



Jeff Wall, A sudden gust of wind (after Hokusai)

Towards a Smart Economy

How Digital Technologies will Transform Global Trade and Finance

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Foreword

As Lord Mayor my priority theme in office - "Connect to Prosper" - has focused on leveraging the City of London's strengths and connections to tackle global challenges and seize new opportunities.

As outlined in our Vision for Economic Growth report¹, collaboration among government, industry, academia and international partners is essential for a fully integrated and inclusive digital society.

The "From Fintech to Ubiquitech" report² highlights a golden opportunity exists for the City of London and the UK Government to embrace recent advances in technology to lead a transformation of our economy.

Over the next 20 years, the acceleration of rich, real-time and open data, alongside shared ledgers and artificial intelligence, will catalyse a digitally 'smart' approach to doing business. Countries that embrace this next wave of technology to drive forward efficiency and effectiveness will prosper by increasing productivity and trust while reducing cost. These countries will build Smart Economic Networks.

London is Europe's Fintech capital - attracting more Fintech investment than the next 13 European cities combined - the City of London ecosystem can show new leadership as the global digital economy evolves to the point where smart data is used across all aspects of the economy. Home to 40 learned societies, 70 higher education institutions, 130 research institutes, and over 24,000 businesses, including some of the world's most innovative tech firms, the Square Mile is truly unique. We have world-renowned financial services, an enabling legal and regulatory environment and access to incredible talent and skills.

Drawing on a series of workshops and discussions with representative stakeholders from the City of London in 2024, the Smart Economy Networks Steering Group explored the key steps Towards a Smart Economy. This paper provided a framework of issues around which stakeholders should convene, build consensus, and drive forward the evolution of a smart economy and the infrastructure - technical and governance which will underpin it.

The Rt Hon Lord Mayor of London Alderman Professor Michael Mainelli

¹ [City of London, 2023](#)

² [Ubiquitech Group, 2024](#)

Introduction

The essence of every economy is founded on a myriad of transactions, a multitude of 'deals' made to exchange goods (tangible or intangible) and services between counterparties. All these exchanges take place using contractual 'infrastructure' and in a venue providing contextual support for standards of trade and trust.

From the primitive days of immediate barter to complex global supply chains, centuries of reinvention of contracts, trade and commerce have shaped and reshaped our economic networks and built the modern world we now take for granted. The commercial infrastructure, which has changed our planet and underpinned the local and global economies on and around it, is set to transform again through a 'smart' economic network revolution - the issue is how and where this transformation will take place.

The contracts, which are the atomic elements of our economy, must be specified, recorded, communicated, resourced and executed - all while minimising risk, resolving disputes and incorporating tools for increased efficiency (such as automation). Viewed along these axes, contractual infrastructure in our economic networks has come to be transformed by each technological revolution. Social, legal and engineering developments have changed the prevailing tools used, leading to radical increases in our economies' potential speed, efficiency, scale, reliability and resilience. (See Table 1.)

Contract Specification	<i>Standard terms, standard weights, counterparty identity.</i>
Contract Recording	<i>Clay tablets, to written documents, to digital records.</i>
Communication	<i>Postal systems, telegraph, telephone, fax, email etc.</i>
Contract Financing	<i>Barter to fungible currency, fiat etc.</i>
Dispute Resolution	<i>Commercial law, regulation, dispute resolution, treaties etc.</i>
Trade Automation	<i>Abacus, calculation, spreadsheets, smart contracts, AI.</i>

Table 1. Evolution of commercial technology.

Developments, such as the invention of fungible fiat currency and credit, have addressed friction associated with resourcing and remunerating financial transactions. Methods of recording and communicating contracts have evolved - from the clay tablet to the paper contract, sent by messenger, then by the postal system, then faxed across a phone line, and more recently emailed across a network of LEO³ satellites. Across time and technology, the agility of contractual infrastructure has improved, accelerating contractual agreement and execution. Currently, the UK Government customs agencies still require physical paper-based trade documents, which must be couriered between parties. To date, there is minimal adoption of the recent Electronic Trade Document Act (EDTA)⁴, although this presents an opportunity for change.

Meanwhile, harmonised technical standards - from unit measures to contractual terms - have assisted in the clearer and more reliable specification of contracts - reducing risks for wholesalers and retail consumers alike. Increasingly clear and compatible contractual terms allowed supply 'chains' of sequential and interdependent contracts to develop, allowing increasingly complex aggregation of transactions and efficiencies of scale. Developments in commercial treaties, laws and regulations have further improved trust between contracted parties, while insurance and dispute resolution mechanisms have assisted with resilience when the unexpected happens. While much has happened in the plane of negotiations, specifications and agreements, a plethora of associated (and increasingly interdependent) logistical innovations have taken place when it comes to executing contracts. From the bottle to the

³ Low Earth Orbit

⁴ [UK Parliament, 2023](#)

shipping container, from the paper receipt to the lading documents audit trail, and the abacus to the spreadsheet, physical information and computational engineering have improved the practical aspects of trade in our economic networks.

All of the above has happened without recent advances in technology (distributed ledgers, IoT, AI, etc) being embedded in our infrastructure. This document is about a further wave of change in our contractual and trade infrastructure - the development of Smart Economic Networks which embrace new, distributed, reliable, real-time, data-rich, AI-ready - smart transactions.

Over the last 50 years, digital technologies have been impacting wider society, but they have yet to fully transform our economy. While the Internet, personal computer, word processor, spreadsheet, databases, scanners and printer have helped re-implement analogue paper processes either partly or wholly in digital form, this 'digitisation', has in some respects just substituted physical paper-pushing with electronic paper-pushing. Administrative benefits relating to speed and scaling have accrued, but practical speaking, once back-office benefits are discounted, our underlying national and international economic networks operate in the mid 2020s much as they might have at the end of the last century.

