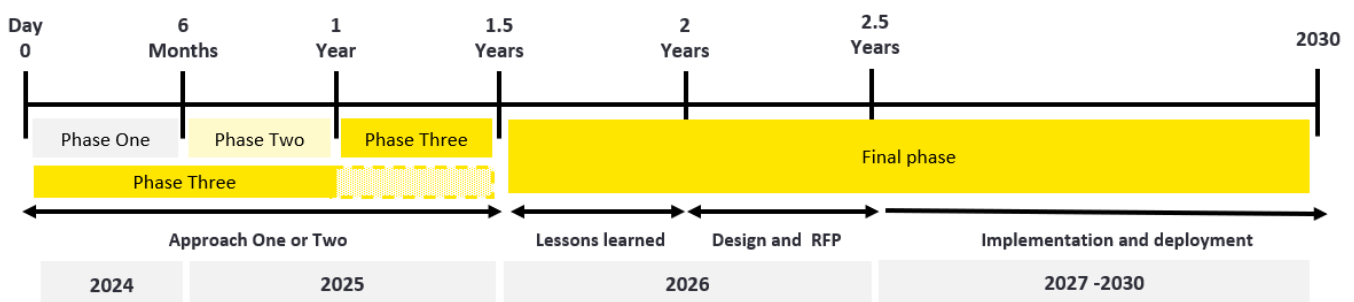


Figure 2: UK Debt Capital Market future outlook

potential trade-off involved for policymakers. Key factors will likely be the political appetite to demonstrate competitiveness in the tokenisation of securities markets and the willingness for regulatory authorities and government agencies to agree this initiative as a priority and make the required rule or operational changes to enable success. More generally, all parties engaged in this initiative will need to consider respective tolerance and management of challenges and risks.

Following the decision between approach one and approach two, the focus for the UK government and market participants will shift towards developing the optimal digitalisation strategy for sovereign debt issuance; such a strategy then should act as a catalyst and global intention setter for the digital evolution of the UK's broader capital markets eco-system. This strategy must underscore a strong commitment to enhancing the UK's competitiveness and the desire to host an innovative and technologically leading capital markets eco-system. This commitment will be reinforced by the approach and capabilities deployed over the next 18 months to ensure a successful outcome.

The final phase, as outlined in Figure Two above, encompasses gathering and analysing lessons learned from the initial 18 months, issuing a request for proposal (RFP) for the

requisite infrastructure capability (i.e., determining who will build the technical infrastructure, including the blockchain infrastructure, the platform, and access layer), and designing and implementing the final approach to a digital gilt, as part of a wider digitalised capital market ecosystem.

During this phase, careful evaluation and reflection on the experiences and outcomes of the initial implementation will be paramount. Insights gleaned from this process will inform the procurement of necessary infrastructure capabilities through the RFP process. Additionally, based on these insights, the final approach will be refined and solidified.

Ultimately, the objective is likely to have an established Digital Financial Market Infrastructure (D-FMI) to run a DLT based platform for the end-to-end trade lifecycle.

Deep collaboration across industry with UK policymakers has been instrumental in getting us to where we are today. Going forward, the collaborative efforts of government entities, market participants, professional services firms and technology providers will be pivotal in shaping the success of this final phase. By leveraging the lessons learned and harnessing the capabilities acquired, the UK can lay the groundwork for a robust and innovative digital capital market ecosystem, bolstering its position as a global leader in financial technology and digital finance.

### 3. The benefits of issuing a UK digital gilt now

A key recommendation of UK Finance's [Unlocking the Power of Securities Tokenisation](#) report, reiterated in a letter to the Chancellor in early December 2023, was that HM Treasury, via the Debt Management Office, should issue a digital gilt via the Digital Securities Sandbox.

As outlined above, we are pleased by the statements made in the [Spring Budget 2024](#) which supported the further examination of the possible applications and benefits of applying DLT to a sovereign debt instrument.

The combination of automated processes, a reduced need to pre-position collateral, and enhanced settlement, could help investors manage gilt collateral more efficiently to meet margin calls in times of stress (such as the [2022 liability-driven investment \(LDI\) crisis](#)).

The implementation of DLT in traditional capital markets through securities tokenisation has typically been focused on delivering operational efficiencies by enhancing the automation of processes, including the use of smart contract across the end-to-end securities lifecycle. Some of these benefits include:

- ▶ **Issuance lifecycle** - Tokenised securities can be issued directly to the end-investor, lowering costs of entry for investors by reducing the number of intermediaries involved.
- ▶ **Trading and investing** - Securities can be transferred almost-instantly, shortening the traditional clearing and settlement cycles, reducing counterparty and systemic risk, and freeing up capital. Additionally, 24/7 trading facilities and ability to use a digital gilt as high-quality collateral can improve liquidity by providing access to liquid assets for institutions.
- ▶ **Post-trading** - The nature of a distributed ledger would mean that reconciliation processes would not be required. The reduced settlement times would allow capital to be unlocked that was previously posted as collateral and hence improve liquidity.
- ▶ **Investor outcomes** - Tokenisation enables increased market access for investors. The efficiencies gained through trading on DLT could reduce costs, thereby reducing barriers to entry to the capital markets. Fractional ownership could increase access to securities, and traditionally illiquid assets could also become more accessible through digitalisation. Increased transparency and risk reduction will facilitate greater investor protection.
- ▶ **Better Risk Management** – The use of DLT Promotes resilience and reduces systemic risk and counterparty risks by settling transactions real-time and on a 24/7 basis.

The above points represent clear benefits to embarking on the journey to launch the first ever UK digital gilt. Additionally, trust will be built amongst UK and international investors by showcasing momentum to transform the UK capital markets into digital-first markets,

prioritising cheaper and easier ways of transacting. The benefits of using DLT can be realised across the entire trade lifecycle, the UK can show international leadership here by focusing not only on issuance, but considering the facilitation of technology that can be deployed across the trade lifecycle. This in turn will continue to attract a talent pool to the UK financial services market that is digitally driven with an innovation mindset.

### **Why now?**

It is critical for the UK to engage actively in a competitive landscape and move beyond the pilots seen elsewhere.

In recent years, several pilot issuances and proof of concepts experiments have been launched across Switzerland, Hong Kong, Luxembourg, Germany, Japan. We have seen plenty of examples of corporate and SSA (sovereign, supranational and agency) debt issuances. Lessons can be learnt from these pilots by UK policymakers to ensure the strongest adoption by multiple financial institutions at the outset. Whilst the UK will not be the first 'past the post' in launching a digital bond, by using lessons learnt in other jurisdictions, the UK can competitively move ahead by sponsoring a program of digital gilt issuances that can be backed by multiple financial institutions, using different options for platforms as set out further below. Appendix Five sets out useful case studies the UK can draw from.

The Digital Securities Sandbox provides the UK with a solid advantage to issue a digital gilt. One of the critical features of a live Digital Securities Sandbox is that financial systems can operate with participants of the Digital Securities Sandbox much like they would with traditional financial market infrastructures. The lessons learnt over the next five years of the Digital Securities Sandbox will accelerate the UK government and regulators' ability to put in an appropriate regime that facilitates technology and innovation for digitalisation in the UK<sup>3</sup>.

We have received feedback from financial institutions that sterling-denominated digital gilts would attract broader investor participation, and deeper market reach, than through the issuance of a corporate digital bond, which in turn would drive liquidity. This signal of appetite for adoption of a UK digital gilt by financial institutions will allow for the UK to launch an impactful sterling-denominated digital gilt issuance that truly 'moves the dial' and galvanises industry.

By taking this approach, we believe this provides a way for the UK capital markets to guard against firms moving elsewhere to invest in new technologies and capital in jurisdictions where the government approach and regulatory environment has been historically nimbler. The UK now has a timely opportunity to create scalable adoption by financial institutions of UK digital gilts that go beyond a pilot scheme - something which no other jurisdiction has yet achieved.

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<sup>3</sup> [Digital Securities Sandbox joint Bank of England and FCA consultation paper](#)

## Ensuring the UK retains a competitive edge

The issuance of digital gilts is emerging as a priority for the UK, especially as other jurisdictions have already taken steps in this direction by issuing digital bonds, including corporate and SSA bonds.

Over the past three years, Europe and Asia have progressed in digital bond issuance, accompanied by supportive digital asset laws and regulations. From a digitalisation perspective, there is still much to do to integrate digital bond issuances in a way that attracts investors and enables liquidity in a way that traditional bond issuances do today.

Date (month/ year)	Digital Bond Issuer	Bond tenor	Bond type	Level of digitalisation (End-to-end digital vs hybrid)	Amount	Jurisdiction
Sep-21	Black Manta Capital Partners (BMCP) & Globacap	3.5 years	Corporate	End-to-end digital	GBP 15 million	London and Luxembourg
Nov-21	SDX in collaboration with Credit Suisse, UBS Investment Bank, and Zürcher Kantonalbank	5 years	Corporate	Hybrid	CHF 150 million	Switzerland
Nov-22	Switzerland's SIX Digital Exchange (SDX) & UBS AG – London Branch	3 years	Corporate	Hybrid	CHF 375 million	Switzerland
Nov-22	European Investment Bank - Project Venus	2 years	SSA	End-to-end digital	EUR 100 million	European Union
Jan-23	European Investment Bank	2 years	SSA	Hybrid	GBP 50 million	European Union
Feb-23	Siemens	1 year	Corporate	End-to-end digital	EUR 60 million	Germany
Feb-23	HKSAR Government	1 year	SSA	End-to-end digital	HK\$800 million	Hong Kong
May-23	Israel Government	N/A (Proof of concept)	Sovereign bond issuance	N/A (Proof of concept)	N/A (Proof of concept)	Israel
Jun-23	European Investment Bank	2 years	SSA	End-to-end digital	SEK 1 billion	European Union
Oct-23	World Bank	3 years	SSA	Hybrid	EUR 100 million	World Bank
Dec-23	Hitachi	5 years	Corporate Green	End-to-end digital	YEN 10 billion	Japan
Feb-24	HKSAR Government	2 years	SSA	Hybrid	HK\$ 6 billion	Hong Kong

Figure 3: Examples of the digital bond issuances in the last three years

Given most of the digital bonds issued to date have been issued by either a corporate issuer or by a sovereign supranational agency (SSA), we believe it will now be critical to focus on fully developed and scaled sovereign bond issuances given their attractiveness to encourage broader investor participation and wider acceptance as high-quality liquidity asset.

The UK will be uniquely positioned to be an issuer of an end-to-end digital native and fully scaled sovereign bond in the market. The UK's Digital Securities Sandbox will play a pivotal role in setting up the foundational element and infrastructure where it will imminently be able to have both digital assets and digital payments on-chain.<sup>4</sup> Market participants and Bank of England would be part of the same wholesale payment system, which would enable real-time atomic settlement across securities transactions.

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<sup>4</sup> We note the ongoing private and public sector explorations and investments into the market infrastructures required to facilitate and support issuance and tokenisation.



## 4. The building blocks to support the issuance of a UK digital gilt

In many respects, the UK already has many of the ingredients in place to enable the issuance of a UK digital gilt within the next six months. We characterise these building blocks into four categories:

- ▶ **Intent and adoption:** Demonstration of the government's commitment to adopt digitalisation, alongside stakeholder buy-in (financial institutions, infrastructure partners and investors) to validate the UK's ambition to be a key player in this market.
- ▶ **Digital infrastructure:** Ensuring suitably qualified DLT platforms are chosen to partner with the Debt Management Office on the gilt issuance. We recommend that any RFP process should provide detailed requirements for execution of a digital gilt, and the opportunity for vendors to share a presentation on their capabilities and the different options for how a single gilt issuance or program of gilt issuances could work.
- ▶ **Legal and regulatory framework:** Application of sound legal reasoning and implementation of a robust regulatory foundation are fundamental to bring clarity and confidence in the treatment of digital gilts in the UK e.g., the Digital Securities Sandbox.
- ▶ **Operating model:** Clear articulation of the new gilt issuance process flow is required to provide transparency and clear requirements on the ecosystem of technology providers and market participants needed to enable a digital gilt issuance. Having formalised governance, detailed processes and people with the right skills and competence in place, form another key building block.

