Digital Trade: Britain's Unrealised Growth Opportunity

Why coordinated adoption is essential to turn digital capability into economic growth

The International Centre for Digital Trade and Innovation (IC4DTI), TradeTech Solutions Ltd **and the** Teesside Digital Trade Testbed | Joint UK strategic discussion paper v0.38 | 2 November 2026

Evidence and attribution notes apply throughout.

Executive Summary

This paper examines the benefits of trade digitalisation, the barriers and their causes, and potential solutions. It seeks to encourage organisations able to accelerate SME adoption to act.

It should be noted that AI is a supporting capability**.** Digital trade does not depend on AI. However, effective AI use depends on reliable digital information and connected processes.

The economic opportunity is substantial. ICC United Kingdom identifies £25 billion in potential trade growth and £224 billion p.a. in potential efficiency savings. [2,33]. The Department for Business Innovation Science and Technology (DBIST) also have quoted with approval an estimate from LSE that global digitalisation of trade could add 1.3% to GDP. At the same time the Bank of England estimates the current SME trade finance gap to be some £22bn.

To benefit from this potential benefit, businesses must address three connected imperatives.

1. statutory compliance
2. market competitiveness; and
3. trade expansion

However, available technology and statutory compliance alone cannot ensure effective adoption. Small and medium-sized enterprises (SMEs) face significant barriers to adoption. These include

1. fragmented provision of services and information
2. limited awareness; and
3. severe implementation difficulties.

A new, coordinated approach is required to bridge these gaps.

To help SMEs adopt and utilise suitable digital services effectively, this paper proposes the establishment of Digital Business Communities (DBCs). They combine a single digital reference point with trading opportunities and, critically, proactive management. DBCs would direct firms to relevant public support and help them connect their existing systems to digital trade services they can use with customers and suppliers.

However, a single, national DBC is not necessary to provide effective solutions. Individual DBCs focused on the commercial interests of their community are much easier to construct and manage. These individual DBCs can then be connected as deemed appropriate to provide wider market access to their members.

It is recommended that these communities are built upon existing, trusted business relationships of organisations such as telcos and banks. These private-sector owners, supported by specialist service providers, should own, finance and promote their DBCs. As a return on this investment, the DBCs can provide a direct financial return to the owners through a blend of: sales commissions, advertising and increased sales. Indirect benefits include client retention and market differentiation.

Timely action matters. Changing requirements and trading practices give businesses reasons to prepare now.

To discuss the findings or explore how a Digital Business Community could benefit your organisation, please contact **Ian Dunning** or **Nick Davies** to arrange a no commitment consultation.

Purpose of this Paper

Digitalised trade offers substantial potential benefits to individual firms and the wider UK economy. [1,2,33] However, significant barriers stand between available capability and effective SME adoption.

This paper examines those benefits, the barriers to adoption and their underlying causes, and potential solutions. By showing how these solutions can deliver wider economic and commercial benefits, it seeks to encourage action by private-and public-sector organisations able to accelerate the adoption of digitalised trade.

The framework is intended to support different ownership and delivery settings. Short accompanying briefings can set out the investment proposition for particular organisations, while a DBC solution briefing explains implementation, services and operating responsibilities.

We consider this to be a practical deliverable and commercially viable proposal. Other efforts have focused on new technology and platform development and have not succeeded as a result. Our approach is to build on existing capability and to impact SMEs as little as possible so that benefits to both users and suppliers of new services can flow in a reasonable timeframe.

What Trade Digitalisation Means

Resolving trade digitalisation issues first requires a clear understanding of the term. Appendix A sets out the detailed definition and practical capability framework. [16,19,27,34]

In simple terms, trade digitalisation uses reliable, reusable digital information to connect business processes and trading partners, this without rekeying and dispensing with the need for paper documents. ”Data not documents” is our watchword.

Businesses can benefit from individual improvements without every element being in place. However, improving internal systems or specific trading connections captures only part of the potential value. For example, a supermarket’s integration with its suppliers does not, by itself, help those suppliers adopt digital capabilities across their wider trading activities.

The Economic Opportunity

Economic Opportunity Figures

ICC United Kingdom identifies £25 billion in potential trade growth (approximately 1.3% of annual UK trade. [30]) and £224 billion p.a. in potential efficiency savings. [2,33] In a public policy perspective it is the equivalent of paying every household £7,700 a year, building 224 large hospitals or 5600 large secondary schools every year.

Trade Digitalisation and AI

As we head towards the advent of Web 3.0 wherein transactional norms will be based on agent-to-agent interaction, the need for AI to be founded on reliable and accurate data is more critical than ever. Thanks to MLETR adoption we now have a new category of data that carries with it legal authority to execute an English law contract. It is on that data that AI can safely be applied and benefits realised.

The opportunity estimates above concern trade digitalisation. They should not be presented as estimates of additional AI benefits. As set out in this paper, suitable AI applications could support implementation and further improvements; any incremental benefit requires separate assessment.

The Three Imperatives

1. **Compliance is the first imperative.** Businesses must meet applicable digital information and reporting requirements as they take effect. Non-compliance can result in fines, corrective action or restrictions on products and market access, depending on the regime and breach. [3,4,5,6,7,8,9,17]

   Compliance alone does not deliver the full benefits of digitalisation: a compliant process can still involve repeated data entry, disconnected systems and manual handovers.

2. **Competitiveness is the second imperative, independently of regulation.** Delayed adoption can leave firms facing higher costs, slower service and exclusion from customers' trading networks, putting their long-term viability at risk. [1,15,16]

3. **Trade expansion is the third imperative**. Businesses need to develop customer and supplier relationships in domestic and international markets. Digitalisation can support increased sales and access to suppliers that improve competitiveness, resilience and sustainability.

