

CHAIN REACTION

As companies increasingly seek solutions to ensure environmental, social and governance (ESG) criteria are being met, can blockchain technology assist organisations' ESG reporting and enhance standards of transparency, accountability and ethical practice? Phil Lattimore speaks to experts to find out if, and how, blockchain technology can help



Blockchain is the digital technology best known for its role in underpinning cryptocurrency systems such as bitcoin, but could it be a solution to the challenge of transparency and standardisation in environmental, social and governance (ESG) reporting for the quality profession?

The technology has a number of benefits for the quality industry, not least the potential to allow transparency across the supply chain, and to improve efficiencies and the consistency of data. At its most basic level, blockchain is a database that keeps a record of all interactions between parties using the database. Unlike an analogue database, however, changes cannot be made without the other parties knowing, and data is encrypted so it is only accessible to the parties involved. This transparency makes it an ideal conduit for quality professionals.

Sustainability and ESG criteria are becoming increasingly important for many organisations, as demands accelerate from investors for equities, bonds and other assets where ESG factors have been integrated into the investment process.

These non-financial ESG standards have become an important way for investors to measure and evaluate an organisation's commitment to sustainability, social responsibility and good corporate governance, so are a

priority on many corporate agendas. Indeed, an analysis by Bloomberg in February 2021 ([bloom.bg/3Bd4Ktj](https://www.bloom.bg/3Bd4Ktj)) suggests ESG assets will make up a third of total assets under management by 2025 (US\$53tn), underlining the importance of organisations developing a robust, transparent and accountable ESG strategy.

As such, the sustainability agenda and ESG were a focus of CQI's World Quality Week last year. For quality professionals, however, ESG reporting not only offers important opportunities to highlight how their organisation is addressing these issues – redefining its long-term values and meeting stakeholder demands – but it also brings challenges around the accuracy, credibility and transparency of ESG reporting and sustainable performance.

Transparency and ESG

Many aspects of ESG are interconnected, complex and difficult to measure or report on using traditional accounting and managerial reporting structures. For investors, this raises the issue of trust in ESG reporting around the accuracy of the data being used, and the transparency of how non-financial metrics are connected to tangible assets throughout the value chain.

Blockchains can help establish that data credibility, some argue, and may have an important role to play in assuring standardised and reliable ESG reporting.

A blockchain is, in essence, a system for recording digital information that

makes it difficult or impossible to alter or hack that information. A blockchain is a shared, immutable encrypted digital ledger of transactions shared by several parties in a distributed network of computer systems. It is structured in such a way that it ensures the security and fidelity of the data (see boxout, p49), and allows network members to see all the details of transactions end to end. It facilitates the process of recording transactions and tracking assets – whether tangible or intangible – in a business network.