In contrast, the rest of the world is changing quickly - many business models and sectors have experienced 'digitalisation', a transformative effect of re-engineered processes often following on from plain 'digitisation'. The entertainment industry has in large part moved from live performances of film and music, to recordings available on demand over a network. Yet despite recent decades of IT innovation - developments in fields such as resilient, open, cryptographically secured, real-time distributed systems, mass data storage and data interoperability standards etc - our commercial infrastructure has not experienced the effect of digitalisation. The generation of citizens now entering adulthood have grown up with and come to expect 'smart' real-time, data-rich, reliable, secure engagement with social and other networked services, yet the systematic transformation of our commercial infrastructure has not yet happened. Our economic networks are not yet 'Smart'.

In the following chapters, this document sets out:

- A range of opportunities for Smart Economic Networks to improve international trade - spanning cross-border commerce, trade finance, and international payments.
- Key aspects of a 'smart' economic network architecture, including an overview of technical components which need to be developed by a partnership of stakeholders.
- Recommendations for next steps to facilitate the growth of Smart Economic Networks and the role of the City of London.
- Examples of work already undertaken or underway to build 'Smart Economic Network's that can be built on.

1. Smart Economy Network Opportunities

The economic networks upon which we rely extend locally, regionally, and internationally. Given the City of London's historic position as the nexus for global trade, as well as London's reputation for embracing technological innovation, this document focuses on the potential for Smart Economic Networks to build upon the City's existing preeminent position as the preferred venue for global trade. Building a smart contractual infrastructure that would most materially enhance cross-border trade execution, trade finance, international payments and the increasingly challenging demands of supply chain management where transparency and compliance are needed to address regulatory and security considerations.

As observed in the "From Fintech to Ubiquitech" report⁵, a golden opportunity exists for the City of London and the UK to embrace recent advances in technology to lead a transformation of our economy. Over the next 20 years, the acceleration of rich, real-time and open data, alongside shared ledgers and artificial intelligence, will catalyse a move to a digitally 'smart' approach to doing business. Countries that embrace this next wave of technology to drive forward efficiency and effectiveness will prosper by increasing productivity and trust while reducing costs. These countries will build Smart Economic Networks (SEN).

The proposed Smart Economy Network should build on the City of London's global reputation, legal and regulatory standing and establishes a resilient, interoperable network of systems and technology. Ideally, participants would be financial institutions, national and international trading partners and governments. This network would deliver secure permissioned data sharing between participants of cross-border supply chains, built on the common data required by the market participants (importers, exporters, UK Government customs department, trade finance and payment operations); data and information are shared through interoperable, reliable technology. The permissioned participants could input and view information on the state of goods within the cross-border supply chain. The objective is that as goods move across the customs border with minimal friction, the trade finance and payments supporting the movement of goods through the cross-border supply chain are delivered with minimal delay. This allows an importer or exporter access to optimal financial support (finance and payments) for the trading/movement of goods cross-border while ensuring that the UK Government's legal and regulatory customs data requirements are met for the 'traded goods'.

Cross-Border Trade

Significant inefficiencies and complexities characterise today's cross-border trade system. A typical transaction involves numerous intermediaries, including customs brokers, freight forwarders and financial institutions. Each step in the process requires extensive paperwork and manual verification, leading to delays and significant costs. The system is also prone to errors and fraud, with limited transparency and traceability of goods, which increases the risk for all parties involved. Cross-border supply chains involve a complex network of suppliers, manufacturers, distributors, and retailers, often operating across and within multiple jurisdictions. The lack of transparency and real-time information sharing leads to inefficiencies, delays, and increased costs. Tracking and tracing the origin and journey of goods is challenging, often resulting in delays/frictions at the customs border, counterfeiting and quality control failures. Cross-border inefficiencies, such as the logistical challenges of warehousing, transport, and reconciling different jurisdictions' regulatory and tax regimes, are time-consuming and costly. These challenges are highlighted in the UK's transition to its post-Brexit relationship with the EU. The Office for Budget Responsibility estimates that the post-Brexit trading relationship, as set out in the Trade and Cooperation Agreement (TCA) effective 1 January 2021, will reduce long-term productivity by 4% relative to remaining in the EU. It also estimates that exports and imports are projected to be around 15% lower in the long run than if the UK had remained in the EU.

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⁵ [Ubiquitech Group, 2024](#)

Digital trade documents would replace traditional paperwork, enabling real-time verification and seamless information exchange. Distributed trading systems would ensure transparency, traceability, and immutability of transaction records, significantly reducing the risk of fraud and errors.

For instance, a shipment of goods could be tracked from origin to destination and automatically trigger payment upon fulfilment, streamlining the process and reducing delays. Compliance and customs checks could be integrated into the digital framework, allowing for real-time validation and reducing the administrative burden on businesses.

Many of the current inefficiencies could be mitigated by reducing the administrative burden of cross-border trade. If regulatory approvals for low-risk and high-volume data transactions were automated, data would be reconciled before goods and services cross the border, reducing processing times and enabling more efficient tax administration.

For instance, a manufacturer could track the entire lifecycle of a product, from raw material sourcing to final delivery. Data on the production process (such as composition, carbon footprint, human rights or security provenance), transportation, and handling would be recorded in real-time, providing a comprehensive and transparent view of the supply chain. This would enable better decision-making, reduce inefficiencies, and enhance consumer trust.

As the first G7 country to make digital records the equivalent of the paper ones we have been using since 1882, the UK is a global leader in digitising documents of title with the full sanction of English law – itself the preferred legal framework globally whether or not there is a UK nexus. We can digitalise all the elements of a contract, and with the adaptability of the UK's common law system, as well as the Law Commission's involvement in the passing of legislation, the risks associated with automation of international contracts have been effectively mitigated.