How Business Gains Support Economic Growth

Business gains provide routes to national growth. [1,16,33]

1. Lower administrative costs and fewer errors can release resources for productive activity.
2. Faster payments and improved access to finance can support working capital and investment.
3. Better market access can support additional domestic sales, exports and participation in larger customers' trading networks.
4. Reliable, reusable information can improve supply-chain management, traceability and environmental reporting.
5. Wider adoption can create demand for UK legal and related professional services, alongside technology, integration, assurance and training services. [29]
6. Lower costs and greater choice can benefit business customers and consumers.

The extent to which these business gains translate into additional UK output depends on how firms use the resources released and opportunities created. It will also be a function of how easy and cheap it will be to access relevant digital systems – this is why the "first mile" service provision for such access is so important. Stronger demand and competition can encourage investment and expansion, while the national benefit also depends on how much of the resulting value remains in the UK.

Appendix B sets out the principal estimates of the UK economic opportunity, their assumptions and limitations.

Growth Through New Trading Relationships

The £25bn ICC United Kingdom–IC4DTI estimate includes potential growth in trade, alongside efficiency gains. [2,33]

Opportunities extend across domestic and established international markets. Trade agreements provide an additional route to new trading relationships.

New UK trade agreements and economic partnerships, including the UK–India FTA and CPTPP, create opportunities for British businesses. [35] However, firms must identify customers, establish trusted relationships and serve unfamiliar markets before they can benefit.

Distance, language differences, unfamiliar requirements and the cost of establishing reliable local contacts make entry into new markets difficult. The staff time and specialist support required can put otherwise attractive opportunities beyond an SME's practical reach.

Digitalisation offers a practical, scalable route to these markets. Market intelligence, multilingual visibility, virtual trade events and trusted business matching can reduce the cost of finding and engaging potential partners. These capabilities need to connect with practical support for market entry and subsequent transactions.

UK businesses have an opportunity to access burgeoning markets in:

1. The Far East[1],
2. In Africa as the AfFTCA stretches its muscles; and
3. In the Middle East as they develop digital trading and finance capabilities.
4. In the Pacific, now that the UK is a member of CPTPP.

Workforce Adjustment and Trade Expansion

Increased trade can also help businesses redeploy staff as digitalisation reduces manual administration. Retraining can support moves into market research, customer development and managing new trading relationships, although new opportunities will not automatically replace every displaced role.

Value Creation and The Distribution of Benefits

Digitalisation can help businesses identify opportunities to change supply chains so that producers undertake more value-adding activities and retain a greater share of the returns.

Better market information and connections with potential buyers can help establish the business case before investment. They can also support implementation by connecting producers with customers for their higher-value output.

Heterodox Global Advisory's published analysis illustrates this opportunity through the Kenyan tea trade. It estimates that farmers receive just 11% of the final value of a cup of Kenyan tea. It advocates investment in processing, packaging, cold chains and branding in producing countries, enabling more value to be added and retained locally. [21,24]

Kenyan public-sector sources also identify opportunities in processing, packaging and branding. [22,23] The potential benefit therefore extends beyond more efficient transactions to changing where value is created and who receives it.

Changing Requirements and Supplier Readiness

Why Timely Preparation Matters

Digital capability requires continuing development as regulations, commercial requirements, technologies and trading practices change. The increasing pace of change and overlapping implementation timetables make timely preparation essential.

Appendix B sets out selected regulatory changes and implementation dates. [7,31,32]

Preparation extends beyond a business's own systems. Larger customers also depend on reliable information from suppliers, whose readiness can affect the wider supply chain. Businesses therefore need time to organise data, train staff and coordinate with trading partners. [15,16,31]

The predictable future of trade will be one where MLETR adoption is widespread, where digital systems operate across supply chains and where standardisation of data formats will be the norm. This is likely in the 3–5-year timeframe – as businesses consider investment cycles and longer-term commercial strategies, they need to be supported by their digital service providers to plan ahead and to make the most of incipient changes.

Law Is Enabling and Shaping Digital Trade

Legal developments can impose additional compliance costs through digital information and reporting duties, including measures to protect consumers and reduce fraud. However, they also support the digitalisation of trade, for example:

1. Recognising electronic trade documents, without requiring businesses to adopt them. [3]
2. Supporting trusted digital identification. [37]

[1] China's recently published 5-year plan is based on providing to its citizens more goods to spend their money on - a clear export opportunity for the UK.

A Shared Responsibility for Supplier Readiness

Meeting one buyer's digital requirements does not ensure that a supplier operates efficiently across its business. Purchasing, inventory, logistics and invoicing may still depend on disconnected systems and manual processes. Larger customers therefore have an additional commercial interest in supporting broader digitalisation by suppliers, which can indirectly improve reliability, service and costs across their supply chains.

Scope 3 emissions create an additional information requirement. Buyers assessing or reporting emissions across their value chains need relevant emissions data from suppliers, beyond the information required to purchase their products. Their reporting capability therefore depends in part on the quality and availability of supplier information. [10]

Conditions for Effective Digital Trade Adoption

Trust as a Condition for Digital Commerce

- **Confidence in counterparties.** Businesses need confidence in an organisation's identity, its representatives' authority and the purpose of contact. Familiar relationships support engagement but remain vulnerable to impersonation and fraud. [25]
- **Trusted participation.** Proportionate identity and authority checks, clear contact permissions and accountable handling of abuse should underpin participation in any coordinated trading environment.
- **Reliable supporting information.** Company Digital Vaults can facilitate onboarding and due diligence through controlled access to source documents. Verifiable credentials can support the exchange of identity and other claims, but verification does not replace assessment of their source, validity or commercial significance. [26]

For a hard-pressed SME who may have many suppliers and customers, the benefit here is being able to trade with a counterparty based on their membership of another "reliable system". They need not establish trust with individual traders.

