

The advent of blockchain in trade

Blockchain is a fairly new technology that is still evolving. Initially used for digital currencies, most research into this technology has been carried out for the finance industry. In recent years, however, research and development on supply chains and trade-related business processes have also gained ground. Start-ups and large companies have already exploited a wide range of blockchain-based applications in these areas, but the opportunities generated by this technology in international trade have yet to be fully exploited.

Distributed ledger technology (DLT) and blockchain

Ledgers are sets of accounts that are used to [keep records](#) of transactions or property. Until recently, they were managed centrally, by banks or governments for instance. The bank or government, which served as an intermediary, was responsible for maintaining the ledger and controlling the degree of transparency regarding the functioning of the ledger and the data stored on it.

Recent advances, however, have allowed for a technology where ledgers are decentralised or 'distributed' across multiple data repositories, forming a database [that can be shared](#) 'across a network of multiple sites, geographies or institutions'. This technology, on which the first crypto-currency, [Bitcoin](#), was based, is called 'distributed ledger technology'. It allows ledgers to be [collectively maintained](#) and controlled by a network of computer servers, called [nodes](#). New data entries are subject to a [consensus mechanism](#) that allows network members to establish whether they are legitimate or not. The validation method used for consensus, in turn, uses [cryptography](#). These three elements, i.e. distributed ledgers, a consensus mechanism used to validate new data entries and the use of cryptography, are the main characteristics of distributed ledger technologies.

Blockchain is a particular type of DLT. It uses cryptography and algorithms to create and verify a series of transactions, the records of which are bundled together with others into 'blocks', which are added as links in a 'chain'. Through the consensus mechanism, each change to the ledger is replicated across the entire network and each network member has a full, identical copy of the entire ledger at any point in time.

The main advantages associated with the use of DLTs include the potential elimination of the intermediary (given that, in theory at least, consensus eliminates the need for system participants to trust a central institution); transparency (as everyone has a copy of the ledger and additions necessitate consensus); automation – and thus speed; immutability (the state of a block cannot be modified after it is created), and thus the possibility for each of the network's participants to verify the transactions of any asset.

Blockchain opportunities in trade-related areas

Blockchain ledgers were [originally](#) used to underpin digital currencies. In recent years, the potential of DLT has become relevant in [other areas](#) too, including supply chain management, trade finance, product provenance and authenticity, and intellectual property (IP) registration.

As regards supply chains, blockchain could enhance underlying logistics by [registering, certifying and tracking](#) goods along the chain, with the details of each transaction being verified, stored and shared. Data digitisation would not only provide all participants in multiple sites with real-time access to information at every step of the supply chain, it would also streamline paper-based processes. Thus the technology would increase efficiency, by reducing, for instance, the costs of handling trade documentation and customs clearance times. The decentralised nature of blockchain, enabling shared oversight, the immutable records and the verifiable transaction history would also enhance security in the supply chain, for instance by reducing the risk of fraud and error. Moreover, these features may help customs authorities' [risk assessment work](#). In trade finance, blockchain-driven trade digitalisation could enhance [efficiency and security](#), for example by reducing the risk of duplicate invoices, and may secure SMEs [easier access](#) to capital.

Another benefit would be the increased transparency ensured by the record-keeping functionality of this technology, which would provide proof of authenticity, provenance and ethical standards of goods and

services. Thus, in sectors where there are often problems such as unsafe working conditions and environmental damage, consumers could decide whether they wish to buy a given product.

Furthermore, blockchain allows for the automated execution of transactions based on a code stored in the blockchain. Depending on this '[smart contract](#)', the delivery of a product could automatically trigger a payment, for instance. Blockchain could also play a role in the management of IP rights, for example by enabling checks of legitimate ownership and tracking ownership history.

The 2018 [policy brief](#) by the European Centre for International Political Economy (ECIPE) pointed out that the use of blockchain in supply chains is currently limited, mainly to specific operations. It also stated that some multinationals spearheading blockchain-related innovation are using it within their own organisations, in order to become more competitive through improved efficiency.

Examples for blockchain-empowered applications in trade

In recent years, a number of companies have already started to employ blockchain in trade-related areas.

In 2016, HSBC Bank, Bank of America Merrill Lynch and the Infocomm Development Authority of Singapore reported the creation of a [prototype blockchain](#) that would simplify letter of credit transactions between exporters, importers and their banks. Retailer Carrefour, which uses [blockchain technology](#) to track free-range chicken production in France, will extend the application to [more product lines](#) by the end of 2018.

Alongside large companies, start-ups are also tapping into the use of this technology. Tech start-up Modum has developed a [blockchain-based solution](#) to monitor temperature in shipments of pharmaceutical products that will be used by [Swiss Post](#). UK-based [Provenance](#) meanwhile set up a platform for producers and retailers to prove the origins of their products, based on a blockchain-powered [traceability system](#).

Blockchain has also attracted interest from some customs authorities. In 2017, technology giant IBM and shipping company Maersk announced a [blockchain solution](#) to improve documentation management in supply chains by digitalising processes. The idea was piloted by the Dutch Customs Authority as part of an [EU research project](#), and by US customs. Following its participation in a [shipping logistics](#) pilot scheme, the Korea Customs Service is to launch a pilot for a blockchain-powered customs-clearance platform by the [end of 2018](#).

Challenges presented by blockchain technology

Several questions have been raised in relation to the implementation of blockchain in international trade. These include the [technology's capability](#) to handle the scale of transactions; the various DLT systems' interoperability; cybersecurity; the need for significant [investment and expertise](#) for the comprehensive implementation of such a technology; and the willingness of all parties involved, for example in a supply chain, to use this technology. Regarding the last point, companies may not be interested in sharing critical information, for instance about prices, or willing to face increased scrutiny of their production processes.

Moreover, [analysts](#) point out that the novel features of blockchain technology will present regulatory and legal challenges to its use in international trade. In this context, the most common concerns include the following. The decentralised and cross-border aspect of this technology creates a number of jurisdictional issues, for example with respect to regulatory authorities. Another jurisdictional issue concerns which courts would have jurisdiction over disputes. There is legal concern about liability and accountability issues, as distributed ledgers do not have legal personality. Therefore, [analysts](#) highlight the need for a harmonised regulatory approach, especially considering the transnational nature of the issues involved. Smart contracts are expected to pose challenges to traditional contract law, as regards, for instance, the legal validity and enforceability of these contracts. Finally, analysts point out that the use of blockchain will need to comply with data protection laws regulating the localisation and cross-border transfer of certain data. This could unearth further jurisdictional issues as it is unclear which [data protection mechanism](#) applies for international blockchains.

In its May 2016 [report](#) on virtual currencies, the European Parliament emphasised that the scope of DLT extends far beyond the financial sector. It highlighted the dynamics generated by blockchain technologies in the business environment and called for a proportionate regulatory approach and capacity-building at EU level.