Practical examples⁶ can be found in the ICC's report "Seizing the Moment - Unleashing the Potential of Trade Digitalisation"⁷, and Appendix 1.

Trade Finance

Trade finance is crucial for global commerce, providing essential funding and risk mitigation for cross-border transactions. The trade finance gap—the difference between trade finance demand and supply—has reached critical levels, highlighting the sector's importance. According to the Asian Development Bank's [2023 Trade Finance Gaps, Growth, and Jobs Survey](#), the trade finance gap hit a record \$2.5 trillion in 2022, up from \$1.7 trillion in 2020, representing 10% of global mercantile trade value.

Despite the challenges, global trade in goods has rebounded strongly post-COVID, growing 26.6% in 2021 and 11.5% in 2022; however, the widening trade finance gap limits companies' ability to fully capitalise on this recovery. This paradox—trade growth alongside an expanding finance gap—underscores the urgent need for innovative solutions to support robust and inclusive global trade expansion.

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The ADB recommends addressing the Trade Finance Gap by targeting new facilities and capabilities for Small and Medium Enterprises (SMEs), deeper and tiered supply chain finance, and attracting new pools of capital to meet the challenge. For improved resiliency, trade finance could be integrated into crisis response programmes.

It's generally recognised that access to financing limits companies' ability to trade across borders, and the digitalisation of trade finance is being held back by a lack of harmonised standards and recognition of electronic

⁶ A pilot demonstrated the use of this technology to enhance trade for suppliers between the UK and Singapore under the Free Trade Agreement and Electronic Trade Agreement. IoT devices were placed on a shipment of goods, connected to a distributed system, and linked to an Electronic Bill of Lading, as a way to expedite customs and border control administration and provide real-time geo-spatial tracking.

⁷ [ICC, 2024](#)

documents across all jurisdictions. Digitalisation efforts should harmonise data collection, documentation, and commercial adoption and promote legal and regulatory model adoption.

The City could be the critical driver of better solutions, building on its mercantile, finance, and legal primacy over centuries.^[1] Within the City of London, Lloyds Bank has been an early adopter of harmonised standards, distributed ledger technology and changes to the legal framework to digitalise their documentary trade offering.

Documentary Trade products require the presentation through the transaction chain of shipping documents that include an invoice, certificates/declarations from the exporter and 3rd parties and evidence of shipment of goods. The evidence of shipment of goods usually comes in the form of bills of lading, a document that, if in negotiable form can give the holder rights to the possession of goods. Similarly, other key trade documents such as promissory notes and bills of exchange give the holder the right to payment at maturity.

In August 2022, in partnership with Swedish fintech, Enigio, Lloyds completed the first transaction under the International Trade and Forfaiting Association's (ITFA) Digital Negotiable Instrument (DNI) initiative. The transaction utilised a contractual law instrument, the "electronic Payment Undertaking" (ePU) to replace paper promissory notes as underlying security for the advance of funds to UK housebuilders for the purchase of land for new-build houses. The digital process can be completed within a working day compared to between 1 and 2 weeks for the paper process and removes the need to courier documents at least 3 times. In April 2024, Lloyds brought together Enigio's trace:original solution for the issuance of digital Promissory Notes (dPNs) and digital Bills of Exchange (dBEs) with an electronic bill of lading solution offered by WaveBL to create a Digital Documentary Collection solution. Digital Documentary Collections have been used by several of Lloyds Bank's clients (both Importers and Exporters) and they have significantly enhanced the underlying product offering. Overall transaction times have been reduced from up to 30 days down to as little as 2 hours and the need to courier physical documents (which can happen 10 times in a single transaction) has been completely removed.

International Payments

International payments are notoriously slow, expensive, and complex. Transactions often take several days to process, involving multiple correspondent banks and incurring high fees. Additionally, the risk of fraud and money laundering is significant, necessitating stringent AML (Anti-Money Laundering) and KYC (Know Your Customer) procedures, which further complicate the process.

Looking at the high-value space for wholesale cross-border payments, which are relevant in global trade, we observe improvements in terms of speed and cost. However, given the overall process relies on commercial credit, it is still prone to financial stability risks as evidenced during the financial crisis.

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Transactions could be processed in real-time, with reduced fees and enhanced security. A unified digital identity framework would facilitate seamless AML and KYC compliance, reducing the administrative burden on financial institutions.

In applying this model to the wholesale cross-border payment space, which is so crucial in supporting global trade, we would also require legal certainty of settlement finality in order to remove the current financial stability risks associated with the fact that all transactions are effectively 'promises to pay'. Unless we move into a world where transactions are settled both with finality and in an asset class that supports cost efficiencies for banks, aka central bank money as the High-Quality Liquid Asset class, we will not achieve any significant improvements through technology alone. The focus should be on multiple value asset classes (e.g. commercial bank money, central bank money) to start with, allowing the industry to gradually evolve to a real-time liquidity and funding model.

^[1] [ICC, 2024](#)

A good example is the Digital Financial Market Infrastructure (DFMI) Consortium, a UK-based cross-industry initiative founded by leaders of the global financial services industry with a mission to reimagine, design and test new payment rails for the global financial system in the digital economy age through public/private collaboration. To coordinate the deployment of the best practices derived from this testing, also known as 'Digital Financial Market Infrastructure (DFMI)'. Starting with Project New Era in the UK, the group has focused on real-world testing to evaluate a future digital asset ecosystem, environment and economy that includes the coexistence of current forms of money, regulated crypto assets (including cryptocurrencies and stablecoins), tokenised deposits, tokenised real-world assets (RWAs) and Central Bank Digital Currencies (CBDC).

Digitalisation of the Global Economy

Recognising the vast economic value to be derived from digitalising the trade, trade finance and payments ecosystem, several countries which are, or are becoming, important trading partners of the UK have undertaken much needed law reforms and made other changes to facilitate electronic operations in a cross border harmonised framework.