Considerations for End-To-End Adoption

- CargoLedger's experience illustrates the dependence of digital trade on independent supply-chain participants. Any one participant's inability or unwillingness to use a digital process can interrupt an otherwise connected workflow. [18]
- The FIT Alliance's 2026 electronic bill of lading (eBL) survey similarly identifies interoperability and platform fragmentation as leading concerns. International cooperation is helping address cross-border legal barriers through UNCITRAL's Model Law on Electronic Transferable Records (MLETR), which provides a common basis for recognising electronic transferable records through national legislation. [19,20]

  Achieving end-to-end digital trade therefore requires coordination across participants, systems and jurisdictions. Partial digitalisation can nevertheless deliver benefits while wider adoption progresses. [18]

Commentato [ND1]: MLETR allows for paper but vertical digitalisation (of eBls for example is of limited benefit to SMEs who will not be directly affected. We need to avoid the position wehre all the benefits are realised by , say carriers or insurers or bankers and none filter out to the edges and end users.

Building on Existing Interoperability and Finance Infrastructures

Existing frameworks and emerging initiatives offer foundations for wider adoption. Peppol and DIFO illustrate the opportunities in document exchange and access to finance.

- Peppol combines common document specifications, secure exchange and governance. OpenPeppol[2] maintains the framework, through which buyers and suppliers connect using their chosen accredited service providers. [27]
- DIFO - Digital Invoice Finance Origination - aims to use digitised, standardised invoice data to support verifiable due diligence and SME-finance risk assessment. [28]

[2] OpenPeppol does not endorse a particular DBC service.

- SWIFT offers existing infrastructure for the management of payments and as it adopts ISO 20022 and innovates on its Digital Ledger capability, settlement of international trading liabilities can be sped up and derisked.
- GS1 capability also provides standardised infrastructure for physical assurance of consignments as they cross borders

These capabilities can be brought together to provide to trading entities data, finance and physical assurance all in the same digital environment, reducing replication of data, easing risk management and reducing costs.

AI as a Supporting Capability

Trade digitalisation does not depend on AI. However, effective use of AI in trade depends on reliable digital information and connected processes, making trade digitalisation an important foundation for its application.

Designing for Data Security

Digital trade requires secure handling of commercial information, with clear access permissions, reliable records and controls over how data is shared and used. Where AI is involved, additional controls should govern access to business data, its use for model training and authority to act. [25,36,38]

Designing and maintaining these safeguards often requires expertise beyond an SME's internal resources. Trusted specialist providers should supply this capability, supported by clear contractual responsibilities and appropriate assurance. Businesses retain responsibility for their decisions and authorised use of their information. [36]

Data Sovereignty

Both governments and commercial stakeholders cite their preference and the need for data sovereignty is assured control of where data is stored managed and with whom it is exchanged and accessed. Globally there are different norms, laws and standards that apply to data manipulation by AI agents. Here we have an opportunity to design in, alongside data security and consistency, sovereignty rules that meet the requirements of major markets across the globe.

Barriers to SME Adoption

The UK's Business Growth Service brings together public advice, training and local support for businesses seeking to grow at home and overseas. [41] A Digital Business Community (DBC) would direct firms to relevant public support and help them put digital trade services into use with customers and suppliers.

For example, a DBC could help an SME connect its existing accounting software to an electronic invoicing service that its buyer can use. A specialist would set up and test the connection with both parties. The community team would follow up to see whether the process works in day-to-day use.

UK business-support evaluations identify confusing offers and difficulties reaching businesses. [13,14,15] The LSE Trade Policy Hub's review of electronic trade documents also highlights limited SME awareness, platform fragmentation and the need for coordinated action. [34][3]

Addressing these difficulties requires coordination across four connected areas:

1. **Fragmented provision:** businesses face separate offers and incompatible systems, making suitable solutions difficult to identify and connect.
2. **Reaching SMEs:** businesses need clear explanations of the benefits, communicated through relevant and accessible channels.
3. **Building trust:** concerns about identity, authority and credibility can prevent engagement, particularly when approaches are unsolicited. [25]

3 The OECD identifies trusted intermediaries, peer learning and buyer support for suppliers as important channels for UK SME technology adoption. This supports the use of established relationships to help firms navigate fragmented provision; it does not evaluate the proposed DBC model. [39]

4. **Practical adoption:** businesses need time, skills, finance and support to select, implement and maintain suitable solutions.

Our partnership is set up to provide coordination, leadership and practical assistance to the SME sector so they can fully participate in the digital economy.

Why Potential DBC Owners Have Yet to Act

Our analysis identifies a gap between the capacity to coordinate adoption and the commercial incentive to do so. Organisations with reach and resources understandably focus on their core activities. Coordination will remain peripheral unless it offers a clear business return and receives funding, staff time and an explicit mandate. A viable delivery model must make these incentives and responsibilities concrete.

Why Demand for Coordination Does Not Emerge from Below

Potential beneficiaries do not necessarily recognise the aggregate opportunity. SMEs are more likely to focus on immediate business needs, while consumers rarely see how fragmented trade processes affect the prices they pay. Even where benefits are understood, there is no obvious organisation to approach with the remit, resources and commercial incentive to coordinate delivery.