<b>Intent and adoption</b>	Demonstration of government intent	Issue a short-term UK digital gilt programme
	Stakeholder engagement and adoption	Issue a medium-term UK digital gilt programme
		Issue a long-term UK digital gilt programme
		Fair level playing field for Financial Institutions (FIs) to participate in the programme
	Digital currency adoption	Involvement of market participants
		Adoption of digital gilt as collateral in repo market to promote liquidity
<b>Digital infrastructure</b>	Technology	Consensus for digital currency adoption
		Presence of issuance platform to tokenise the gilt
		Real-time settlement in primary market
		Trading in secondary market using DLT
		Real-time settlement in secondary market
		Trade digital gilt as collateral in repo market using DLT
	Digital asset	Automated interest payment and asset servicing
		Digital asset setup on DLT platform
<b>Legal and regulatory framework</b>	Legal and regulatory certainty	Digital currency setup on DLT Platform
	Risk and controls	Legal and regulatory certainty of the UK position of digital securities
		Issue any regulatory clarifications identified using regulatory toolkit
<b>Operating model</b>	Governance	Verify confidence that third party providers have the controls in place to manage new risks
	Talent	Clearly defined roles and responsibilities throughout the lifecycle
		Debt Management Office (DMO) team mobilised including the risk skills and competency
	Process	Market participants mobilised including the risk skills and competency
		On-boarding of market participants
		End to end process flow documented and validated

Figure 4: The building blocks to support the issuance of a UK digital gilt

## 5. Two proposed approaches

### 5.1 Approach One: the “Evolutionary” approach

Under this approach, the digital gilt program undergoes three distinct phases, each of which incrementally showcases critical features aimed at establishing its uniqueness and differentiation within the global capital markets. Consequently, this approach will facilitate the realisation of all the benefits associated with digitalisation in an evolutionary manner.

- ▶ **Digital gilt characteristics:** facilitating the issuance of debt across short, medium, and long-term tenors.
- ▶ **Digitalisation coverage:** enabling comprehensive coverage of the key components of the value chain, encompassing origination and structuring, primary market issuance, secondary market trading, and post-trade activities (including custody, settlement and asset servicing).
- ▶ **Ecosystem coverage:** involving all stakeholders within the debt issuance and trading ecosystem.
- ▶ **Collateral:** using digital gilts for repo and collateral purposes, thus significantly enhancing liquidity levels.

These three phases are designed to illustrate to global markets the advantages and distinctiveness of the UK debt capital markets in an evolutionary fashion, focusing on these four key features.

Features	Phase One	Phase Two	Phase Three
<b>Digital gilt characteristics</b>	Short-term	Medium-term	Long-term
<b>Digitalisation coverage</b>	High (Issuance, Trading, Post-Trade)	Medium (Only Issuance is on-chain)	High (Issuance, Trading, Post-Trade)
<b>Ecosystem coverage</b>	Low	Medium	High
<b>Collateral</b>	No	Yes	Yes

*Figure 5: Summary of the three phases of the “Evolutionary” approach*

**Phase One:** This phase involves issuing a short-term digital gilt (a T-bill) that undergoes digitalisation across its entire lifecycle, using digital currency. Market participation is limited, with minimal secondary market activities and no use of digital gilts for repo and collateral purposes.

**Phase Two:** The issuance of a medium-term gilt is the focus of this phase. While issuance and settlement are digitalised, trading, and post-trade activities continue using existing infrastructure. Market participation broadens to include institutional investors, asset managers and global emerging markets. This phase also includes secondary market activities and allows the use of digital gilts for repo and collateral purposes.

**Phase Three:** Combining elements from both previous phases, this phase introduces a medium/long-term digital gilt that is entirely digitalised throughout its lifecycle. It uses digital currency and targets broader market participation. Secondary market activities are included, and digital gilts are used for repo and collateral purposes.

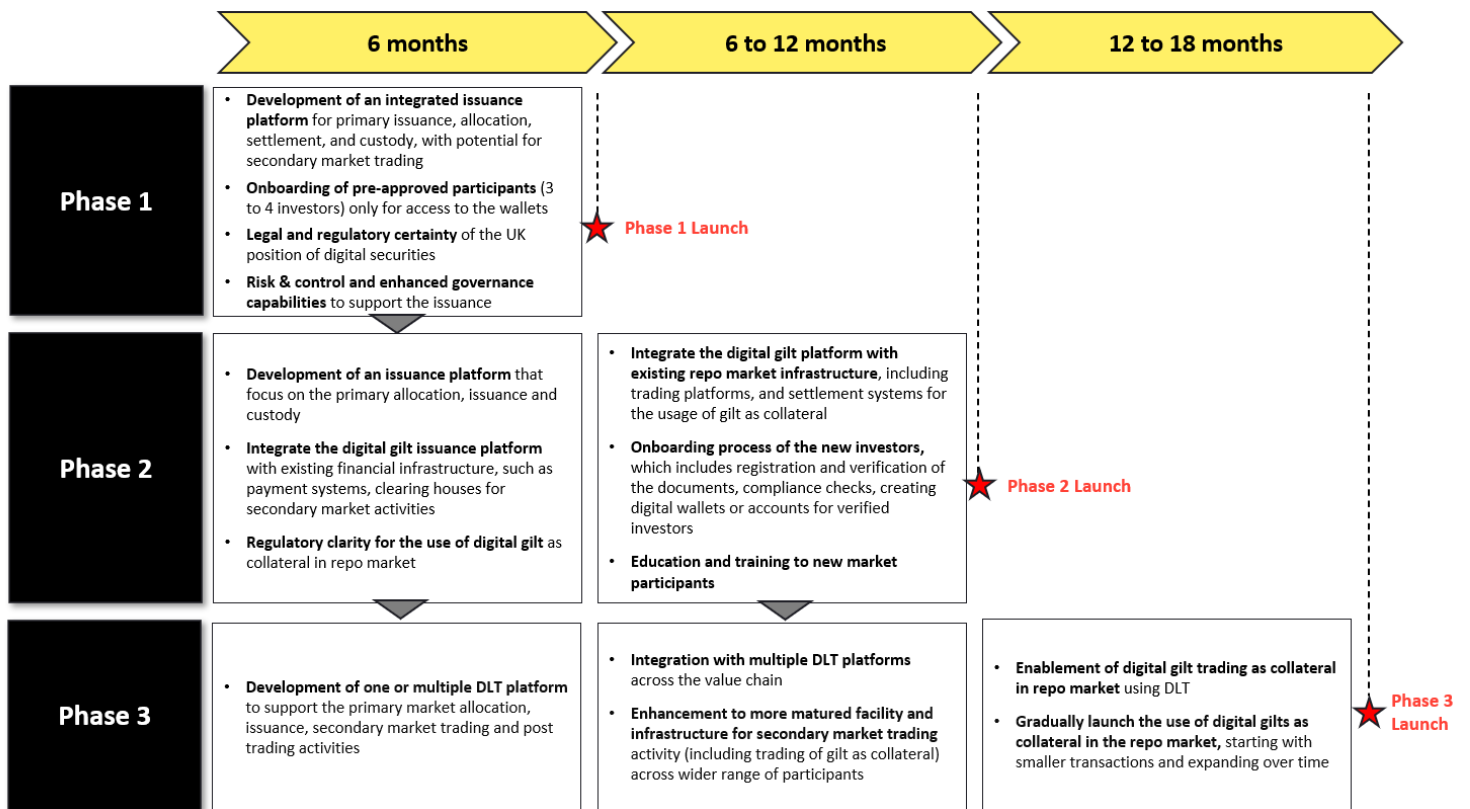


Figure 6: Summary of incremental activities across the three phases of the “Evolutionary” approach

### 5.1.1 Phase One

The primary objective of phase one is to signal to global markets the UK's commitment to digitalising its capital markets. Achieving this goal within the next six months, while encompassing all aspects of the value chain—such as issuance, trading, and post-trade processes—will generate the necessary momentum and underscore the UK's ambition in this endeavour.

This phase primarily concentrates on digitalising primary issuance, initially targeting a select group of pre-approved participants/investors. Primary issuance and allocation will be executed by a GEMM. The strategy involves using an integrated DLT platform for primary issuance, allocation, settlement, and custody, with potential for secondary market trading among pre-approved participants. The issuance focus will be on short-term digital gilts. Another option for the Debt Management Office to consider, where possible within the envisaged timelines, is for there to be a lead GEMM, within a small syndicate of GEMMs. In both options, a single integrated DLT platform is used for primary issuance, allocation, settlement, and custody, with potential for secondary market trading among pre-approved participants.

#### Description of the key features of phase one

Phase one comprises the following features:

##### 1. Digital gilt characteristics:

- ▶ Three-month Treasury bill
- ▶ Issue size: Fully scaled (similar in size to a traditional gilt issue) - depending on funding requirements from the Debt Management Office and investor appetite

##### 2. Digitalisation coverage:

- ▶ Primary Market Issuance
- ▶ Secondary Market Trading (for pre-approved participants)
- ▶ Post-trade activities including custody, settlement and asset servicing
- ▶ On-chain digital money for cash-leg of the transaction

##### 3. Ecosystem coverage:

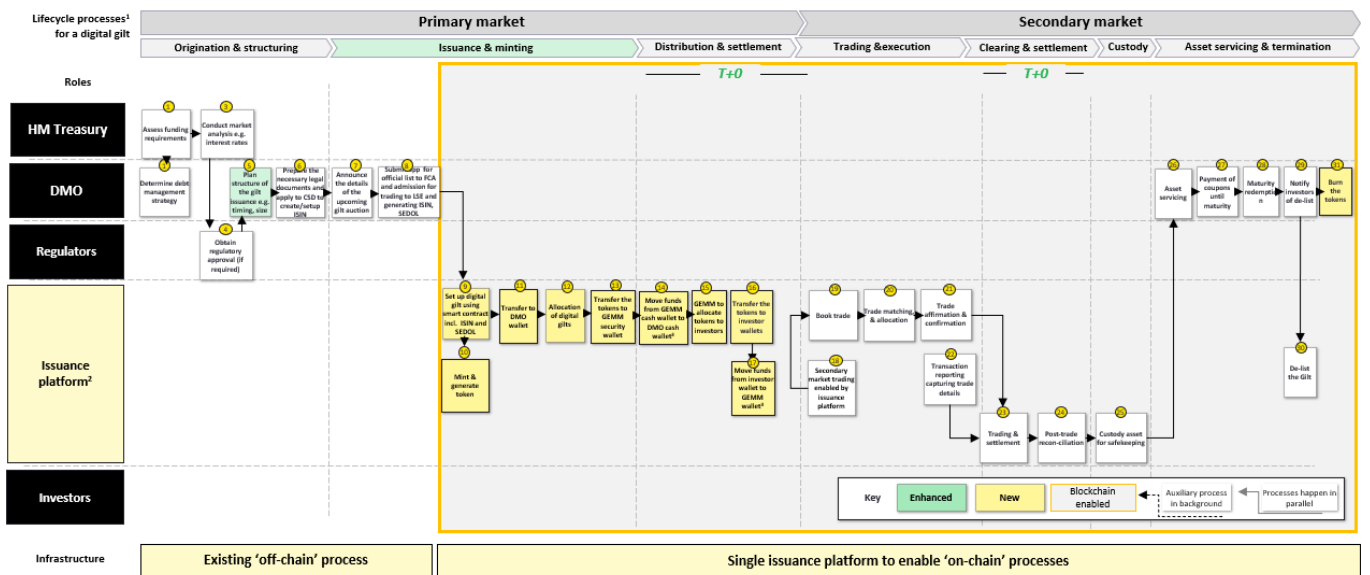
- ▶ One integrated DLT platform
- ▶ Participation in primary issuance is limited to three to four investors (e.g., through private placement) through a sole GEMM (or potentially a small syndicate of GEMMs as discussed above)
- ▶ Participation by one custodian due to limited pre-approved participants

4. Collateral:

- ▶ Not covered

**Process flow**

See the process flow diagram in Appendix Three (minimised below) to illustrate the process flow and requirements.