However, there are many other countries where reforms - similar to those undertaken in the UK - need to be introduced to ensure a fully efficient, trusted, harmonised and friction-free global digital trade, trade finance and payments environment that is fit for the 21st century. The UK and the City in particular, with its vast mercantile, financial, technological and legal expertise, and its international connections through the ICC and other organisations, is in an ideal position to be a leader in guiding and assisting key countries to introduce and implement the necessary legal and operational changes for the benefit of all in the trade and payments ecosystem.

2. Architecture Considerations

Trade and commerce once centred on places where merchants could meet, barter and transact from Alexandria and Carthage to Venice and Timbuktu and civilisation often massed around these economic centres. While New York and London have more recently served as the “centres” of modern finance, the information age has led to a more fundamental change.

As the platforms and exchanges where transactions happen have moved online, their physical location has become less relevant, and a new set of questions around ownership and control have emerged. In the early years of the internet, these questions focused on the open or closed nature of Internet services.

Early examples of closed internet systems, including AOL and CompuServe, provided a range of services within a confined ecosystem. These platforms were eventually surpassed by the open standards of the World Wide Web, which fostered greater innovation, collaboration, and scalability. Similarly, we argue that the modern global economy requires an open, interoperable system for digital trade, which will ultimately prevail over closed trading platforms.

Many of the architectural consideration in establishing a smart economy network have been developed and operated at scale, for decades by nation states, network operators and technology companies. One key example is Estonia’s distributed data exchange layer, X-Road. The backbone of e-Estonia, X-Road has been used to run the country’s public and private sector services for more than 20 years and many elements including the Estonian Identity System offer potential building blocks for a smart economy network.

At a more fundamental level, the open internet runs on a collection of internet exchange points (IXPs) where internet service providers (ISPs), content delivery networks (CDNs), and other network operators, including Banks and Financial Services organisations interconnect and exchange a range of internet-based data. In the UK, the London Internet Exchange (LINX) handles approximately 70% of all internet traffic, including highly valuable, trade, finance, video, email, AI, cloud, rich media and high-performance compute. As part of the UK’s national critical infrastructure, these Internet Exchange Points will form the foundation of any future trading system.

Below are some key architectural considerations for the creation of a smart economy network.

Philosophy and Governance

Open and Liberal Approach:

- The modern global economy requires an open, interoperable system for digital trade.
- This system should foster greater innovation, collaboration, and scalability, similar to the open standards of the World Wide Web.

Trade Bodies and Governance:

- Creation of or integration into trade bodies representing the interests of the wider economy.
- These bodies should:
 - Advocate policies and initiatives for the good of trade
 - Promote best practices
 - Develop industry standards
 - Conduct research
 - Position themselves as neutral entities established for the benefit of trade and the economy
 - Establish a market presence through trade events and general marketing activity

Data Standards and Interoperability:

- Adoption of standardised formats for various elements of trade, such as digital trade documents and payment methodologies.
- Implementation of a modular architecture for flexibility, allowing integration of various standards and protocols.
- Creation of a hub-and-spoke architecture enabling the network to act as a unifying layer, facilitating interoperability between different digital standards.

Core Technical Considerations

Distributed Transaction Processing Architecture:

- Employment of a distributed architecture of processing nodes that undertake relevant functions contributing to the network's transactions.
- Nodes capable of validating and processing transactions independently, enhancing system resilience and reducing latency.

Distributed Storage Architecture:

- Implementation of various distributed storage schemes to provide reliable access to transaction data.
- Potential integration of blockchain technology for specific use cases, such as asset tokenisation.

Security and Encryption:

- Implementation of robust security measures to ensure data integrity, privacy, and trust across the network.
- Encryption of all data transmissions using advanced algorithms.
- Regular security audits and penetration testing to identify and address potential vulnerabilities.

Infrastructure Layer:

- Establishment of a technical fabric to provide core services.
- Maintenance of core elements such as security services, trust services, certification authorities, and time stamp authorities.
- Creation of a trusted, secure, validated fabric for interoperability.

Core Regulatory Considerations

Identity and Authorisation:

- Implementation of a flexible, multi-layered identity and authorisation system.
- Incorporation of various forms of identification:
 - Government-issued IDs (e.g., digital passports, national ID cards)
 - Electronic signatures (e.g., EU's eIDAS)
 - Decentralised identifiers (DIDs)
- Development of standardised data formats or national trust frameworks for identity verification.

Compliance and Liability:

- Support for real-time data enabling compliance checks and liability assessments.
- Integration of compliance mechanisms for:
 - Anti-Money Laundering (AML)
 - Carbon footprint tracking

- Human rights compliance
- Security provenance
- Real-time insurance

Transaction Tracking and Audit:

- Implementation of real-time transaction tracking capabilities.
- Support for automated transaction processing.
- Enablement of smarter audit processes through rich transaction data capture.

Tokenisation and Regulatory Implications:

- Support for digitisation and tokenisation of trade documents (e.g., as outlined in the "Electronic Trade Documents Act 2023").
- Consideration of regulatory implications for different types of tokens (e.g., utility tokens, security tokens).
- Analysis of the regulatory landscape for tokenised assets and digital trade documents.

Appendix 2 provides additional details of the Key Architecture considerations

3. Opportunities for the City of London

The City and the UK are each facing challenges to their positions as global leaders in the areas of trade, finance and technological innovation. At the same time, the UK has a new administration, the world's leading FPS market and a vibrant and innovative commercial sector. We have a great, but time-limited opportunity to deploy our undoubted skills to create the digital economy that will maintain and enhance that global leadership.

Alongside the development of specific opportunities for the City of London itself, an active programme of technical assistance could be built, especially on the work of the ICC iC4DTI, to encourage and assist selected countries in their efforts to reform their laws and practices to facilitate fully digital harmonised cross border trade, trade finance and payments frameworks for the benefit of all participants.