Digital Business Communities (DBCs) as a Coordinated Response

The preceding analysis identifies four requirements for effective SME adoption:

1. **Trusted reach**: communicating trading opportunities, new economic partnerships and adoption requirements through credible, established channels.
2. **Coordinated services:** bringing together relevant knowledge, solutions and providers.
3. **Practical implementation support:** helping businesses select, adopt and use suitable services.
4. **Sustained participation**: proactive outreach, useful introductions and implementation follow-up to turn initial interest into continuing use as needs and requirements change.

The research and analysis reviewed in this paper indicate that coordinated provision across all four areas could address many of the barriers identified. [13,14,15,16,34] Our analysis proposes a DBC as a practical framework for bringing these elements together.

In this paper, a DBC is a business community whose participants access coordinated digital knowledge, services and trading opportunities.

Starting from an Existing Business Community or Corporate Customer Base

Establishing a new community from scratch requires substantial time and investment. Attracting the first participants is particularly difficult when there are few businesses with which to interact or trade.

The Digital Business Community Owner (DBCO) should therefore have a sufficiently large and varied client or membership base to support useful activity from launch. Established relationships provide a route to explain the benefits, encourage participation and introduce relevant services.

Customers need not already interact with one another. Shared access to useful services and trading opportunities can provide the basis for developing the community.

The Four Defining DBC Characteristics

1. **A single point of digital reference** for relevant knowledge, requirements, services and support.
2. **Opportunities to increase trade** through business matching, customer and supplier introductions, and access to new markets.
3. **Proactive central management** to maintain information, coordinate services, assist implementation and sustain participation.

4. **A critical mass of participants from launch** to generate useful interactions, relevant trading opportunities and demand for services.

A designated management team should turn the DBCO's existing reach into active participation. It should welcome participants, identify their needs, organise communications and introductions, and follow up on service uptake.

Regular feedback and participation data should guide improvements. Technology provides the means; critical mass and proactive management together turn access into productive activity.

Ownership and Potential DBC Owners (DBCOs)

A Digital Business Community needs an owner able to organise, finance and sustain its delivery, drawing on specialist providers. A prospective DBCO should have:

- A sufficiently large and varied client or membership base to support useful activity from launch.
- A clear commercial interest or development mandate in promoting SME growth.
- The authority, organisational capacity, commercial expertise and finance to build, launch and manage the DBC, including a dedicated team and continuing operating budget.

Potential owners include telecoms providers, banks, large buyers and federated professional-service networks.

The DBCO Investment Case

The investment case can be built around these three elements:

1. Existing assets can lower the cost of establishing a DBC. Customer and supplier relationships provide routes to participation, while suitable existing digital infrastructure, service channels and support capabilities can be reused[4].
2. A DBC can strengthen commercial relationships, differentiate the owner's offer and improve supply-chain performance.
3. A DBC can generate additional revenue from the owner's existing customer or supplier base through subscriptions, paid services and provider arrangements.

Given the investment and commercial focus required, chambers of commerce and trade associations are more likely to support a DBC through collaboration where their members' interests align.

Selecting Services and Solution Providers

A DBC should bring together recommended services and specialist providers across the needs of its participants. These include digital trade solutions, training and mentoring, a business knowledge centre, market intelligence, virtual trade events and business matching.

Recommendations should reflect business needs, service quality, interoperability and affordability. Active administration should help participants identify suitable support and put it to effective use.

Provider-selection criteria and relevant commercial relationships should be transparent to participants.

Viable Scale and Connections Between DBCs

A DBC needs sufficient active participation and income to sustain useful services and cover continuing costs. An established sector, regional, professional or corporate community can provide a reasonable starting base. It is important to note that viability depends on engagement and commercial performance, rather than a fixed membership threshold. Indeed, excessive scale can complicate administration.

[4] Specialist partners can supply additional trade expertise and services. Each prospective owner should assess which assets are transferable and what further investment is required.

Multiple DBCs can coexist and, by agreement between their owners, connect to extend business matching, knowledge sharing and access to services. These connections require compatible systems and agreed governance, but not common ownership.

There is therefore no requirement for a single national or government-sponsored DBC. Individual private-sector DBCOs can organise delivery at a viable scale.

Making DBCs Commercially Sustainable

Commercial Incentives and Funding

Sustainable coordination requires a commercial case for each participant. DBCOs need to offer to service providers a return that justifies investment and continuing administration. SMEs need benefits that outweigh the costs of adoption and use, while service providers need viable remuneration.

Initial investment must be matched by recurring income to sustain delivery. Subscriptions, paid services and provider arrangements can generate revenue, with stronger customer relationships and improved supply-chain performance adding to the owner's return.[5]

Leadership and Delivery Responsibilities

A DBC provides leadership, funding and an explicit mandate to develop and sustain the community. A designated management team needs time, resources and clear operational responsibilities to deliver the activities described above.

The DBCO does not need every capability in-house. IC4DTI, universities and other specialist organisations can contribute research, interpretation, education and technical expertise. Independent providers can supply digital solutions, business services and implementation support. [11,12]

Reusing infrastructure does not by itself establish trade readiness. Existing onboarding provides a starting relationship, while trade, finance and regulated services can require additional verification. Responsibilities for specialist services, information and participant support must be agreed before delivery.

Delivery arrangements should distinguish the DBCO's community-management role from each provider's responsibilities for its own services and information. Contracts should define these responsibilities, participant support and escalation routes.