<sup>1</sup> The sequence of process steps and activities may vary and/or steps and activities may occur simultaneously.  
<sup>2</sup> One integrated DLT (Distributed Ledger Technology) platform on behalf of DMO/HMT for primary issuance, allocation, secondary market trading, settlement and custody for pre-approved market participants  
<sup>3</sup> This cash wallet represent cash on the ledger which is setup during the onboarding process. The cash wallets are backed by traditional fiat in commercial bank accounts which are converted to digital money (on-chain)

Source: 1) GEMM Guidebook 2) Official Operations of Gilt Market 3) Roles of DMO and Primary Dealer 4) Guide from EY SMAs on Digital Assets and Blockchain

Figure 7: The process flow for Approach one, phase one

### 5.1.2 Phase Two

The primary objective of phase two is progress towards the inclusion of wider beneficial features related to the use of DLT. This includes widening investor participation and bringing a focus on different areas of the value chain (i.e., ensuring that the digital gilt can be used as collateral in the repo market).

Phase two concentrates on the primary issuance, allocation and custody being performed by a DLT issuance platform with multiple GEMMs participating and a wider group of investors than in phase one. In designing phase two, efforts could also be made to bring onboard more than one custodian and to encourage connectivity between custodians and consequently assist with broadening the investor base for the digital gilt. Because phase two deals with a digital gilt with a longer tenor, phase two will limit on-chain activities to the primary market only and leverage existing off-chain secondary market infrastructure which will now include the use of digital gilt as collateral in repo trading activities. The issuance will focus on medium-term digital gilts.

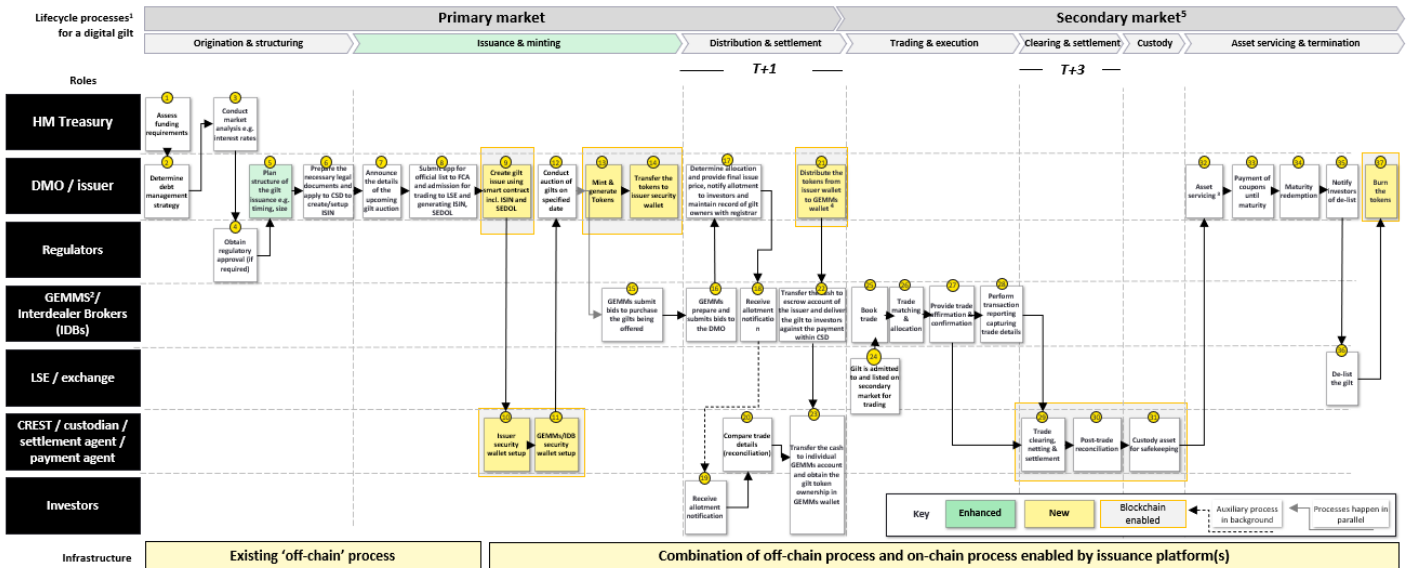
#### **Description of key features of phase two**

Phase two comprises the following features:

1. Digital gilt characteristic:
  - ▶ Medium-term digital gilt (5 to 15 years)
  - ▶ Issue size: Fully scaled - depending on funding requirements from the Debt Management Office and investor appetite
  - ▶ Coupon Rate: Fixed coupon, paid on a semi-annual basis
2. Digitalisation coverage:
  - ▶ Primary market issuance
  - ▶ Post-trade activities including custody only
  - ▶ Traditional fiat for cash-leg of the transaction
3. Ecosystem coverage:
  - ▶ Participation in primary issuance by multiple GEMMs and their respective group of investors (e.g., through an auction process)
  - ▶ One DLT platform to provide primary issuance and post-trading activities
  - ▶ Participation by multiple custodians
4. Collateral:
  - ▶ Covered leveraging existing off-chain secondary market infrastructure

## Process Flow

See the process flow diagram in Appendix Four (minimised below) to illustrate the process flow and requirements.



<sup>1</sup> The sequence of process steps and activities may vary and/or steps and activities may occur simultaneously.  
<sup>2</sup> Gilt-edged market maker is a primary dealer in gilts and actively trades in either conventional gilts, index-linked gilts or both.  
<sup>3</sup> The asset servicing functions may be performed directly by the DMO or outsourced to third-party service providers, depending on the specific arrangements and practices in place.  
<sup>4</sup> If the investor wants to transfer the security to 3rd party custodian, then tokens need to be transferred and burned in tokenisation platform and minted in custodian wallet  
<sup>5</sup> We do not have a matured secondary market trading facility to enable digitalisation of the gilt instrument.

Source: 1) GEMM guidebook 2) Official operations of gilt market 3) Roles of DMO and primary dealer 4) Guide from EY SMAs on digital assets and blockchain

Figure 8: The process flow for approach one, phase two



### 5.1.3 Phase Three

The primary objective of phase three is to build on the characteristics and features from phases one and two, to achieve maximum possible digitalisation across the value chain and increase the ability to use a digital gilt in all forms akin to traditional financial instrument (i.e., a digital gilt can be posted as collateral for short-term financing in repo market).

Phase three concentrates on the primary market issuance, allocation, secondary market trading and post-trading activities (e.g., custody, settlement, and asset servicing) being performed by one or many DLT issuance platform(s) with multiple GEMMs to grant access to a wider group of investors. As this market develops and current interoperability challenges are addressed, phase three could see increased connectivity between custodians, and greater capabilities for custodians to access the platforms of other DLT providers.

In this phase, the digital gilt will be capable of being used as collateral in repo trading activities using DLT platforms and infrastructure. The issuance will focus on long-term digital gilts.

#### Description of key features of phase three

Phase three comprises the following features:

1. Digital Gilt characteristic:
  - ▶ Long-term digital gilt (15 + years)
  - ▶ Issue size: Fully scaled - depending on funding requirements from the Debt Management Office and investor appetite
  - ▶ Coupon Rate: Fixed coupon, paid on a semi-annual basis
2. Digitalisation coverage:
  - ▶ Primary Market Issuance
  - ▶ Secondary Market Trading (including trading of gilt as collateral in repo market)
  - ▶ Post-trade activities including custody, settlement and asset servicing
  - ▶ On-chain digital money for cash-leg of the transaction
3. Ecosystem coverage:
  - ▶ Participation in primary issuance by multiple GEMMs and their respective group of investors (e.g., through an auction process)
  - ▶ One or many DLT platforms to provide primary issuance and post-trading activities
  - ▶ Participation by multiple custodians
  - ▶ The digital bond will be admitted and listed on trading venues without any restrictions in the over-the-counter (OTC) market

#### 4. Collateral:

- ▶ The digital gilt will be capable of being used as collateral in repo trading activities using DLT platforms and infrastructure

#### 5.1.4 The building blocks of the “Evolutionary” approach

The relevance of the different building blocks varies across each phase. This demonstrates the incremental changes and features being implemented across each phase. As you would expect, there is significant difference in the relevance of building blocks across phase one and phase two given their different objectives, whereas phase 3 has high relevance across most of the building blocks with it being an amalgamation of the previous phases. It is, however, important to note that there are key elements across the legal and regulatory framework (e.g., legal and regulatory certainty and appropriate risk and controls) and operating model (e.g., clear governance) that have the same level of relevance regardless of the phase.

			Phase 1	Phase 2	Phase 3
<b>Intent and adoption</b>	Demonstration of government intent	Issue a short-term UK digital gilt programme	High	NA	NA
		Issue a medium-term UK digital gilt programme	NA	High	NA
		Issue a long-term UK digital gilt programme	NA	NA	High
	Stakeholder engagement and adoption	Fair level playing field for Financial Institutions (FIs) to participate in the programme	Low	Medium	High
		Involvement of market participants	Medium	High	High
		Adoption of digital gilt as collateral in repo market to promote liquidity	NA	High	High
Digital currency adoption	Consensus for digital currency adoption	Medium	NA	High	
<b>Digital infrastructure</b>	Technology	Presence of issuance platform to tokenise the gilt	High	High	High
		Real-time settlement in primary market	High <sup>1</sup>	NA	High
		Trading in secondary market using DLT	Low	NA	High
		Real-time settlement in secondary market	High <sup>1</sup>	NA	High
		Trade digital gilt as collateral in repo market using DLT	NA	NA	High
		Automated interest payment and asset servicing	High	NA	High
	Digital asset	Digital asset setup on DLT platform	High	High	High
		Digital currency setup on DLT Platform	High	NA	High
<b>Legal and regulatory framework</b>	Legal and regulatory certainty	Legal and regulatory certainty of the UK position of digital securities	High	High	High
		Issue any regulatory clarifications identified using regulatory toolkit	High	High	High
	Risk and controls	Verify confidence that third party providers have the controls in place to manage new risks	High	High	High
<b>Operating model</b>	Governance	Clearly defined roles and responsibilities throughout the lifecycle	Medium	Medium	Medium
	Talent	Debt Management Office (DMO) team mobilised including the risk skills and competency	Medium	Medium	Medium
		Market participants mobilised including the risk skills and competency	Medium	Medium	Medium
	Process	On-boarding of market participants	Medium	High	High
		End to end process flow documented and validated	High	High	High

**Key:** High High relevance for this phase  
Medium Medium relevance for this phase  
Low Low relevance for this phase

<sup>1</sup> Available only for limited investors

Figure 9: The building blocks across the three phases

### 5.1.5 Benefits of the “Evolutionary” approach for each phase

The tokenisation of gilts has the potential to unlock a wide range of benefits, but the realisation of such benefits will differ, depending on the extent of digitalisation being deployed at any given phase, and the involvement of market participants across the value chain. A comparison of phase one, phase two and phase three against the digitalisation and ecosystem coverage would help us design the elements for phase three launch and adoption.