Call to Action

Following on from the publication of the paper, the Smart Economy Network Steering Group will:

1. Establish effective governance for the Digital Public Good that will underpin the digital economy of the UK. This will include:
 - Forming an independent, not for profit body to continue the work of the Group.
 - Ensure representation on that Body from:
 - The City (including financial institutions and law firms)
 - Government
 - Industry
 - Academia
 - Provide for accountabilities for the work of the body to an appropriate authority
 - Ensure that contributions to its work in kind or in cash will result in no control over either the Body or any IP it creates (including by government)
 - Identify and work with institutions that are already active in this space (eg the Open Data Institute, the Centre for Financial Innovation and Technology and the Digital Public Good Alliance)
2. Capture best practice already in evidence across the world by those countries who have already embarked on this kind of digital transformation. This will include the example of X-road in Estonia and the implementation of it in the safe and secure management of private public and commercial data in Estonia and other jurisdictions that have started to pilot it.
3. Ensure international interoperability of the design of the infrastructure through the identification and implementation of best in class standards for tech, governance and data management.
4. Set out short- medium and longer term delivery plans – for which it will be accountable to the authority mentioned above- aligning those with government, regulatory and social priorities as identified through its work.
5. Establish and maintain effective channels for the publication of our work , which will be by default open, to enable consensus to form around the design and to ensure it meets the requirements of as wide a group of stakeholders as it possible.

Following the publication of this paper, the Group will publish by the end of 2024:

- A timetable for its work over the next 3 years
- A comprehensive plan for governance of and accountabilities for its work

- A resource requirement plan and initial funding requirement for full delivery of the infrastructure within the lifetime of this parliament.

Actions

The City of London Corporation should convene business leaders, financial institutions, professional service providers, trade bodies, representatives of the UK Government, and law enforcement around this shared vision for the future of global trade.

Broad agreement among parties is essential to ensure the adoption and support of a common vision.

Consensus-building efforts should involve regular forums, workshops, and working groups to foster stakeholder dialogue and collaboration. The City of London as a community can leverage its historical role as a financial hub to bring together diverse perspectives and drive the development of a cohesive vision for a smart economy.

Standards

The consensus built by the City must translate into specific roles, connections, and standards that would define all aspects of a Smart Economy Network. The City could host working groups and bring together experts and leaders in each area with the express intention of agreeing on new standardised forms of interaction.

These standards would cover everything from transaction protocols to compliance frameworks. By helping to establish clear and widely accepted standards, the City can facilitate interoperability and ensure that all participants speak the same language.

Governance

Housed in the City of London, a new governance framework is needed based on international/country-based policy, regulation, legislation and operational standards to govern the operational processes between the various actors and institutions within the cross-border trade ecosystem. As part of developing a governance framework, industry and government programmes must align around a shared vision that details the digitisation and digitalisation of the end-to-end cross-border supply chain. Then, collaborative governance frameworks are required between the UK Government and Industry to create trust⁸ and resilience⁹ in the end-to-end supply chain, align operational goals, and incentivise change. With each development iteration, the requirements for policy change are required, which will ensure continued focus from interested government departments. In parallel, Governments must focus on rationalising and sharing data, creating trusted bidirectional information flows between governments and industries that support new trade agreements.

Adaptive governance strategies are required to better prepare for rapid technological advancements and the evolving global economic and geopolitical landscape. Specifically, a deeper exploration of key technological developments, geopolitical changes, regulatory challenges, and the shifting nature of global trade networks would strengthen the basis for making credible and actionable recommendations.

⁸ [University of Surrey, 2022](#)

⁹ [University of Surrey, 2024](#)

Conclusion

This vision for the evolution of global trade and finance reflects the urgent need to adapt to the rapidly changing landscape of international commerce, where digital transformation and multipolar global power dynamics are reshaping the global economy. To achieve this, we must support open standards, robust identity and authorisation mechanisms, compliance integration, and a resilient, distributed network infrastructure that facilitates seamless and secure transactions.

The City of London is central in this transformation, leveraging its historical position as a global financial hub to drive consensus-building, standards development, and governance. By doing so, the City of London can help create a new financial architecture that is both adaptive to future challenges and aligned with the liberal values that have historically underpinned global trade.

The transition towards a smart economy is not merely a technological shift but a comprehensive evolution of the global trade and finance ecosystem. It requires collaboration across sectors and borders, the development of new standards and governance models, and the commitment to building an infrastructure to support the future digital economy. With its unique convening power and historical expertise, the City of London is well-positioned to lead this initiative, ensuring that the global trade and finance remain resilient, inclusive, and ready to harness the full potential of a smart economy.

We recommend the formation of a Community Interest Company (CIC) to continue the work of the Smart Economy Networks Steering Group and we appreciate the endorsement of the City of London Corporation and the Lord Mayor as we go from the drawing board to action.

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Appendix 1. Progress to Date - Exemplars & Case Studies

One of the initiatives to reduce friction in international trade originated from a cross-government, academia and industry workshop held in September 2018 as the result of a series of meetings in response to Lord Holmes of Richmond – DLT for the Public Good paper¹⁰. Further workshops in late 2018 developed the various workshop outputs, and the Reducing Friction in International Trade project (RFIT) programme was initiated in March 2019, as detailed in the UK Government 2025 Border Strategy¹¹. The programme goal was to determine how Distributed Ledger Technology (DLT)/Blockchain and Internet of Things (IoT) technology could be used to reduce the friction in international trade by:

- Simplifying the importation process.
- Ensuring fiscal and regulatory compliance
- Reducing opportunities for fraud
- Delivering cost and efficiency benefits through the supply chain and at the UK customs border.