How Other Organisations Can Support Adoption

Organisations outside the DBC's delivery structure can help accelerate adoption:

- **Government and public agencies** can clarify legal requirements, support common standards and ensure public processes work digitally.
- **Chambers, trade associations and NGOs** can communicate opportunities, identify shared needs and encourage SME participation.
- **Large buyers, banks and professional advisers** can identify readiness gaps, direct businesses towards suitable support and help finance improvements where commercially justified.
- **Trade intermediaries – carriers, ports, customs authorities can "lean in" to data management and exchange mechanisms to ensure they meet their requirements**

These contributions can strengthen private-sector delivery without being a prerequisite for establishing a DBC.

5 Rossi and colleagues examine governance and business models across 20 digital innovation hubs in five European countries. Their findings provide a comparison for organising and financing coordination, including mixed funding arrangements, rather than evidence that the proposed DBC model is commercially proven. [40]

Assessing DBC Delivery and Outcomes

A DBC should use statistical analysis by independent evaluators to assess participation, service use, business introductions and its own commercial performance. These measures can guide improvements, but do not by themselves establish the economic benefits achieved by participants.

Individual businesses will hold their own performance data and are unlikely to share detailed commercial information with the DBCO. Assessment of wider outcomes should therefore draw on voluntary feedback, surveys and case studies, with clear distinctions between recorded activity and reported business benefits.

A practical demonstration could test whether an SME can send an electronic invoice using data from its existing accounting software and whether a buyer can process it without re-entering the data. David Hughes and the Digital Trade Testbed (DTT) could help design and evaluate such a demonstration.

Conclusions

Digitalised trade offers substantial benefits to UK businesses and the wider economy. Realising these benefits requires effective adoption, beyond the availability of technology or compliance with individual requirements. Businesses face three connected imperatives: compliance, competitiveness and trade expansion.

Many of the necessary capabilities already exist, but fragmented provision, limited awareness, lack of trust and implementation difficulties obstruct SME adoption. The principal challenge is to bring knowledge, services and practical support together through channels that businesses can access and trust.

Our analysis identifies Digital Business Communities as a practical framework for meeting this challenge and telecoms service providers as new and capable delivery drivers. Built on established business relationships, they combine a single point of digital reference, increased trading opportunities and proactive management. Continuing outreach, implementation support and follow-up are essential to sustained participation.

Commercially motivated private-sector DBCOs can organise and finance this delivery, drawing on external expertise and specialist providers. Additional service revenues, stronger customer relationships and improved supply-chain performance can provide reasons to invest. Individual DBCs can operate at a viable scale and connect where their owners see mutual benefit, without requiring a national platform or government sponsorship.

The opportunity calls for timely action. Regulations, technologies and trading practices continue to develop, increasing both the pressures on businesses and the opportunities available to them.

By accelerating SME adoption, this approach could help realise the substantial economic benefits identified by ICC United Kingdom and IC4DTI, turning potential gains into business growth and wider UK prosperity. [2,33]

Readers wishing to discuss the opportunity or explore the development of a Digital Business Community are invited to contact one of the authors listed below.

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Evidence and Attribution Notes

Third-party organisations, individuals and sources are cited for evidence, context or attributed observations. Their inclusion does not imply review, approval, endorsement or commercial commitment. References to individuals do not establish endorsement by their organisations.

Proposed solutions and conclusions are the authors' analysis unless expressly attributed. First-party descriptions state the source's own position; they are not independent evaluations of achieved results. The institutional explanation draws on stakeholder observations. It is not a representative assessment of organisational practice.

The paper's contribution is to integrate established findings into a practical proposition for commercially motivated DBC owners. It presents a strategic synthesis and delivery proposal, rather than a new theory or an empirically validated model. [39,40]

The Kenyan example draws on public posts and institutional sources. The 11% figure is an attributed estimate; its method and denominator have not been verified. [21,24]

Appendix A - Practical Meaning and Capabilities of Trade Digitalisation

This appendix sets out the authors' proposed working framework for domestic and international trade digitalisation. It is a synthesis for discussion, not a prescribed standard, statutory checklist or certification scheme. Requirements depend on business role, products, markets, counterparties and the workflow being assessed. [15,16,20,27,34]

Working Definition

Trade digitalisation is the coordinated use of reliable, reusable digital information to conduct and manage trade within and between businesses and relevant authorities. It connects commercial, financial, logistics and compliance processes through compatible systems, with appropriate legal recognition, permissions and controls.

The practical test is whether information can pass through a trading process, be accepted by the next participant and support the required action. Unnecessary re-entry, paper handling and repeated verification should be reduced. A workflow can be assessed in stages; useful partial improvements do not require universal adoption. [16,18,20,27,34]

Three Levels of Implementation

Digital records place information in electronic form, including PDFs, spreadsheets and scans. Digital business processes use information within a firm's systems. Connected digital trade enables independent participants to exchange, accept and reuse information across a relevant transaction or supply chain.

Each level can create value. Advanced internal processes do not establish connected implementation across counterparties. Conversely, remaining friction does not show that every business needs every technology or that a headline economic estimate is achievable by each firm.

Capabilities to Assess

"Full" digitalisation is not a fixed endpoint or a requirement to adopt every available technology. The objective is proportionate improvement across relevant activities as needs and capabilities change. Partial benefits remain valid; further opportunities and net returns should be assessed separately.

Compliance is one dimension of readiness. Meeting legislation or one buyer's requirements does not establish that all worthwhile improvements have been captured. Assess relevant activities and counterparties, including processes outside the selected customer relationship.