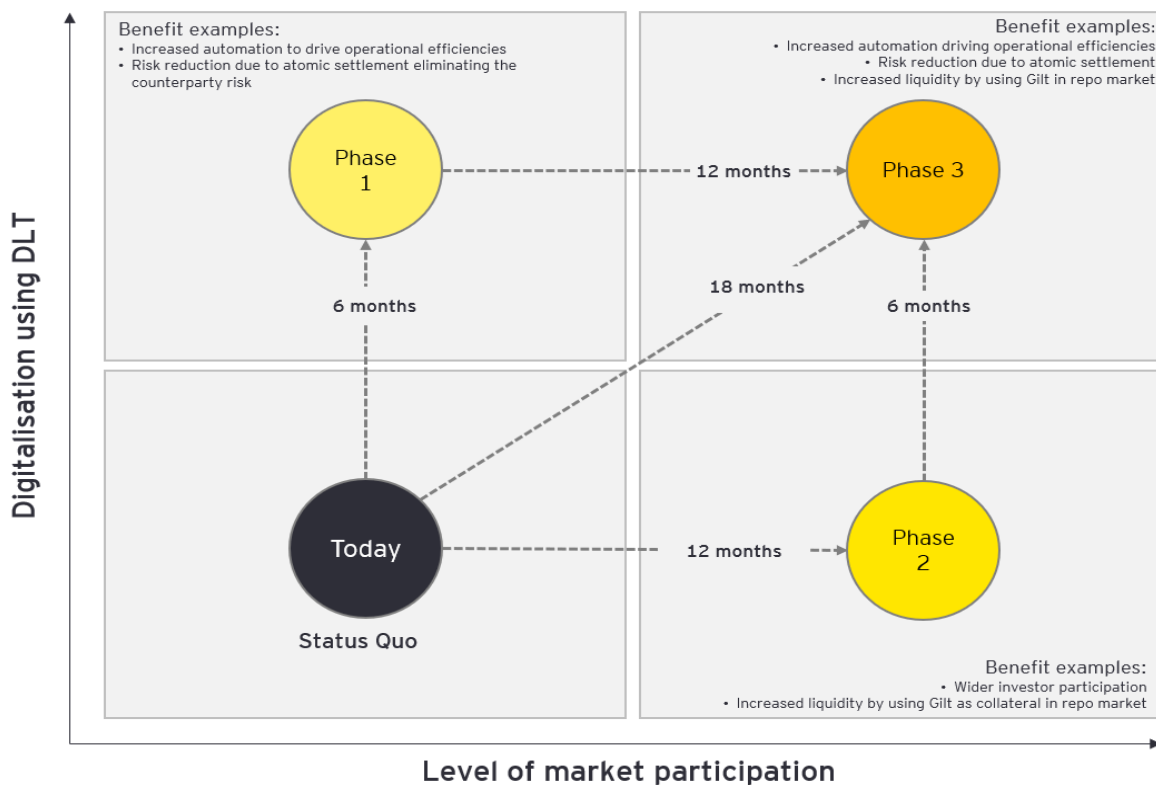


Figure 10: Comparison of phase one, phase two and phase three relative to the digitalisation and ecosystem coverage

The “Evolutionary” approach will lead to gradual realisation of benefits in subsequent phases with phase three potentially presenting more benefits due to the extent of digitalisation and market participation compared to other phases.

	<i>Illustrative Examples</i>	Phase 1	Phase 2	Phase 3
<b>Process automation and cost reduction</b>	<ul style="list-style-type: none"> <li>Manual and bespoke processes will be automated and digitalised to drive operational efficiencies <b>(all the phases)</b></li> </ul>	High	Medium	High
<b>Process effectiveness and quality</b>	<ul style="list-style-type: none"> <li>Reduced processing time will allow the issuer to respond to market demand more efficiently <b>(all the phases)</b></li> <li>Simplification of on-boarding processes <b>(phase 2 and 3)</b></li> <li>Instant access to customer data and automation of on-going monitoring <b>(phase 2 and 3)</b></li> </ul>	Medium	Medium	High
<b>Risk, loss and capital reduction</b>	<ul style="list-style-type: none"> <li>DLT can enable atomic settlement to eliminate counterparty risk and bankruptcy risk <b>(phase 1 and 3)</b></li> <li>Transfer and ownership of bonds are recorded immutably support transparency and building trust <b>(phase 1, 2 and 3)</b></li> </ul>	High	Medium	High
<b>Liquidity optimisation</b>	<ul style="list-style-type: none"> <li>By synchronising bond and money flows on a digital platform, market depth and systemic interbank liquidity will improve by: <b>(phase 2 and 3)</b> <ul style="list-style-type: none"> <li>Near-instantaneous settlement in secondary market</li> <li>Use of gilts as margin or as collateral in repo market</li> </ul> </li> </ul>	Low	Medium	High
<b>Market access</b>	<ul style="list-style-type: none"> <li>Fractionalisation of bond ownership will reduce the barriers to entry, and easy access to illiquid assets, thus broaden the investor base <b>(phase 2 and 3)</b></li> </ul>	Low	High	High

**Key:**

- High** High likelihood this benefit will be realised
- Medium** Medium likelihood this benefit will be realised
- Low** Low likelihood this benefit will be realised

Figure 11: Benefits of each phase of the “Evolutionary” approach

## 5.2 Approach Two: The “Big Bang” approach

The “Big Bang” approach involves directly implementing phase three without preceding phases one and two. It aims to swiftly position the UK at the forefront of digitalisation compared to its peers. However, as articulated earlier, this approach can pose its own set of challenges from a legal, policy, and financial standpoint and therefore requires upfront commitment from the government and market participants to endorse the initiative.

- ▶ It will be critical to assess the approach taken by the Bank of England to expand its list of eligible Level A collateral, which currently includes traditional gilts, to include digital gilts, with the appropriate haircut, for use in its sterling monetary framework operations. This would encourage the adoption of digital gilts in the wider market, as collateral for the standard repo transactions that occur between financial institutions.
- ▶ This end-to-end digitalisation should include all necessary components and features of traditional market infrastructure to ensure that adequate demand and interest from the investors exist (for example, restriction on the use of digital gilt as collateral might impact the liquidity of the digital gilt and short-term financing facility available to investors).
- ▶ Risks due to any spread that may potentially exist between digital and traditional bonds can be mitigated by guarantee, strong commitment, and risk acceptance by the Bank of England and the government to maintain appropriate levels of liquidity in the market.
- ▶ Given the broader acceptance among different market participants to transform financial market infrastructure to adapt and redesign specifically to support issuance, trading, and post-trade activities on-chain, any operational and technical challenges can be mitigated with proper standards and practices in place to determine how the digital gilt interacts with the underlying blockchain/DLT infrastructure.

Overall, swift political decision making and clear consensus between HM Treasury, the Debt Management Office, the Bank of England and market participants will instil confidence and enable successful launch of the digital gilt issuance.

## 6. Considerations to ensure the liquidity and adoption of the UK digital gilt

Ensuring liquidity in the UK digital gilt market is crucial for maintaining its efficiency and stability.

Repos play a significant role in ensuring liquidity in the sovereign bond market. Overall, repos will play a crucial role in ensuring liquidity in the UK digital gilt market by providing short-term funding, facilitating market making, supporting collateral management, and serving as a tool for monetary policy operations. Hence, the importance to use a UK digital gilt as repos and collateral.

### 6.1 The importance of repos in ensuring the liquidity of the UK digital gilt market

Repos contribute to liquidity of the UK digital gilt market as follows:

- ▶ **Short-term Funding:** Repos provide a mechanism for market participants, such as banks, hedge funds, and institutional investors, to obtain short-term funding by using government bonds as collateral. This allows market participants to leverage their bond holdings to raise cash quickly, thereby increasing liquidity in the market.
- ▶ **Leverage and Arbitrage:** By using repos, investors can effectively leverage their bond positions, amplifying their trading activities and market participation. This increased leverage can lead to more trading volume and liquidity in the sovereign bond market. Additionally, repos enable arbitrage opportunities, as investors can exploit price differentials between cash and bond markets to generate profits.
- ▶ **Market Making:** Market makers, such as primary dealers and other financial institutions, often use repos to finance their inventory of government bonds. By engaging in repo transactions, market makers can manage their balance sheets more efficiently and provide liquidity to other market participants by facilitating trading in the sovereign bond market.
- ▶ **Collateral Management:** Repos serve as an essential tool for collateral management in financial markets. Banks and other financial institutions use repos to optimize their balance sheets, meet regulatory requirements, and manage liquidity and funding risks effectively. Sovereign bonds are commonly used as high-quality collateral in repo transactions, enhancing market liquidity.
- ▶ **Monetary Policy Operations:** Central banks frequently use repos as a monetary policy tool to influence short-term interest rates and manage liquidity in the financial system. Through open market operations, central banks conduct repos to inject or

withdraw liquidity from the banking system, thereby influencing overall market liquidity conditions and interest rates.

- ▶ **Risk Management:** Repos allow market participants to mitigate counterparty credit risk by requiring collateralisation of the transaction. The use of high-quality government bonds as collateral in repos helps mitigate credit risk, thereby increasing confidence and liquidity in the sovereign bond market.
- ▶ **Market Efficiency:** By facilitating borrowing and lending of government bonds, repos contribute to the overall efficiency of the sovereign bond market. They help ensure that bond prices reflect all available information, and that trading occurs at fair and transparent prices, enhancing market liquidity and functioning.

## 6.2 Legal and regulatory considerations to enable collateral and repo transactions

There needs to be a sufficient degree of legal and regulatory clarity to help increase confidence and achieve greater levels of adoption by market participants to transact in digital instruments in the UK. Whilst there has been significant work done towards achieving this, including the recent Law Commission's Digital Assets report, further work is required.

This now primarily rests in the hand of legislators and regulators who can expedite a more confident perception in the UK through enacting amendments to existing legislation and regulations. Certain recommendations have been highlighted by the Law Commission already, including requests for express clarification by policymakers that cryptoassets (including digital debt) fall within the scope of Financial Collateral Arrangements (No 2) Regulations 2003<sup>5</sup>.

In addition, clear statements that: (i) digital debt instruments are deemed acceptable collateral by the Bank of England; and (ii) digital sovereign debt instruments would be accepted as equivalent to other forms of government debt, would assist market participants to have sufficient certainty to execute digital sovereign debt transactions, including repo transactions. Such statements of clarification may be achieved through amendments that could be enacted under the use of the Digital Securities Sandbox<sup>6</sup>.

It is only through greater use of digital debt in these traditional structures and transactions that the frequency and use of digital debt will increase, thereby having a positive halo effect of improving liquidity for digital sovereign debt<sup>7</sup>.

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<sup>5</sup> Law Commission, Digital Assets: Final Report, Law Com No 412, paragraph 8.7.

<sup>6</sup> Section 13 of the Financial Services and Markets Act 2024 gives the Treasury the power to modify the application of an enactment for the purposes of the FMI Sandbox.

<sup>7</sup> By way of illustration, we note that in October of 2023, Blackrock tokenised a representation of its shares in a money market fund and transferred these to Barclays on a private blockchain application, almost instantaneously, as collateral for an OTC trade between the two firms. This offered the prospect of greater efficiency and stability in time of market stress. (Ignites Europe, "BlackRock money market fund tokenised on JP Morgan blockchain" dated 12 October 2023).

We note that the Basel Committee for Banking Supervision set out standards on the prudential treatment of crypto asset exposures in December 2022. It stated that tokenised traditional assets, that meet the necessary conditions, should be subject to capital requirements based on risk weights of underlying exposures. In 2023, the PRA started working on its rules to implement these standards and appears to be taking a technology-neutral approach, while also considering the risks that may apply to the use of specific technologies<sup>8</sup>. A similar principle could be used for the Bank of England's recognition of digital gilts as Level A collateral.

### 6.3 What are the other levers of liquidity and adoption for the UK digital gilt market?

Repos are not the only way to enhance liquidity of a digital gilt, there are other ways to enhance liquidity (please note that this list are just examples and may not be exhaustive):

1. **Market Making:** GEMMs are committed to make, on demand, continuous and effective two-way prices to their clients in all gilts for which they are recognised as a market maker. The application of this GEMM obligation should be clarified in the context of a digital gilt.
2. **Regulatory Framework:** Establish and enforce regulations that promote transparency, fair trading practices, and market integrity of the UK digital gilt.
3. **Secondary Market Development and market infrastructure:** Foster the development of a vibrant secondary market for digital gilts, where investors can easily buy and sell UK digital gilts after issuance. Enhancements linked to the full digitalisation of post-trade activities such as standardised contracts, trading protocols, and clearing and settlement systems should boost liquidity and market depth.
4. **Market Information:** Provide timely and accurate information on digital gilt issuance, trading activity, yields, and market developments. Transparent information typically fosters investor confidence, improves price discovery, and facilitates trading, thereby supporting liquidity.
5. **Investor Participation:** Encourage diverse investor participation in the digital gilt market, including institutional investors, asset managers, pension funds, and potentially at a later date retail investors. A broad investor base enhances market depth, resilience, and liquidity by increasing trading activity and demand.
6. **Central Bank Support:** Central banks can play a critical role in ensuring liquidity by conducting open market operations, providing liquidity facilities, and acting as a lender of last resort during periods of market stress. Central bank interventions can stabilise the digital gilt and alleviate temporary liquidity shortages.

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<sup>8</sup> HM Treasury, Consultation on the first Financial Market Infrastructure Sandbox - The Digital Securities Sandbox dated July 2023, paragraphs 3.5 and 3.6.