The RFIT program worked with Chainvine Ltd¹² to develop an interoperable data/information platform built on DLT, Blockchain technologies (Ethereum, Sawtooth and Corda), and IoT device capabilities. The RFIT digital platform emulated the end-to-end importation supply chain for wine, including the customs and border processes and met the data requirements to provide integration with HMRC (CDS) and FSA systems and processes, including the tracking and sensing information. It was designed to provide registered users with a view of the trade information based on their user, for example, legal, fiscal, and regulatory requirements.

In summary, the RFIT platform:

- Reduced data duplication, manual data entry errors and the administrative overhead
- Improved trust across all parties - including the government
- Improved data visibility/traceability/tracking across the participants and supported food standard and consumer provenance requirements
- Improved information sharing across the end-to-end supply chain and between UK government departments.

The Ecosystem of Trust (EoT) programme¹³ commenced in 2021 to test whether a new border model could be implemented across the public and private sectors to reduce trade frictions. This model is based on innovative technology capabilities, real-time data, and trusted relationships to provide border agencies with new ways to assuring goods as they cross the border. UK Government's Cabinet Office partnered with six industry consortia of technology firms, traders, and logistics companies to test new ways of sharing data and assurances around the border, exploring the benefits these approaches could deliver. The EoT evaluation report found that the industry can make a broader range of higher-quality data available to the government than that available today and confirms that digital supply-chain data can support the “risking” requirements for customs purposes. However, new innovative models are not yet ready to replace traditional border control mechanisms. In addition, the broader cross-border trade industry has yet to be incentivised to develop the appropriate technical infrastructure to make it available in the required format at scale. The report confirms that the UK government has not yet adequately determined the most effective ways to use or collect data. Finally, augmenting technologies, or assurance devices, can provide assurance of a goods’ integrity and its journey and how useful that information can be at the border. However, while these devices cannot be relied upon to assure that consignments have not been compromised, they can improve the border by providing new, useful intelligence (e.g., about temperatures) to help border agencies deliver effective border controls.

¹⁰ [House of Lords, 2024](#)

¹¹ [Gov.uk, 2024](#)

¹² [Chainvine](#)

¹³ [Gov.uk, 2023](#)

The RFIT programme¹⁴ and the EoT programme confirmed that industry and government can collaborate quickly and usefully to unlock solutions, where there is an appetite on both sides to drive trade digitisation and facilitate the adoption of supply chain data into government for mutual benefit.

Appendix 2. Key Architecture Considerations

Identity and Authorisation:

A Smart Economic Network requires a flexible, multi-layered identity and authorisation system to ensure secure, verifiable transactions while reducing fraud risks. This system must accommodate various forms of identification and allow for the delegation of authority. This is crucial for enabling trusted digital interactions in a global economy where participants may never meet face-to-face.

To recognise the appropriate identity standards and match them against transaction type, a relatively simple standardised data format or national trust framework is needed that lists the types of identities accepted for a process, so that companies can easily verify whether they meet the requirements. This could be as simple as a controlled list of names for approved schemes (like LEI, eIDAS, DUNS, eResidency) and a standardised way of presenting the approved identity requirements similar to the digital identity frameworks developed by various countries.

Key elements contributing to an Identity and Authorisation process include

- Government-issued IDs: A user could verify their identity using a digital version of their passport or national ID card, authenticated through a secure government database. This could be used for high-stakes transactions or when opening new accounts.
- Electronic signatures: For everyday business transactions, a system like the EU's eIDAS could be used, allowing individuals to sign contracts or authorise payments with the same legal standing as a handwritten signature.
- Decentralised identifiers (DIDs): For privacy-sensitive transactions, users could employ DIDs, allowing them to prove specific attributes (like age or citizenship) without revealing unnecessary personal information.

Compliance, Liability and Smarter Audit

To enable smart engagement by stakeholders such as compliance and trust service providers, a 'smart' network will have to be able to support real-time data which can enable compliance checks and liability assessments. The real-time data which would support these stakeholders could also be used by logistics providers and regulators/government agencies to reduce cross border administrative friction e.g. customs measures, ensure adherence to regulatory requirements and manage risks effectively. The same data gathering which assists with administration could help promote responsible business practices. In a fast-paced smart economy, where transactions cross multiple jurisdictions and involve complex supply chains, each with their own legal and ethical considerations, capture of rich transaction data will become more important.

Key considerations and opportunities arising include:

- Anti-Money Laundering (AML): During an international financial transaction, the system could automatically check the parties involved against global watchlists, assess the transaction's risk level based on amount and destination, and flag any suspicious patterns for further review.

¹⁴ [Lord Chris Holmes, 2020](#)

- Carbon footprint tracking: For a manufacturing company ordering raw materials, the system could calculate the carbon footprint of different suppliers and transportation options in real-time, allowing the company to make environmentally conscious decisions and comply with emissions regulations.
- Human rights compliance: When sourcing components for electronics, the system could in effect ensure that suppliers meet labour standards by requiring a transaction embedded verification and accountability mechanism e.g. certification provided by some identified third party, systems of checking against databases of known violators etc.
- Security provenance: For sensitive technology exports, the system could track the entire supply chain of components, ensuring that no parts come from restricted entities or countries. It could also verify that the end-user meets all security clearance requirements before allowing the transaction to proceed.
- Real-time insurance: An insurance provider could offer instantaneous coverage for a shipment of perishable goods, adjusting premiums based on real-time data about weather conditions, transportation routes, and the shipper's historical performance.