Identity and Authority

Establish the parties' identities and who can represent them, approve actions or access information. Verification must be proportionate and does not guarantee creditworthiness or conduct. [25,26]

Reliable Business and Product Data

Maintain accurate identifiers, records and supporting evidence that can be reused for relevant purposes. Specify ownership, provenance, review responsibilities and access permissions. Apply relevant data-protection requirements when personal information is involved. Product and reporting requirements vary. [7,8,10,31,32,36]

Connected Commercial Processes

Exchange and process enquiries, quotations, orders, invoices and related records through compatible arrangements. Assess repeated entry, reconciliation and acceptance by customers and suppliers. [4,16,27]

Logistics and Trade Documents

Exchange and verify required transport, customs and trade records. Where documents embody rights, establish reliable control and legal recognition for the relevant handovers and jurisdictions. [3,5,16,20]

Payments and Finance

Connect transaction evidence, invoicing, reconciliation and financing processes where commercially appropriate. Measure payment delays and financing costs separately. Credit decisions still depend on lender requirements and risk assessment. [28,34]

Compliance and Assurance

Produce and share evidence required for applicable tax, customs, product, environmental and customer requirements. Distinguish statutory obligations from buyer specifications and future requirements. [4,6,7,8,10,31,32]

Service Selection and Continuity

Select services that fit the business need and existing systems. Assess interoperability, support, affordability and the ability to retrieve records or change providers. Clarify responsibilities at handovers between providers and trading partners. [15,16,27,36]

Continuing Operation

Provide security, permissions, trained staff, exception handling, support and performance monitoring. Assign responsibility for maintenance, data retention and changing requirements. Where AI is used, govern access to information, model-training use and authority to act. [9,15,16,25,36,38]

Knowledge and Implementation Support

Identify the knowledge, training, mentoring and specialist assistance needed to select and use suitable services. Provide accessible explanations of changing requirements and help businesses progress from interest to implementation. [13,15,16,34]

Market Discovery and Trade Expansion

Assess market research, multilingual visibility, virtual trade events and trusted business matching for customer and supplier development. Connect suitable opportunities with due diligence and transaction support, including relevant FTA requirements. [35] Distinguish introductions and reported additional sales from administrative savings.

Workforce Capability and Adjustment

Identify affected tasks and assess staff training and redeployment needs. Explore opportunities in market research, customer development and managing trading relationships. Employment outcomes are matters for participating businesses; any DBC-level assessment should use voluntarily shared information.

Community Readiness and Commercial Sustainability

For community delivery, assess the reachable customer or supplier base, immediate value for participants, expected service use and continuing administration costs. Test owner revenues and participant incentives. Existing participants need not already interact, and no universal minimum community size is assumed.

Applying The Framework

Begin with a real workflow and its counterparties. Identify systems already in use, manual handovers, data gaps and acceptance constraints. Agree the improvement sought, who must participate, responsibilities, costs and measures of success. Preserve suitable existing systems and assess net value before expansion.

Appendix B - Economic Estimates And Selected Implementation Dates

Selected reference map as at 1 November 2026. Applicability depends on product, jurisdiction, operator and transaction. An enabling law or application date is not a universal mandate. EU measures concern relevant EU market access, transactions or activities; they do not automatically create UK domestic duties. Sources and qualifications appear in Appendix C.

Measure	Status and relevant timing	Implication
UK Electronic Trade Documents Act 2023 [3]	In force 20 September 2023.	Permits qualifying electronic trade documents. Reliable systems are required. Transaction acceptance also matters.
UK VAT e-invoicing [4]	Policy plans for April 2029. Peppol is the announced core framework. Finance Bill 2026–27 enabling powers are proposed. Detailed regulations will follow.	Prepare compatible invoices and provider arrangements. Distinguish future requirements from current rules. Planned governance is not yet operational.
EU eFTI [5]	Full operation from 9 July 2027. Commission timetable.	Authorities must accept covered electronic freight information. Compliant certified platforms are required. This is distinct from title transfer.
EU ViDA [6]	Directive 2025/516 in force; phased implementation. Cross-border B2B digital reporting from 1 July 2030.	Check national invoice and VAT reporting rules. Domestic systems have different dates.
EU ESPR and batteries [7]	ESPR in force 18 July 2024; passport duties depend on product-specific measures. Specified battery passports from 18 February 2027.	Identify product category, required data and legal role. No universal ESPR passport deadline.
EU packaging regulation [8]	Regulation 2025/40 generally applies from 12 August 2026. Labelling and reuse obligations have separate, phased dates; implementing measures also apply.	Packaging records and labels have a separate legal basis. There is no blanket Digital Packaging Passport mandate.
EU AI rules [9]	General application from 2 August 2026. Amended high-risk stages: 2 December 2027 and 2 August 2028.	Assess whether the business is a provider or deployer and whether EU territorial scope applies. Data-protection and security responsibilities also require assessment.
EU deforestation regulation [31]	Main duties from 30 December 2026. Qualifying micro and small operators follow on 30 June 2027, subject to the timber exception.	Check covered products, market activity and operator role. Obtain relevant supplier evidence; no blanket duty for UK domestic sales.
UK packaging EPR reporting [32]	Next reporting deadline 1 April 2027. Relevant reporting periods differ for large and small producers.	Check producer status and required data. These are recurring reporting duties, not a universal new digitalisation mandate.

How To Describe The Macroeconomic Opportunity

The UK Government's 2022 assessment modelled £1.137bn in net present benefits over 2023–2032. It uses 2019 prices and a 2020 present-value base. It includes transition costs and depends on adoption, interoperability and international legal consistency. It is not an annual saving. [1]

ICC United Kingdom's 2021 case identifies £25bn in potential trade growth and £224bn in potential efficiency savings. The 2025 ICC United Kingdom–IC4DTI plan restates these opportunities. They are not verified realised outcomes. [2,33]

The estimates concern different scopes and appraisal assumptions and should not be added together. Released working capital is distinct from an annual operating-cost saving. Financing-cost reductions and additional sales should also be assessed separately to avoid double counting. [1,2,33].