By implementing these measures, policymakers, regulators, and market participants can collaborate to enhance liquidity in the government bond market, thereby promoting its efficiency, resilience, and attractiveness to investors.

## 7. Future Outlook for the UK Debt Capital Markets

### 7.1 What could a Future Outlook encompass?

The UK has a distinctive opportunity to articulate a comprehensive strategy for digitalising key components of its capital markets. This strategy, which commences with a UK digital gilt, will serve to attract a diverse array of investors (including for example international investors and potentially retail investors). This endeavour seeks to fortify the City's standing as a premier hub for capital market activities and cultivate a more efficient and robust debt capital market ecosystem.

An ambitious Future Outlook will position the UK as the pre-eminent destination for capital markets, leveraging innovative technologies such as DLT and artificial intelligence (AI) to streamline processes and enhance cost effectiveness and agility for all stakeholders, all with a continued focus on strong outcomes for investors and effective, proportionate regulation.

This vision will concentrate on delineating the optimal level of digitalisation throughout the entirety of the debt issuance lifecycle within the UK, encompassing issuance, trading, and post-trade activities. While envisioning a future where all new bonds are digitalised is conceivable, the strategy must also account for a realistic and feasible transition phase.

The vision should also consider the inherent variability in requirements across different markets. Throughout the transition phase, the adoption of DLT will fluctuate across various asset classes and different stages of the trade lifecycle. Traditional gilt and corporate bond issuance will continue unabated during this transitional period as all market participants progress along this trajectory.

As outlined in our [Unlocking the Power of Securities Tokenisation](#) report, while the industry has initially focused on bonds as the first use case, there is potential for expanded tokenisation, particularly with long-dated, highly intermediated, and complex products characterised by lower liquidity, such as real estate. Unlocking this potential represents a significant opportunity as the transition advances.

Several foundational elements exist to facilitate this transition, including the robust legal and regulatory frameworks currently in place in the UK. These frameworks ensure the safe integration of digitalisation into the nation's debt capital markets without compromising market integrity. However, the development of a technological infrastructure that aligns with critical business and non-functional requirements such as security, scalability, interoperability, and resilience could pose significant complexity and may require considerable time.

The Future Outlook must strike a delicate balance between ambition, seeking to differentiate the UK from other international capital markets, and pragmatism, acknowledging the challenges and intricacies inherent in implementation.

Equally vital, this vision should prioritise enhancements to the current state and encompass ten critical objectives and strategies for integration:

1. **Assurance of a level playing field:** for the vision, there will be a consolidation of key platforms and all market participants will have access to these platforms to ensure the widest participation and prevent the fragmentation of liquidity.
2. **Robust legal and regulatory environment:** the objective is to get a clearer legal and regulatory environment, enabling industry participants to have certainty across all aspects of the lifecycle of the digital gilt issuance. Greater legal and regulatory certainty will increase industry adoption of tokenised securities.
3. **Increase market liquidity:** building a critical mass of liquidity in secondary markets.
4. **Tangible and material benefits:** using and deploying digital gilts will bring material benefits to the entire ecosystem. Financial firms will operate at a much lower cost and investors will have better and cheaper access to digital gilts and bonds.
5. **Enhanced transparency:** standardising and automating reporting requirements, improving disclosure practices, and targeting real-time data dissemination.
6. **Diversification of instruments:** ability to quickly engineer and deploy a wide range of debt instruments catering to different investor needs and risk appetites.
7. **Sustainable finance:** facilitate and enable the issuance of green bonds, social bonds, and sustainable development bonds to finance environmentally and socially responsible projects. This not only attracts socially conscious investors but also contributes to addressing global challenges such as climate change and inequality. Measuring and managing environmental, social and governance (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.
8. **Market accessibility:** ensure greater, easier and faster access to debt capital markets for a broader range of issuers, including small and medium-sized enterprises (SMEs) and emerging market entities.
9. **Risk Management and systemic risk prevention:** such vision should strengthen risk management practices among market participants, including issuers, investors, and intermediaries. This involves robust credit assessment, stress testing, and risk mitigation strategies to prevent systemic risks. 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.

10. **The development of new talent:** that will support and enable such transition towards full digitalisation of the gilt.

## 7.2 The ecosystem

While it is too soon to be able to define in detail what this vision will look like, the graph below shows an example of a fully digital debt capital market ecosystem

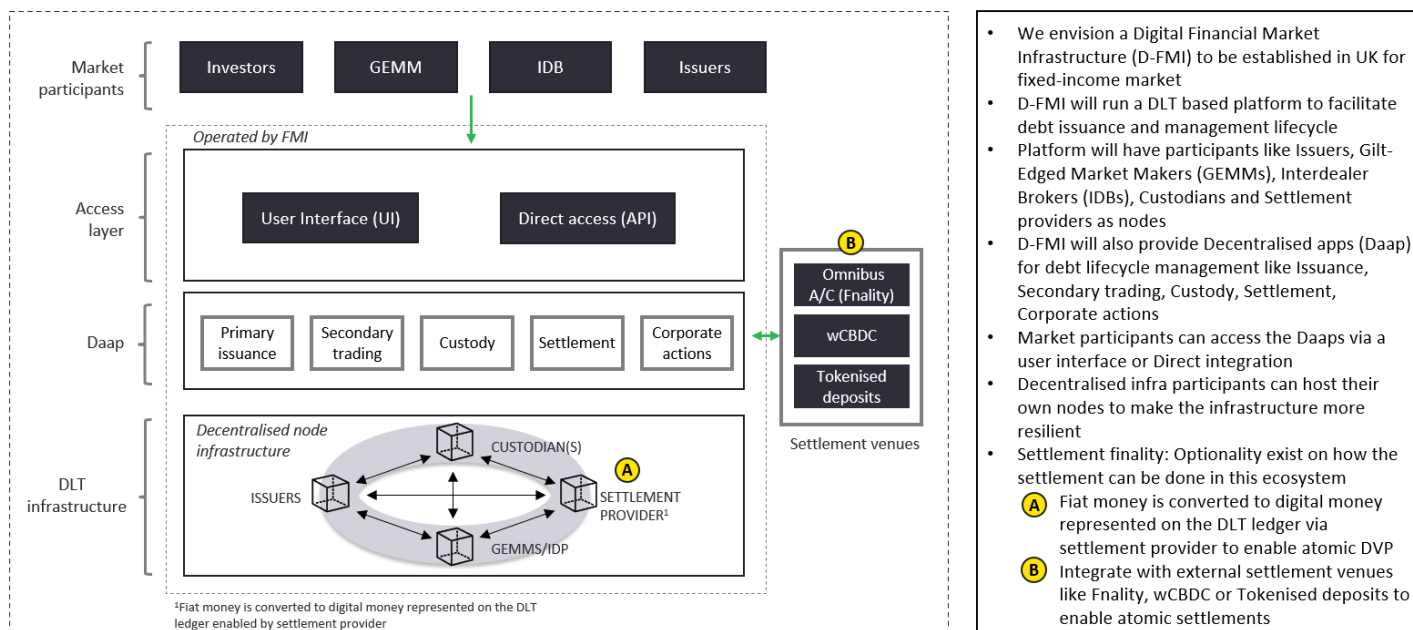


Figure 12: Example architecture diagram of a fully digital capital market ecosystem

## 7.3 Conclusion

We are pleased that exploring the benefits of applying DLT to a sovereign debt instrument has received broad political support.

UK Finance and its members stand ready to support the next stages of this exploration. We trust that this roadmap is of service to government, regulators and industry.

A UK digital gilt would act as a beacon to global market participants; signalling that the UK will continue to embrace innovation and strengthening its position as a global financial centre.

The UK has the opportunity to lead in this space, but it must act now. As a first step, we recommend that the government consider stating publicly that it wishes for the UK to lead the world in regulating digital tokenisation. This will set the vision for the UK and help to unite regulators and industry around a common aim.

The UK's capital markets are an engine of domestic growth. We look forward to government and industry working together to build the necessary infrastructure for more advanced, inclusive and innovative financial markets.

# 8. Appendices

## Appendix One – Legal and regulatory analysis

### A. Recommended steps for gilt issuance in the short-term:

In respect of the short-term (i.e., within the next six months), the government has the option to use any of the following regulatory tools:

- ▶ The first step would be a public statement made by the UK government stating that it wishes the UK to lead the world in regulating digital tokenisation and, to support that aim and catch up with other jurisdictions, signal an intent to issue a digital gilt.
- ▶ A Dear CEO Letter to include:
  - confirmation that the UKLA Listing Rules apply to the listing of digital securities and assets.
  - clarification that the instruments defined in the RAO, UK MiFID and UK MiFIR include the equivalent digital assets and securities.
  - clarification that the CASS rules apply to digital gilts on a principal basis, and formal rules will be implemented to reaffirm this position.
  - confirmation that certain digital assets (including a digital gilt) will fall within the Financial Collateral Arrangements (No.2) Regulations (FCARs), as per the Law Commission's recommendation.
- ▶ A statutory instrument to include:
  - Amendments to the Regulated Activity Order (RAO), UK MiFID, UK MiFIR, and the National Loans Act 1968 that specify that the relevant definition of a gilt (e.g., "*government and public securities*" and "*stock*" etc) includes a digital gilt.
  - Amendments to the Government Stock Regulations 2004 to amend and/or remove the requirement for a "*Registrar of Government Stock*", to enable one or more distributed systems to undertake this function in respect of digital gilts.
  - Amendments to FCARs to include express reference to digital gilts, ensuring they fall within scope of the regime.
  - Confirmation that the statutory and regulatory amendments made within the Financial Services and Markets Act 2023 (Digital Securities Sandbox) Regulations 2023 will remain in effect after the termination date of 8 January 2029, to provide certainty to Digital Securities Sandbox entrants.

### B. Recommended steps for digital gilt issuance in the long-term:

In respect of the long-term (i.e., beyond the next six months), the government has the option of using a range of regulatory tools, including:

- ▶ Legislation (whether primary or secondary) (following consultation) to include:

- Amendments to the RAO, UK MiFID, UK MiFIR, and the National Loans Act 1968 that specify that the relevant definition of a gilt (e.g., "government and public securities" and "stock" etc) includes a digital gilt.
  - Amendments to the Government Stock Regulations 2004 to amend and/or remove the requirement for a "Registrar of Government Stock", to enable one or more distributed systems to undertake this function in respect of digital gilts.
  - New regulations that replace the Financial Collateral Arrangements (No.2) Regulations (FCARs), clarifying the legal uncertainty identified by the Financial Markets Law Committee and the Law Commission, and including express provision for digital assets.
  - Confirmation that the statutory and regulatory amendments made within the Financial Services and Markets Act 2023 (Digital Securities Sandbox) Regulations 2023 will remain in effect after the termination date of 8 January 2029, to provide certainty to Digital Securities Sandbox entrants.
- ▶ FCA Handbook Rules and Guidance (following consultation) that deal with –
- the applicability of the UKLA listing rules to digital assets and/or relevant modifications to the current listing rules for digital assets; and
  - custody of cryptoassets.

LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
<b>FSMA 2000 and the RAO 2001</b>	The provisions of the Financial Services and Markets Act 2000 ("FSMA") and the Regulated Activities Order 2001 ("RAO"), which set out the financial instruments that relate to regulated activities in the UK, only refer to "government and public securities" (Article 78 of the RAO). They do not refer to digital gilts.	<p>The UK's common law allows for the issuance of a digital gilt under current legislation and regulation. The Law Commission, in its <a href="#">Digital Assets: Final report</a>, confirmed that, "the law of England and Wales has proven itself sufficiently resilient and flexible to recognise some digital assets as capable of being things to which personal property rights can relate", providing certainty that there is a level of protection for financial institutions as they transact in certain digital assets.</p> <p>In their 2023 <a href="#">Legal Statement</a>, the UK Jurisdiction Taskforce ("UKJT") confirmed that</p>	<p><b>Option One</b> - Rely on the Law Commission's, UKJT's and the FCA's statements as support for the view that laws and regulations applicable to non-digital assets and securities will apply to digital assets and securities, in principle.</p> <p><b>Option Two</b> – Pass legislation, e.g., a statutory instrument, that amends the RAO and the National</p>	See <b>Option Two</b> of short-term options

LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
<p><b>Section 12 of the National Loans Act 1968</b></p>	<p>Section 12 of the National Loans Act 1968, which gives the Treasury powers to issue gilts, does not expressly refer to digital gilts.</p>	<p>the use of distributed ledger technology to facilitate the issue of bonds, using tokens, on a blockchain <i>"gives rise to no particularly novel legal issues"</i>, and <i>"conventional registered bond structures already use electronic databases to record and effect bond transfers without any difficulty"</i>.</p> <p>The Financial Conduct Authority ("<b>FCA</b>") has also provided guidance in its <a href="#">Guidance on Cryptoassets Feedback and Final Guidance CP 19/3</a> (see paragraphs 62-64), that it regulates <i>"security tokens"</i> under FSMA. It defines <i>"security tokens"</i> as those <i>"tokens that provide rights and obligations akin to specified investments as set out in the RAO"</i>.</p> <p>For information, we also note that ESMA has issued a Consultation paper on the draft Guidelines on the conditions and criteria for the qualification of crypto-assets as financial instruments dated 29 January 2024. In the paper, ESMA states that, <i>"The technological format of crypto-assets should not be considered a determining factor by national competent authorities and market participants when assessing the qualification as financial instruments. Following this, the process of tokenisation of financial instruments should not affect the nature of such assets. Tokenised</i></p>	<p>Loans Act 1968, which specifies that the relevant definition of a gilt includes a digital gilt. For example, we understand that Luxembourg's blockchain III law amends the definition of <i>"financial instruments"</i> in its the Financial Sector Law to include digital financial instruments.</p>	



LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
		<p><i>financial instruments should continue to be considered as financial instruments for all regulatory purposes”.</i></p>		
<p><b>The Government Stock Regulations 2004</b></p>	<p>The provisions of the Government Stock Regulations 2004 do not expressly account for the issuance of digital gilts.</p>	<p>Currently, under these regulations, gilts are registered by the Treasury’s designated registrar.</p> <p>We note that in UK Finance’s response to the Treasury’s consultation on the digital securities sandbox, it recommended that if the government wishes to issue a digital gilt, <i>“it will likely be desirable to suspend the requirement for a “Registrar of Government Stock” in the Government Stock Regulations 2004 as a means of enabling a distributed system to reduce complexity and cost”.</i></p> <p>In its report on the <a href="#">Digital Securities Sandbox consultation</a>, the Treasury stated that “legislation relating to government securities, such as the Government Stock Regulations and Treasury Bill Act, was highlighted as in need of change if in future the UK Government chooses to issue a digital sovereign debt instrument” (Para 3.77). The Treasury added that the digital sandbox would not exclude the issuance of a digital gilt, but this could require an additional</p>	<p><b>Option One</b> - Amend the Digital Securities Sandbox Regulations to suspend the requirement for a registrar of government stock in the Government Stock Regulations, in relation to the issuance of a digital gilt.</p> <p><b>Option Two</b> - Amend the Government Stock Regulations 2004, to remove/modify the requirement for a registrar in relation to the issuance of digital gilts.</p>	<p>See <b>Option Two</b> of short-term options</p>

LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
		statutory instrument to make changes to the Government Stock Regulations (Para 3.11).		
<b>The UKLA Listing rules</b>	The UKLA Listing Rules are silent on the listing of digital assets and securities.	Under listing rule (LR) 1.1.1 of the UKLA listing rules, an issuer, including a public sector issuer, must comply with specific UKLA listing rules prior to admission of the relevant securities to the Official List. There is no clarity on the application of these rules to digital assets and securities.	<p><b>Option One</b> - Consult with FCA on the application of the listing rules to the listing of digital securities and assets.</p> <p><b>Option Two</b> - Seek the issuance of a Dear CEO letter from the FCA to clarify the applicability of the UKLA Listing Rules to digital assets.</p>	<b>Option</b> - Obtain FCA handbook guidance on the applicability of the UKLA listing rules to digital assets or relevant modifications to the current listing rules.
<b>The LSE's Admission and Disclosure Standards</b>	Definitions of key financial instruments in the LSE's Admission and Disclosure Standards do not refer to digital assets and securities.	The definitions of "debt securities", "transferable securities" and "securities" in the LSE's Admission and Disclosure Standards (2022) do not expressly refer to digital assets and securities. Instead, these refer back to relevant financial instruments set out in FSMA 2000, the RAO 2001 and MiFIR.	<p><b>Option One</b> - Rely on the FCA guidance on the application of the RAO and MiFID to digital assets and consult with the LSE to ensure alignment.</p> <p><b>Option Two</b> - Seek the issuance of a Dear CEO letter from the FCA to clarify the inclusion of digital assets in the instruments defined in the RAO, MiFID and MiFIR, so that the LSE's Admission and Disclosure</p>	<b>Option</b> - Consult with the LSE on the application of the Admission and Disclosure Standards to digital assets and seek the necessary modifications to these standards.

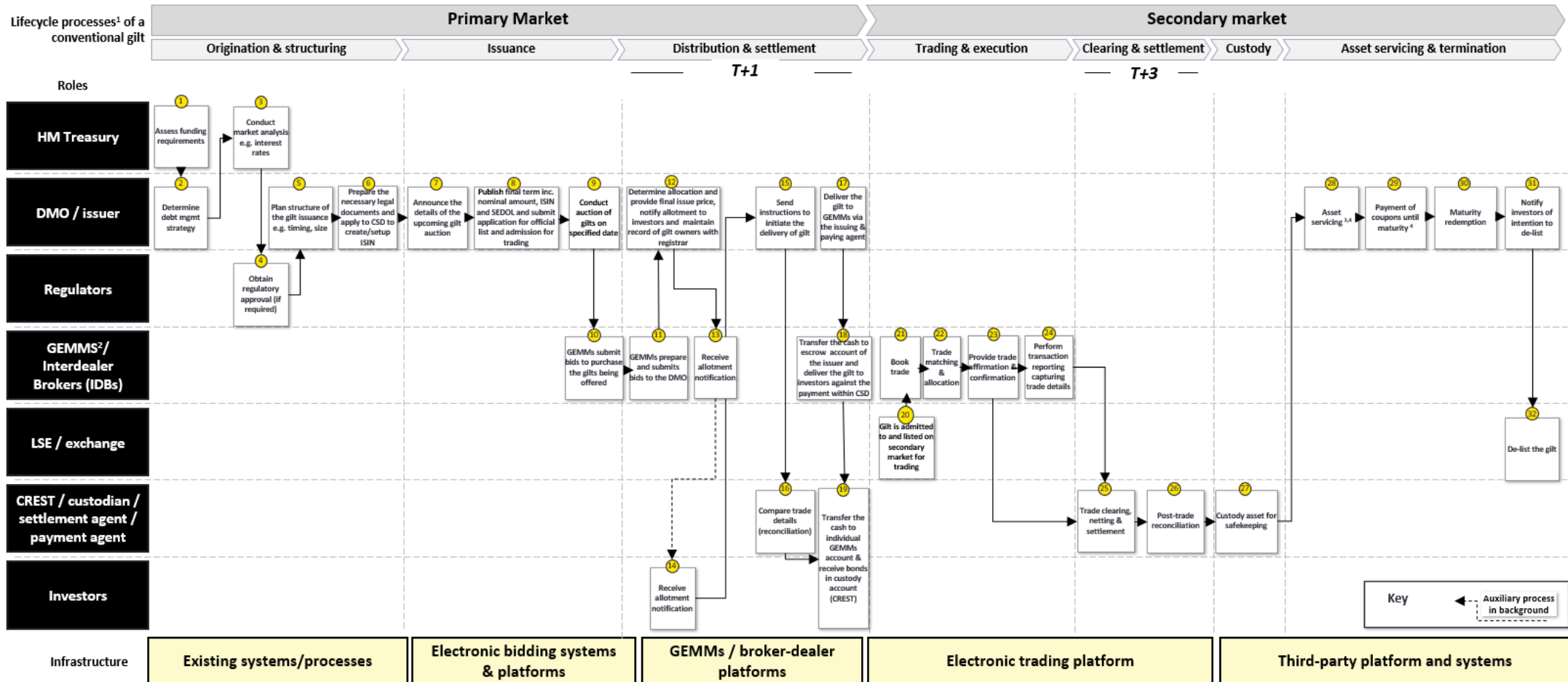
LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
			Standards will apply to these digital assets.	
<b>The Uncertificated Securities Regulations</b>	The Uncertificated Securities Regulations 2001 do not envisage the use of DLT technology.	These regulations allow the transfer of gilts electronically, provided that this is in a system operated by the designated operator, CREST. In HMT's view, they do not expressly provide for the use of distributed ledger technology. For example, with respect to the stated purposes and basic definition in Regulation 2(1), the Treasury identified that there are "no provisions to enable the transfer of securities using distributed systems". ((HMT Consultation on the first FMI Sandbox (para 2.65))	<b>Option</b> - A Digital Securities Sandbox entrant (old or new) could rely on the digital sandbox modifications to these regulations. (See Part 5 of the Schedule to the Financial Services and Markets Act 2023 (Digital Securities Sandbox) Regulations 2023 (the " <b>Digital Securities Sandbox Regulations</b> )).	<b>Option</b> - Issue a statutory Instrument to confirm that the statutory and regulatory amendments made within the Digital Securities Sandbox Regulations will remain in effect after the 8 of January 2029.
<b>MiFID/MiFIR</b>	The financial instruments listed in Annex I of MiFID do not include digital assets and securities.	The FCA has provided guidance in its Guidance on Cryptoassets Feedback and Final Guidance (CP 19/3) (see para 64), stating that "Security tokens.... may also be financial instruments under MiFID".	<b>Option One</b> - Rely on the FCA's guidance that UK MiFID may apply to a digital asset.  <b>Option Two</b> - Pass legislation, e.g., a statutory instrument, that amends the UK MiFID and UK MiFIR, which specifies that the relevant definition of a gilt includes a digital gilt. For example, we understand that Luxembourg's	See <b>Option Two</b> of short-term options

LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
			blockchain III law amends the definition of “ <i>financial instruments</i> ” in its the Financial Sector Law to include digital financial instruments.	
<b>UK CSDR</b>	UK CSDR does not envisage the use of distributed ledger technology.	In the Treasury’s view, in its consultation on the Digital Securities Sandbox, (para 2.57-2.58) parts of UK CSDR do not expressly envisage using digital assets to settle transactions or envisage business models where one entity acts as a trading venue and a settlement system. For example, HMT identified that “ <i>some of the definitions and concepts set out do not accommodate digital asset technology/DLT, tokenised securities, and digital wallets.</i> ”.	<b>Option</b> - A Digital Securities Sandbox entrant could rely on the digital sandbox modifications for UK CSDR (See Part 2 of the Schedule to the Digital Securities Sandbox Regulations).	<b>Option</b> - Issue a statutory Instrument to confirm that the statutory and regulatory amendments made within the Digital Securities Sandbox Regulations will remain in effect after the 8 January 2029.
<b>The CASS rules</b>	Whether the CASS rules apply to the digital gilt assets/securities.	The Treasury’s view is that the CASS rules “ <i>currently apply to security tokens</i> ” subject to any exemptions ( <i>Future financial services regulatory regime for cryptoassets - Response to the consultation and call for evidence</i> (Page 23)) . However, it UK Finance advises that that there is a potential need to amend the existing custody provisions in the CASS to adapt the current custody requirements for emerging technologies (UK Finance’s <i>Unlocking the Power of Securities Tokenisation</i> (page 29)). As recognised by the FCA, custody operates	<b>Option One</b> - Rely on the FCA’s statement that “ <i>where tokenised units fall within the regulatory perimeter (e.g., security tokens), firms carrying out regulated activities relating to custody of these assets are likely to be subject to CASS</i> ”. <b>Option Two</b> - Consult with and seek clarity from the FCA, via a Dear CEO letter,	<b>Option</b> - Await new handbook rules concerning the custody of cryptoassets, following the consultation on draft rules. We note that, so far, the FCA has set out its approach to the custody of cryptoassets in Discussion Paper DP23/4

LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
		<p>differently on DLT networks than with traditional securities Guidance on Cryptoassets Feedback and Final Guidance (CP 19/3) (see page 16).</p> <p>In the Investment Association's UK Fund Tokenisation – <a href="#">A blueprint for implementation – Interim Report</a> from the Technology Working Group to the Asset Management Taskforce dated November 2023, the FCA noted that “<i>In circumstances where tokenised units fall within the regulatory perimeter (e.g., security tokens), firms carrying out regulated activities relating to custody of these assets are likely to be subject to CASS.</i>” However, “<i>The FCA is currently reviewing its custody rules in respect of digital assets –</i>”.</p>	<p>to ensure that CASS will apply on a principles basis to digital assets.</p>	<p>Regulating cryptoassets Phase One: Stablecoins dated November 2023.</p>
<p><b>The Financial Collateral Arrangements Regulations</b></p>	<p>It is unclear whether debt securities fall within the scope of the Financial Collateral Arrangements (No.2) Regulations (FCARs) regime.</p>	<p>The Law Commission has concluded that many crypto-tokens are likely to fall outside of the scope of the FCARs regime. However, this was “possibly different” for collateral arrangements in respect of CBDCs, stablecoins, equity and debt securities. For at least some of these, it is conceivable that they fall within the scope of the FCARs regime. The Law Commission recommended law reform to clarify this position (Law Commission Report on Digital Assets (para. 8.7)).</p>	<p><b>Option One</b> - Rely on the Law Commission’s statement that certain digital assets may fall within the FCARs regime.</p> <p><b>Option Two</b> - Consult with the FCA and obtain a Dear CEO letter that confirms that digital assets (including a digital gilt) will fall within the FCARs regime.</p>	<p><b>Option</b> - Include digital assets in the new regulations that will replace the FCARs, while also implementing the Financial Markets Law Committee’s and the Law Commission’s recommendations for reforming the FCARs.</p>

LEGISLATION /RULES	ISSUE	ANALYSIS	SHORT-TERM OPTIONS	LONG-TERM OPTIONS
		<p>We also note the Financial Markets Law Committee’s letter on the FCARs, noting that the FCARs are listed in Schedule 1 of FSMA 2023 and will therefore be revoked in due course, and that this is the opportunity to ensure that the replacement legislation for the FCARs clarifies the areas of uncertainty. Principally, the Committee proposed that the replacement legislation for the FCARs should provide clarity and certainty, in respect of the definition of “<i>security financial collateral arrangement</i>” as to the separate meanings of “possession” and “control”.</p>		

## Appendix Two – Current lifecycle of a conventional gilt issuance process



<sup>1</sup> The sequence of process steps and activities may vary and/or steps and activities may occur simultaneously.

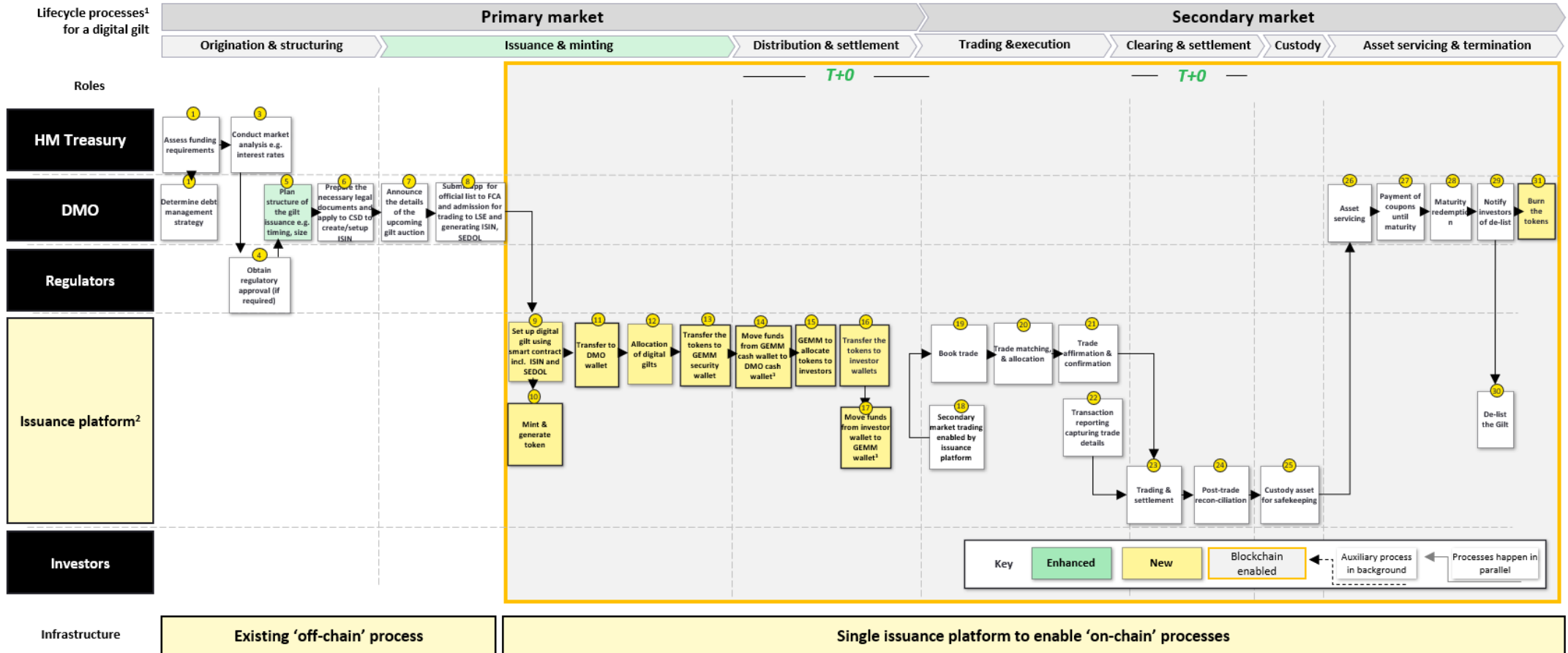
<sup>2</sup> Gilt-edged market maker is a primary dealer in gilts and actively trades in either conventional gilts, index-linked gilts or both

<sup>3</sup> The asset servicing functions may be performed directly by the DMO or outsourced to third-party service providers, depending on the specific arrangements and practices in place.

<sup>4</sup> This starts with DMO but involves other market participants as well to execute the process

Source: 1) GEMM guidebook 2) Official operations of gilt market 3) Roles of DMO and primary dealer

## Appendix Three – Approach one, phase one, lifecycle of issuing a digital gilt



<sup>1</sup> The sequence of process steps and activities may vary and/or steps and activities may occur simultaneously.

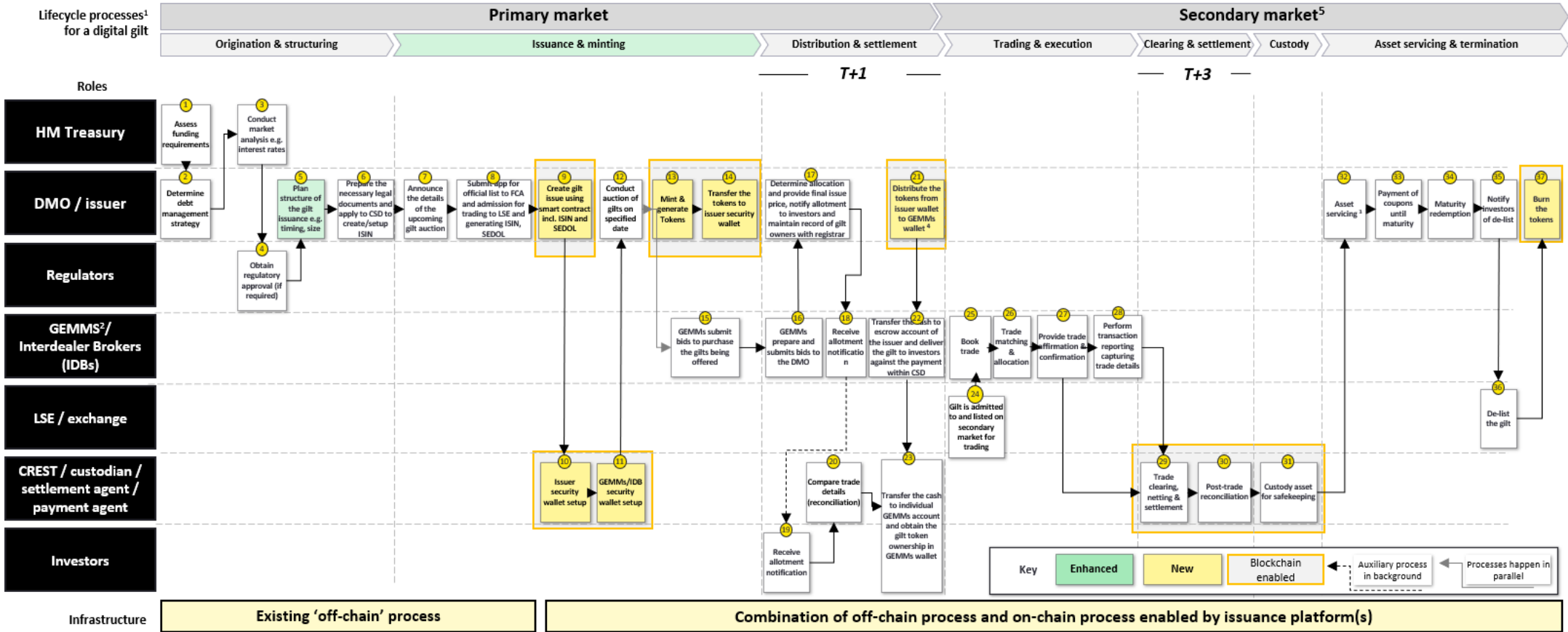
<sup>2</sup> One integrated DLT (Distributed Ledger Technology) platform on behalf of DMO/HMT for primary issuance, allocation, secondary market trading, settlement and custody for pre-approved market participants

<sup>3</sup> This cash wallet represent cash on the ledger which is setup during the onboarding process. The cash wallets are backed by traditional fiat in commercial bank accounts which are converted to digital money (on-chain)

Source: 1) GEMM Guidebook 2) Official Operations of Gilt Market 3) Roles of DMO and Primary Dealer 4) Guide from EY SMAs on Digital Assets and Blockchain



## Appendix Four – Approach one, phase two, lifecycle of issuing a digital gilt



<sup>1</sup> The sequence of process steps and activities may vary and/or steps and activities may occur simultaneously.

<sup>2</sup> Gilt-edged market maker is a primary dealer in gilts and actively trades in either conventional gilts, index-linked gilts or both

<sup>3</sup> The asset servicing functions may be performed directly by the DMO or outsourced to third-party service providers, depending on the specific arrangements and practices in place.

<sup>4</sup> If the investor wants to transfer the security to 3rd party custodian, then tokens need to be transferred and burned in tokenisation platform and minted in custodian wallet

<sup>5</sup> We do not have a matured secondary market trading facility to enable digitalisation of the gilt instrument.