Data Standards, Transaction Records and 'Tokens'

A Smart Economic Network will use standardised data formats, assembled and recorded in transactions and potentially using 'tokens' - a particular form of data construct, see Appendix 5

To deliver on:

- Modular Architecture for Flexibility: The system may employ a modular approach, allowing for the integration of various standards and protocols. This hub-and-spoke architecture would enable the network to act as a unifying layer, facilitating interoperability between different digital standards. For instance, if a new blockchain-based trade finance platform emerges, it could be integrated into the network through a dedicated module, allowing it to interact with existing systems.
- Automated Transaction Processing: Utilising the established identity and authorisation protocols, the system can automate many aspects of transaction processing. For example, once a trade is initiated, the system could automatically verify the parties' credentials, check available funds or assets, and execute the transfer without manual intervention, significantly reducing processing times and potential for errors.
- Real-time Transaction Tracking: The network may provide real-time visibility into the status of transactions. For instance, all parties involved in a complex international trade could have instant access to information about the location of goods, the status of payments, and the verification of documents, enhancing transparency and trust in the process.
- Interoperable Transaction Standards: The network may adopt standardised formats for various elements of trade, such as digital trade documents and payment methodologies. This standardisation enables seamless integration across different systems and platforms. For example, a payment initiated in one country's banking system could be seamlessly processed and received in another country's system without the need for manual intervention or multiple conversions.
- Tokenisation of Trade Documents: The system may support the digitisation and tokenisation of trade documents, as outlined in legislation like the ETDA. For instance, a Bill of Lading could be converted into a digital token, allowing for instant transfer of ownership and reducing the risk of fraud or loss associated with paper documents.

This approach to data standards, tokenisation, and transactions builds upon the robust identity and authorisation framework to create a more efficient, transparent, and secure global trade ecosystem. By addressing the inefficiencies

of traditional systems and leveraging digital technologies, the Smart Economic Network can significantly reduce transaction times, lower costs, and enhance trust among participants in international trade.

Transactions, Network and IT Infrastructure:

A Smart Economy Network requires a robust, scalable, and secure infrastructure to facilitate efficient digital transactions across global markets. This infrastructure could be designed to handle high volumes of data, ensure cybersecurity, and maintain resilience while significantly reducing transaction times and costs. It's crucial for enabling seamless interactions between parties, providing access to critical data, and implementing necessary security measures across diverse economic activities.

Network Infrastructure

The London Internet Exchange (LINX) plays a pivotal role in the digital infrastructure of the UK, serving as a major data exchange point where internet service providers (ISPs), content delivery networks (CDNs), and other network operators, including Banks and Financial Services organisations interconnect and exchange a range of internet-based data (known as Peering). This data may well be any variation of existing common or highly valuable, trade, finance, video, email, AI, cloud, rich media, high performance compute, or any variation of the above. Given its position as part of national critical infrastructure and its technical expertise, LINX is well-positioned to provide Trusted Adviser Status and systems guidance.

Operating from a base in the City of London, with a technical architecture diversely homed in 17 secure data centres within Greater London, LINX is the preeminent internet data exchange platform in the UK and one of the largest in the world. With members Drawn from 85 countries worldwide, LINX manages the exchange of data between 950 networks daily, resulting in over 15 Tbps of transactions at any one time and has a connected capacity in the UK of over 50 Tbps.

LINX has decades of experience in building and maintaining high-performance, low-latency networks. It serves a global clientele, connecting significant telecommunications companies, internet service providers, content providers, and enterprises. Leveraging LINX's established infrastructure minimises the need for building new systems from scratch, reducing setup costs, and accelerating the network's rollout. Moreover, LINX's expertise in network management ensures that the UK's special economic network would benefit from state-of-the-art technology and best practices in cybersecurity, connectivity, and traffic management.

Technology Governance

The infrastructure layer that connects these nodes and facilitates interactions between parties has some important component parts. These give the user access to the data they want when they need it; ensure data-led decision making; validation; and authentication and function as a security wrap which provides the validation and authentication of data users, data requesters and data providers when using the platform.

To provide this, two main elements are required. Firstly, establishing the technical fabric on which to provide such services, understanding who the data users, service requesters and service providers are in the related industry and the industry standards to which they adhere in order to successfully interconnect with one another. This fabric should maintain core elements such as security services, trust services, certification authorities, and time stamp authorities, allowing a trusted secure, validated fabric for interoperability.

The second element is the creation of, or integration into, a trade body which represents the interest of the wider economy, to advocate policies and initiatives for the good of trade, promoting best practice, development of industry standards and research. This body or bodies should seek to promote and position itself as a neutral entity established for the good of trade and the economy, establishing a market presence through trade events and general marketing activity.

Appendix 3. Tokens in a Smart Economic Network

The term 'token' is used to cover a multitude of circumstances, but in the context of blockchain related technology it is typically some combination of data stored on a blockchain with some cryptographically arranged wrapper the control of which has some meaning. In some situations, the token is 'fungible' in that it may be replaced with other similar tokens and there is simply score-keeping in some tally context. In others the token may be non-fungible and in effect having control over the token may be regarded as tantamount to possession. In the history of blockchain there have been circumstances where tokens have been exploited as the equivalent of bearer bonds/shares in unregulated investments and associated with fraud perpetrated on consumers.

As a consequence, there has been regulatory concern about the status of tokens - in particular when they might represent securities and when their distributed nature may bring them into scope of different regulatory jurisdictions. These concerns are important because we anticipate a Smart Economic Network may involve situations where tokens intended to have specific utility - perhaps substituting for a piece of paper documentation used in international trade - rather than simply one of the 'keeping score' crypto-currency tokens - may be key. The following is an analysis of one possible form of 'utility token' which suggests that there may be a way forwards to digitise some forms of document as tokens so that digitalisation of the process which uses that document may be undertaken. The below does not constitute formal legal advice, and the reader is advised to seek their own opinion should the circumstances arise.

We work on the basis that a utility token ("Utility Token") that is used solely in a commercial transaction involving the sale of goods should not be deemed to be an "investment" under the Regulated Activities Order, as amended ("RAO")¹⁵ and the Financial Services and Markets Act 2000, as amended ("FSMA"), and fall outside the reach of regulation by the Financial Conduct Authority ("FCA"), Bank of England and the PRA. This covers only Utility Tokens that are associated with an electronic trade document derived from a paper trade document, nothing else.