Appendix C - References and Status of Information

References support the main text and appendices. Official sources establish legal and policy status; research findings apply within their stated scope. Stakeholder observations and the authors' proposals are identified separately. Links and reference relevance were reviewed on 1 November 2026. Sources that could not be retrieved directly are identified below.

[1] DCMS. Impact assessment of the Electronic Trade Documents Bill, assessment dated 18 July 2022, published 8 December 2022. Ten-year appraisal 2023–2032; best-estimate net present value £1,137m, 2019 prices and 2020 present-value base. Adoption and interoperability assumptions apply. Official assessment

[2] ICC United Kingdom. Creating a Modern Digital Trade Ecosystem, 2021. The executive summary gives £25bn potential growth, originally framed against a 2024 horizon. It also identifies £224bn in potential efficiency savings. This comprises £171bn for bills of lading, £26bn for bills of exchange and £27bn for promissory notes. Scenario estimate, not measured annual consumer savings. Original report

[3] Electronic Trade Documents Act 2023. See sections 1–4 and 8.

[4] HMRC. E-invoicing requirements, published 28 October 2026. Policy plans for April 2029, Peppol as the core interoperability framework, proposed Finance Bill 2026–27 enabling powers and subsequent regulations. HMRC's planned authority role is subject to the legislative process and implementation arrangements. Official policy paper

[5] European Commission eFTI implementation. Operational timetable and legal framework.

[6] Council Directive EU 2025 516. VAT in the Digital Age and phased national implementation. | Commission implementation overview

[7] Ecodesign for Sustainable Products Regulation EU 2024/1781, Articles 4 and 9–12: product-specific measures determine passport obligations. Battery passports have a separate legal basis in Regulation EU 2023/1542, Article 77; specified categories from 18 February 2027, with distinct dates for particular information requirements. ESPR | Battery guidance

[8] Packaging and Packaging Waste Regulation. Regulation 2025/40, including Articles 12 and 71. | Commission implementation guidance

[9] European Commission. AI Act implementation overview and Digital Omnibus on AI. General application from 2 August 2026, with exceptions; amended high-risk stages include 2 December 2027 and 2 August 2028. Assess legal role, territorial scope and use case. Official overview

[10] Carbon Trust. Scope 3 guidance; GHG Protocol Corporate Value Chain Scope 3 Accounting and Reporting Standard, 2011. The standard supports value-chain emissions accounting and supplier engagement; it does not itself impose identical statutory duties on all SMEs. Carbon Trust | GHG Protocol

[11] Teesside University support for C4DTI. The university identifies itself as a founding partner and describes research, training and legal support. This supports the description of intellectual capability; it does not establish endorsement by every institution named in this paper. University source

[12] Teesside Digital Trade Testbed. University describes interdisciplinary digital trade capability, knowledge exchange and industry collaboration.

[13] DBT Backing your business evidence annex

Updated 9 January 2026. Sections Business support fragmentation and Digital adoption describe inconsistent provision, difficult navigation, awareness gaps and difficulty finding suitable solutions and independent advice. A synthesis, not a new provider-market census.

[14] Technopolis Evaluation of the Growth Hubs 2015 to 2020

Published 6 July 2023. Report p 52 discusses confusing messaging and competing offers; p 67 discusses awareness and access barriers. Independent evaluation combining interviews, administrative data and impact analysis. The cited navigation findings are qualitative, not national SME prevalence rates.

[15] RSM Help to Grow Digital final evaluation

Published 18 January 2024. Report p 38 discusses awareness, accountants, chambers and routes to market; p 57 illustrates implementation complexity and demand for assistance. Mixed-method evaluation; small interview and follow-up samples limit generalisation.

[16] Ipsos Electronic trade documents SME exporter research

Published 6 July 2026. Executive summary pp 8–10 and methodology pp 15–18. Fifteen SME exporters and eight intermediaries interviewed in February–March 2026. Awareness, capability, interoperability and acceptance barriers; qualitative findings, not statistically representative adoption rates.

[17] HSE role as a market surveillance authority

HSE describes compliance, withdrawal and recall notices, powers to stop product supply and prosecution with financial penalties. This illustrates product-law enforcement, not a universal penalty schedule for digital rules. It does not show that failure to adopt technology automatically causes closure. Read the applicable legislation for each duty.

[18] CargoLedger. Statement on coordination constraints and partial digitalisation, approved for use by Roel Crooijmans. Roel is a CargoLedger shareholder involved in the company's strategy. This is an approved stakeholder observation, not an independently evaluated case study. (Roel also works on business development for OpenPeppol, where he supports engagement with public authorities and market participants on Peppol adoption and cross-border interoperability.)

[19] ICC and FIT Alliance. Electronic Bill of Lading adoption grows as focus shifts to interoperability, 21 October 2026. Industry survey statement; supports fragmentation and acceptance barriers, not DBC effectiveness. Source

[20] UNCITRAL. Model Law on Electronic Transferable Records, 2017, overview and explanatory material. Model law, not automatically applicable domestic legislation. Source

[21] Steven Pope. Steven Pope. Who earns what in a cup of Kenyan tea, LinkedIn, 19 October 2026. The roughly 11% figure is Pope's estimate. The post is stakeholder analysis, not approval of this paper or a commitment. Source

[22] Kenya Export Promotion and Branding Agency. Tea packaging value addition of Kenya tea, 25 January 2024. Independent primary institutional context for packaging, branding and diversification opportunities; not verification of Pope's wording. Source

[23] Tea Board of Kenya. Terms of reference for product design development branding and packaging services, section 1.1. Discusses ownership changes, farmer returns and barriers to value addition; procurement document, not an impact evaluation. Source Direct retrieval was unavailable during this review; retained from the previously supplied source.