Source: 1) [GEMM guidebook](#) 2) [Official operations of gilt market](#) 3) [Roles of DMO and primary dealer](#) 4) [Guide from EY SMAs on digital assets and blockchain](#)

## Appendix Five – Jurisdictional digital bond issuance case studies

Date	Digital Bond Issuer	Bond tenor	Bond issuer type	Level of digitalisation	Amount	Jurisdiction	Key Takeaways	Links
Sep-21	Black Manta Capital Partners (BMCP) & Globacap	3.5 years	Corporate	End-to-end digital	GBP 15 million	London and Luxembourg	<ul style="list-style-type: none"> <li>▶ Black Manta Capital Partners (BMCP) launched the first fully digital private bond. It raised £15mn to finance affordable housing in the UK using a private placement solution.</li> <li>▶ Efficiencies were achieved by changing how private placement and structured financing is executed.</li> <li>▶ This issuance saw a reduction of intermediary costs, creating higher investor returns.</li> <li>▶ This digital issuance significantly shortened the investment process and enabled automatic redemption and coupon payments.</li> </ul>	<a href="#">Globacap</a>
Nov-21	SDX in collaboration with Credit Suisse, UBS Investment Bank, and Zürcher Kantonalbank	5 years	Corporate	Hybrid	CHF 150 million	Switzerland	<ul style="list-style-type: none"> <li>▶ The bond has two exchangeable parts, making it hybrid in nature. The digital part (P1) will be listed and traded on SDX Trading Ltd and centrally held by SIX Digital Exchange Ltd. The traditional part (P2) will be listed and traded on SIX Swiss Exchange Ltd and centrally held by SIX SIS Ltd.</li> <li>▶ This was the first bond issuance with a pure digital element, in a fully regulated environment.</li> <li>▶ A key takeaway from this issuance was the strong interest demonstrated from the market investor base, which provided confidence to the innovative nature of the Swiss financial market</li> </ul>	<a href="#">Sixgroup</a>
Nov-22	Switzerland's SIX Digital Exchange (SDX) & UBS AG – London Branch	3 years	Corporate	Hybrid	CHF 375 million	Switzerland	<ul style="list-style-type: none"> <li>▶ Switzerland's SIX Digital Exchange (SDX), alongside UBS AG, issued a hybrid digital bond worth CHF 375 million, using the SDX blockchain platform.</li> <li>▶ This represented the first ever public benchmark bond that investors could access in both digital and traditional markets.</li> <li>▶ This bond enabled Investors with or without blockchain infrastructure to invest in the bond.</li> <li>▶ Instant and automatic settlement, without requiring a central clearing counterparty.</li> </ul>	<a href="#">UBS Global</a>

Date	Digital Bond Issuer	Bond tenor	Bond issuer type	Level of digitalisation	Amount	Jurisdiction	Key Takeaways	Links
Nov-22	European Investment Bank - Project Venus	2 years	SSA (Sovereign, supranational and agency)	End-to-end digital	EUR 100 million	European Union	<ul style="list-style-type: none"> <li>▶ A 2-year syndicated bond issuance for the European Investment Bank (EIB) launched via Goldman Sachs digital asset tokenisation platform, GS DAP. This was known as Project Venus.</li> <li>▶ This issuance marked the launch of the Goldman Sachs blockchain platform.</li> <li>▶ Goldman, Santander, Société Générale and the Banque de France were all involved in the issuance.</li> <li>▶ The bond was issued under Luxenberg law and is listed on the Luxembourg Stock Exchange.</li> </ul>	<a href="#">Ledger Insights</a> <a href="#">EIB Digital Bond</a>
Jan-23	European Investment Bank	2 years	SSA (Sovereign, supranational and agency)	Hybrid	GBP 50 million	European Union	<ul style="list-style-type: none"> <li>▶ The EIB announced a fully digital native bond issuance in GBP under Luxembourg law using a combination of the HSBC Orion public blockchain and a public network, with BNP Paribas, HSBC and RBC Capital Markets working as joint lead managers.</li> <li>▶ The private blockchain operates to record legal ownership of the digital bonds and created an operational framework to manage the floating rate instrument.</li> <li>▶ The public blockchain is used for information sharing, providing clarity to investors and the market.</li> <li>▶ This case-study starts the journey to understand how blockchain-based settlement platforms can be used in liquidity management.</li> <li>▶ Sovereign debt issuance via the EIB has been key for Europe's perceived leadership in the digital market</li> </ul>	<a href="#">EIB Digital Bond</a>
Feb-23	Siemens	1 year	Corporate	End-to-end digital	EUR 60 million	Germany	<ul style="list-style-type: none"> <li>▶ Siemens, in Germany issued a digitally native bond worth EUR 60mn, underpinned by the public blockchain Polygon, representing one of the first large corporates to venture into digital securities.</li> <li>▶ This was made possible through Germany's eWpG legislation for digitally native electronic securities that supports both centralised ledgers and distributed blockchains.</li> <li>▶ The bond was issued under Germany's 2021 eWpG legislation for digitally native electronic securities.</li> </ul>	<a href="#">Ledger Insights</a>

Date	Digital Bond Issuer	Bond tenor	Bond issuer type	Level of digitalisation	Amount	Jurisdiction	Key Takeaways	Links
Feb-23	HKSAR Government	1 year	SSA (Sovereign, supranational and agency)	End-to-end digital	HKD 800 million	Hong Kong	<ul style="list-style-type: none"> <li>▶ This is the first tokenised green bond issued by a government globally.</li> <li>▶ The Central Money markets Unit (CMU) of the Hong Kong Monetary Authority (HKMA) is the clearing and settlement system for the bond, leveraging Goldman Sachs' tokenisation platform - GS DAP</li> </ul>	<a href="#">HKMA Gov</a>
May-23	Israel Government	N/A (Proof of concept)	SSA (Sovereign, supranational and agency)	N/A (Proof of concept)	N/A (Proof of concept)	Israel	<ul style="list-style-type: none"> <li>▶ The Tel Aviv Stock Exchange (TASE) and Israel's Finance Ministry successfully completed the proof of concept (POC) phase for a digital Israeli Bond traded on a dedicated blockchain platform. The POC is being referred to as Project Eden.</li> <li>▶ The Ministry of Finance issued and minted the first dummy digital governmental bond on a blockchain-based platform as an ERC-1155 Security Token.</li> <li>▶ The blockchain used for this event was Ethereum Virtual Machine (EVM)-compatible, enabling potential integration with other blockchain solutions in the future.</li> <li>▶ The introduction of a digital payment token was a fundamental component of this settlement process.</li> </ul>	<a href="#">Business Standard</a>
Jun-23	European Investment Bank	2 years	SSA (Sovereign, supranational and agency)	End-to-end digital	SEK 1 billion	European Union	<ul style="list-style-type: none"> <li>▶ EIB SEK 1 billion green bond – issued on the so bond blockchain platform developed by Sweden's SEB and Credit Agricole CIB.</li> <li>▶ The digital bond platform uses a new type of validation logic, which enables low energy consumption and encourages the affiliated banks to continuously improve the carbon footprint of their infrastructure.</li> <li>▶ This 2-year bond was the first native digital 2-year green bond to be listed on the Luxenberg Green Exchange, the bond was also listed on the Luxembourg Stock Exchange Securities Official List.</li> </ul>	<a href="#">Ledger Insights</a> <a href="#">SEB Group</a>

Date	Digital Bond Issuer	Bond tenor	Bond issuer type	Level of digitalisation	Amount	Jurisdiction	Key Takeaways	Links
Oct-23	World Bank	3 years	SSA (Sovereign, supranational and agency)	Hybrid	EUR 100 million	World Bank	<ul style="list-style-type: none"> <li>▶ The World Bank issued the first digital securities on a new Digital Financial Market Infrastructure (D-FMI) DLT platform developed by Euroclear</li> <li>▶ The 3-year Digitally Native Notes raised EUR 100 million to support the financing of World Bank's sustainable development activities.</li> <li>▶ The securities are governed by English law.</li> </ul>	<a href="#">World Bank</a>
Dec-23	Hitachi	5 years	Corporate	End-to-end digital	YEN 10 billion	Japan	<ul style="list-style-type: none"> <li>▶ Hitachi 10 billion yen digitally tracked green bond - issued on the ibet for Fin blockchain.</li> <li>▶ The benefits of this green bond issuance using digital technologies are both improving data transparency and enhancing the data collection process required for green bonds.</li> <li>▶ The form of the bond will be a security token offering (STO) issued by Hitachi, enabling funds to be raised via 'security tokens' on the blockchain platform.</li> </ul>	<a href="#">Hitachi</a> <a href="#">Hitachi</a>
Feb-24	HKSAR Government	2 years	SSA (Sovereign, supranational and agency)	Hybrid	HKD 6 billion	Hong Kong	<ul style="list-style-type: none"> <li>▶ The Government of the Hong Kong Special Administrative Region of the People's Republic of China (HKSAR Government) issued HK\$6bn worth of digital green bonds. An issuance of four digital green bonds in Hong Kong using the HSBC Orion blockchain, in USD, EUR, HKD and CNH.</li> <li>▶ This issuance attracted a broad pool of global investors from financial and non-financial institutions.</li> <li>▶ 2-year bond issuance that could be accessed by investors via accounts with Euroclear or Clearstream.</li> <li>▶ This was one of the first issuances that adopted the International Capital Market Association's Bond Data. Taxonomy (BDT), a standardised and machine-readable language developed to promote automation and reduce fragmentation across the bond issuance lifecycle</li> </ul>	<a href="#">HKMA Gov</a> <a href="#">ICMA Group</a>

## Appendix Six – Glossary of key terms

Term	Definition	Source
<b>Blockchain</b>	A type of DLT database that is decentralised, distributed and self-proving, where transactions (or ledger changes) are verified and validated in blocks. This data is then linked (“chained”) to the previously verified data block, forming a chain. This link makes the ledger, and the data sitting on it, more secure as it is stored cryptographically. Blockchain is a distributed ledger that can store digitalised assets - cryptocurrencies, documents, contracts - in a tokenised form. Users have control - they don’t have to rely on a third party. Several types of blockchain exist, driven by the nature of their use cases, the type of ecosystem they support, and the source of the assets. The dominance of crypto as the first (and most popular) use case has different power and performance characteristics than, for example, a fiat-only blockchain, or a blockchain used for operational needs, e.g., supply chain documentation.	<a href="#">Digital Currency Glossary by UKF – Guide to Digital Currency Terms</a>
<b>Cryptoassets</b>	The Financial Services and Markets Act 2023 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.	<a href="#">Unlocking the power of securities tokenisation</a>
<b>Digital wallet</b>	A digital wallet allows you to send, receive, view and spend cryptocurrency and other forms of digital money. A digital wallet isn’t quite the digital equivalent of a wallet. It doesn’t store your cryptocurrencies or digital money, rather a digital wallet securely stores the private keys and public keys needed to buy, sell and use cryptocurrencies or digital money. Unlike physical cash, cryptocurrencies and digital money never leave the platform on which they are issued; rather, details of ownership are recorded on the platform, through public and private keys of a user that are required to perform a transaction. Thus, a holder needs to	<a href="#">Digital Currency Glossary by UKF – Guide to Digital Currency Terms</a>

Term	Definition	Source
	have proof of ownership to be able to access and transact the cryptocurrency or digital money.	
<b>Distributed ledger technology (DLT)</b>	Distributed ledger technology is the infrastructure and protocols (rules) that allow independent computers (nodes) in different locations to propose and validate transactions. DLT systems and processes allow computers to update records in a synchronised way across a DLT network. A distributed ledger is a common record of information that is shared across multiple locations. DLT is formed of a network of independent computers – if a record is updated on one of those computers, then the records across all the computers that are part of the network also get updated. DLT allows information, including records of transactions, to be stored securely using cryptography. The protocols are the rules of the distributed ledger. They define how records are added, validated and synchronised. Protocols also validate the rights of a digital asset.	<a href="#">Digital Currency Glossary by UKF – Guide to Digital Currency Terms</a>
<b>Fiat Currency</b>	Central Bank or government-backed money, e.g., Pound Sterling	<a href="#">Digital Currency Glossary by UKF – Guide to Digital Currency Terms</a>
<b>Smart contract</b>	A smart contract is defined consistently with the definition put forward by the Law Commission in its 2023 <a href="#">report</a> on digital assets as a 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 program.	<a href="#">Unlocking the power of securities tokenisation</a>

Term	Definition	Source
<b>Tokenisation</b>	Tokenisation refers to the digital representation of financial assets using DLT.	<a href="#">Unlocking the power of securities tokenisation</a>
<b>Tokenised securities</b>	In this roadmap, 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 HM Treasury in their consultation on a “ <a href="#">Future Financial Services Regulatory Regime for Cryptoassets</a> ”, 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. “Hybrid” models of tokenisation exist where only part of the securities lifecycle is on-chain, and the remaining part exists in traditional system and infrastructure. 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.	<a href="#">Unlocking the power of securities tokenisation</a>
<b>Tokens</b>	Tokens are cryptoassets that operate on an existing blockchain network. Tokens are designed to be supported by a specific blockchain network rather than establishing their own new blockchain. For example, the Ethereum Blockchain Network (with its smart contract compatibility) is able to record the transactions of multiple different types of tokens. There is only one ‘native coin’ to the network and that is the Ether cryptocurrency. All the other cryptoassets recorded on the Ethereum Blockchain Network are ‘tokens’.	<a href="#">Digital Currency Glossary by UKF – Guide to Digital Currency Terms</a>