A document used in the type of commercial transaction contemplated hereunder would be a "paper trade document" as defined in Article 1 of the Electronic Trade Documents Act 2023 ("ETDA"). This would become an "electronic trade document" as defined in ETDA Section 2. This Utility Token represents an electronic trade document of a paper trade document, e.g., a bill of lading or other document used in the purchase or sale of goods, not services, in a commercial and not an investment context or setting, which is not promoted as an investment and is not bought or sold on a regulated market or factored as such. These are, as stated in ETDA Section 1(1), used for "trade or transport of goods" or "financing such trade or transport" in a commercial not investment, context, and reflect the type of documents in ETDA Section 1(2).

Utility tokens are, as defined by HM Treasury, "cryptoassets which provide digital access to a specific service or application (e.g. digital advertising or digital file storage) and use a technology such as DLT to support the recording or storage of data. They do not provide the rights or features associated with a security token (e.g. share or ownership rights), and do not function as a means of payment – though they can be traded on cryptoasset trading venues for investment purposes."¹⁶

The FCA has stated how it defines "cryptoassets".¹⁷ It addressed two types of tokens: regulated and unregulated. The tokens referenced were security tokens, e-money tokens and unregulated tokens. In relevant part it stated under the heading "Unregulated tokens" that: "Any tokens that are not security tokens or e-money tokens are unregulated

¹⁵ "The Financial Services and Markets Act 2000 (Regulated Activities) Order 2001 (SI 2001/544)", as amended, <https://www.legislation.gov.uk/uksi/2001/544/contents>, and relevant provisions of the FCA Handbook.

¹⁶ "Future financial services regulatory regime for cryptoassets: Consultation and call for evidence" (February 2023), p. 16 ("HMT Crypto Regime Consultation").

¹⁷ "How we define cryptoassets", Financial Conduct Authority, (November 15, 2023), <https://www.fca.org.uk/firms/cryptoassets>. ("FSA Cryptoassets Definition").

tokens. This category includes utility tokens which can be redeemed for access to a specific product or service that is typically provided using a DLT platform.”¹⁸

In July 2019 Guidance,¹⁹ the FCA stated that utility tokens are “... tokens that provide consumers with access to a current or prospective product or service and often grant rights similar to pre-payment vouchers.” “As utility tokens do not exhibit features that would make them the same as security tokens, they won’t be captured in the regulatory regime.” “Continuing, it said that “we considered utility tokens to be outside the regulatory perimeter. The exception is if they reach the definition of e-money, in which case they would be regulated”. The FCA also stated that it intended to “separate e-money tokens from the utility tokens and security tokens category” ... to “create a specific regulated e-money token category and an unregulated category that includes utility tokens.”

RAO Article 74A states in relevant part that “electronic money” excludes “... monetary value stored on specific payment instruments that can only be used in a limited way and meet one of the following conditions: (i) allow the holder to acquire goods or services only in the issuer’s premises; (ii) are issued by a professional issuer and allow the holder to acquire goods or services only within a limited network of service providers which have a direct commercial agreement with the issuer; (iii) may be used only to acquire a very limited range of goods or services ...”.

In a Q&A to the 2019 Crypto Guidance, the FCA stated that “[i]f a token is considered a specified investment under the RAO including a Financial Instrument under MIFID and any activity in relation to it is carried on in the UK, it may be subject to relevant securities regulations in the UK.” The FCA stated that its perimeter guidance would clarify whether a token was a security token and caught by financial services regulation. The focus and policy driver behind the treatment of a utility token as an investment, or not, comes down to substance, purpose and use, whether the person or persons involved with the utility token are carrying on the business of investments within the scope of regulation under the FSMA and the risk of harm to retail investors: thus, both activity and token are analysed. It is a question of fact. In a pure commercial setting and with no element of investment, and for policy reasons utility tokens should not fall into the realm of investments.

The Law Commission, in drafting and consulting on the ETDA, sought the views of the FCA and HM Treasury on the issue of the financial regulation of an electronic trade document. We were told that both had been consulted and that neither believed that this term and the purpose of the ETDA would bring this into the ambit of a specified investment and caught by the RAO and the FSMA.

Thus, and for purposes of our discussion, we deal solely with Utility Tokens.

¹⁸ Id.

¹⁹ “Guidance on Cryptoassets: Feedback and Final Guidance to CP19/3”, July 2019, <https://www.fca.org.uk/publication/policy/ps19-22.pdf> (“2019 Crypto Guidance”).

Appendix 4. Glossary of terms

Acronym	Full Form	Explanation
DSI	<u>Digital Standards Initiative</u>	An initiative by the International Chambers of Commerce focused on developing and promoting global standards for digital trade and commerce.
ICC	<u>International Chambers of Commerce</u>	A global business organization that promotes international trade, responsible business conduct, and a global approach to regulation.
WTO	<u>World Trade Organization</u>	An international organization that regulates and facilitates international trade between nations.
WCO	<u>World Customs Organization</u>	An intergovernmental organization that focuses on customs matters, including the development of international standards and guidelines for customs procedures.
ISO	<u>International Organization for Standardization</u>	An international standard-setting body that develops and publishes global standards across various industries to ensure quality, safety, and efficiency.
BIMCO	<u>Baltic and International Maritime Council</u>	The world's largest international shipping association, representing shipowners, operators, managers, brokers, and agents.
DCSA	<u>Digital Container Shipping Association</u>	An organization that aims to drive digitalization and standardization within the container shipping industry to improve efficiency and interoperability.
MLETR	<u>Model Law on Electronic Transferable Records</u>	A model law created by the United Nations Commission on International Trade Law (UNCITRAL) that enables the legal use of electronic transferable records in global trade.