[24] Steven Pope. Adding value where it's grown a year of exploration, LinkedIn post. Describes a practical Kenya plan. Price comparisons and the approximately 5% value-added export share are not independently adopted as current sector statistics here. | Source

[25] National Cyber Security Centre. Business payment fraud and Phishing attacks defending your organisation, accessed 29 October 2026. Documents impersonation, fraudulent payment requests and layered organisational and technical defences. Establishes risk and mitigation principles, not a measured DBC effect or ranking of adoption barriers. Business payment fraud | Phishing guidance

[26] W3C. Verifiable Credentials Data Model v2.0, Recommendation 15 May 2025. Issuer holder verifier model, security and privacy considerations. A credential expresses issuer claims; verification and trust decisions are distinct. This is a technical option, not evidence of completed DBC implementation or mandatory reliance on this standard. W3C Recommendation

[27] OpenPeppol. About and Peppol Interoperability Framework, accessed 31 October 2026. Primary descriptions of document specifications, governance, accredited service providers and the four-corner model. However, no completed DBC–Peppol integration is being claimed. These comments simply support the infrastructure description, not endorsement of the paper or a DBC. About Peppol | Interoperability framework.

[28] Global Finance and Technology Network. Democratising Access to Finance keynote by Vittorio Di Bello (International Finance Corporation). Event organiser synopsis identifies Digital Invoice Finance Origination and its intended role in verifiable due diligence and SME-finance risk assessment; not a production deployment assessment. Accessed 29 October 2026. Keynote synopsis

[29] The Law Society. Doing legal business in England and Wales, accessed 29 October 2026. Describes English law's use in international commerce and contracts. Identifies the UK's separate legal jurisdictions. The paper retains English law for the governing-law proposition. Law Society source

[30] UK Government. UK trade in numbers, updated 22 October 2026. ONS-based exports plus imports total £1,947.6bn in the year to August 2026, in current prices. Author calculation: £25bn divided by £1,947.6bn is approximately 1.3%. This is a scale comparison, not a growth forecast. Trade statistics

[31] Council of the European Union and Regulation (EU) 2023/1115, consolidated Article 38. Main obligations apply from 30 December 2026. Qualifying micro and small operators follow on 30 June 2027, subject to the timber-product exception. Product scope and operator role determine duties. EU-market relevance does not create a blanket duty for UK domestic sales. Checked 30 October 2026. Council timetable | Consolidated legislation

[32] Defra. Deadlines for registration and packaging data reporting, updated 19 August 2026. Covered large producers report July–December 2026 data by 1 April 2027. Covered small producers report full-year 2026 data by that date. These are recurring reporting duties, not a universal new digitalisation mandate. Official guidance

[33] ICC United Kingdom and IC4DTI. The plan for growth, 2025. Restates £25bn in potential trade growth and £224bn in efficiency savings, citing the 2021 economic case. This is attributed opportunity analysis, not independently verified realised growth. Growth plan

[34] Garnizova, E., Strong, L. and Fisch, T. T. V. Rapid Evidence Review on the SME Capability and Digitalising Trade with ETDs. LSE Consulting Trade Policy Hub, report dated June 2026; published by DBT on 6 July 2026. Review of 17 sources from 2017–2025 and five expert interviews. Scope is electronic trade documents. Supports awareness, interoperability and coordination findings; economic figures are projections. LSE report

[35] Department for Business and Trade. UK trade agreements in effect, updated 1 September 2026; UK–India Trade Deal collection, updated 15 July 2026. Official context for the UK–India agreement and CPTPP; not evidence of DBC-generated sales. Agreements in effect | UK–India agreement

[36] Information Commissioner's Office. Data sharing advice for small organisations; Information security checklist. Covers lawful sharing of personal data, accountability, provider assurance and controller–processor contracts. Personal-data rules are distinct from controls over all commercial data. Guidance notes ongoing updates following the Data (Use and Access) Act. Data sharing | Security checklist

[37] HM Treasury and DSIT. Using digital identities with the Money Laundering Regulations, 26 February 2026. Explains use of certified and registered digital verification services for regulated firms' due diligence. It does not mandate digital identity for all businesses or replace wider AML obligations. Official guidance

[38] Information Commissioner's Office. What are the accountability and governance implications of AI. Explains allocation of controller and processor responsibilities where AI processes personal data. General commercial confidentiality and agent authority also require contractual and operational controls. ICO guidance

[39] OECD (2026). SME Technology Adoption in the United Kingdom. OECD Studies on SMEs and Entrepreneurship, OECD Publishing, Paris. Published 22 April 2026. Draws on desk research and fact-finding in Greater London, the West Midlands and the North-East. Supports the discussion of trusted intermediaries, peer learning and supply-chain relationships; not an evaluation of DBC delivery.https://doi.org/10.1787/5f25ce2a-en

[40] Rossi, F., Colovic, A., Ciappei, S. and Bonomi Savignon, A. (2026). Business models for digital innovation intermediaries: evidence from the digital innovation hubs initiative. Industrial and Corporate Change, dtag042. Published 22 July 2026. Qualitative interviews with 20 digital innovation hubs in Italy, Spain, France, Germany and the UK. Examines business models and governance in policy-driven digital transition; does not establish the viability of the proposed privately financed DBC model. https://doi.org/10.1093/icc/dtag042

[41] Business.gov.uk. About Business.gov.uk and the Business Growth Service. Official overview of the service's advice, training and local support for businesses. https://www.business.gov.uk/about/