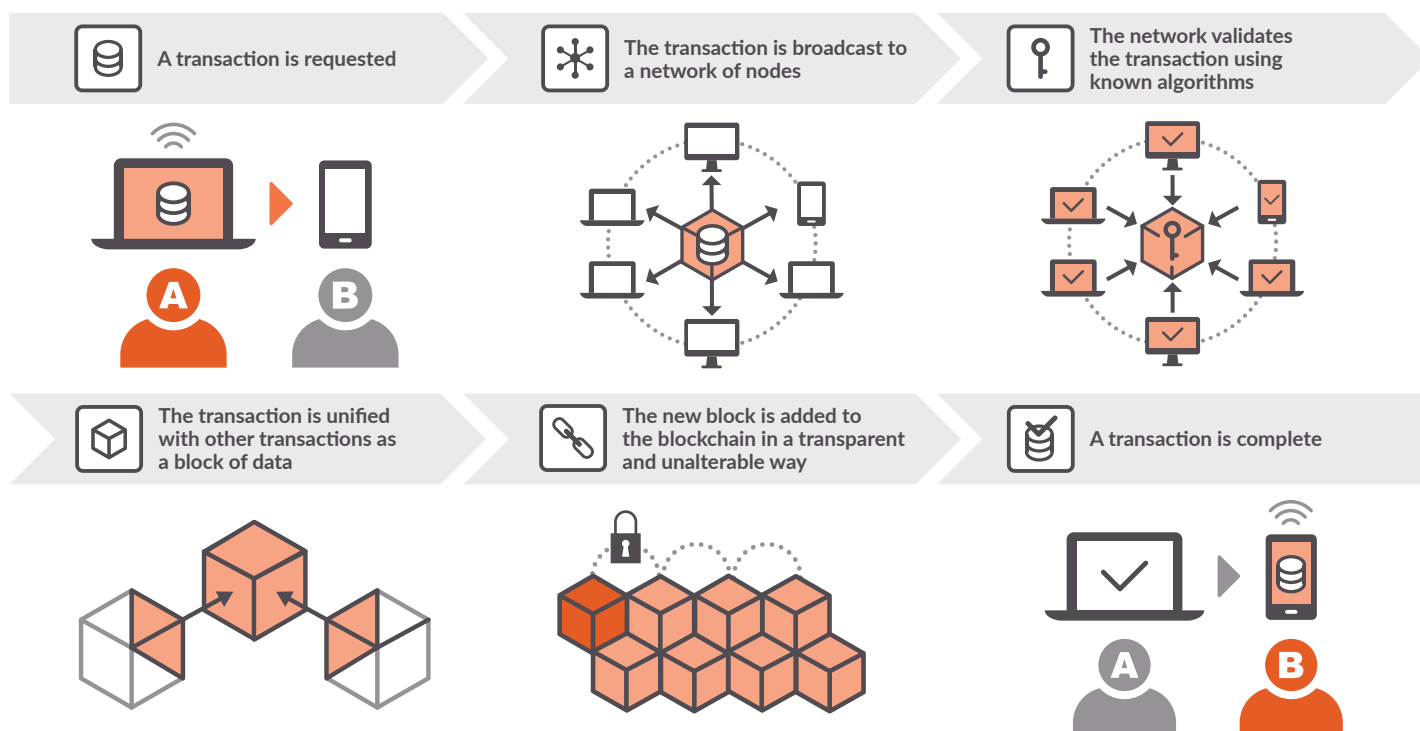
Trust machine

According to Kimmo Kaskikallio, Chief Technology Officer Finland and Nordics at multinational professional services company EY, blockchains thrive in an environment where there are many stakeholders with varied and, sometimes, conflicting needs, and where there is no trust – or at least some friction in collaboration. The technology, he says, has been referred to as the 'trust machine', so "can play a considerable role in reliable ESG reporting in the near future".

Nish Kotecha, Chairman and co-founder of blockchain technology firm Finboot, headquartered in the UK and with a base in Barcelona, agrees that blockchain has a role in ensuring ESG data is more transparent and robust.

"ESG goals risk becoming 'nice to have' rather than hard targets supported by data," he says. "Where possible, KPIs [key performance indicators] attached to each category need

How blockchain works



to be translated into quantitative – and, therefore, measurable – targets, which can be used to underpin further assessments. These metrics are dynamic and, as such, need to be recorded over time to ensure they are auditable, measurable and immutable.”

Ben Taylor, EY Global Strategy and Markets Lead within Climate Change and Sustainability Services, says blockchain inherently brings a level of provenance and traceability for quality professionals. “Companies really struggle to manage and control all of the various data sources and demonstrate how calculations are being applied to ultimately report a single ESG metric. This is especially true of emissions where calculations can be done locally (also to serve local reporting needs) using a variety of

calculation methods, and central teams lose sight of whether or not these have been done accurately.”

While carbon emissions are becoming more standardised, methane is another challenge, Taylor says. In addition, he identifies a lack of transparency for metrics on the social side: “Typically, metrics beyond diversity can be very bespoke – for example, societal impact of local community employment or community projects. Even on diversity data, which should be simple, sourcing the data is a huge challenge.”

Helping to address these issues, blockchain can become a single source of immutable data for quality

professionals that contains not only the source data, but also the calculations and audit trail. “This will make a full digital audit of ESG data feasible,” Taylor says.

This digital audit trail will be a key element of ESG both internally and externally. With ESG metrics becoming increasingly important for investment decision-making, Kotecha says enterprises should expect their ESG claims to be scrutinised by regulators, as well as by ever more socially and environmentally conscious consumers.

“All it takes is for one enterprise to raise the curtain and others will have to follow, or risk being left behind. The

“Blockchain will make a full digital audit of ESG data feasible”

What is blockchain?

Blockchain is a system of digitally recording transactions across many computers that makes it difficult or impossible to alter, hack or change the information retroactively. It is a type of distributed ledger technology – a digital ledger of transactions and/or numerous other types of auditable information that is duplicated and distributed across a decentralised database, which stores encrypted blocks of data that are chained together.

Each block in the blockchain contains a number of transactions, and each time a new transaction occurs, a record is added, with a timestamp. The blocks are linked together using cryptography, and each time a transaction occurs, a record is added to the participants' ledger. Each block contains information about the previous block, so is resistant to modification, because, once recorded, none can be altered retroactively without altering all subsequent blocks.

more forward-thinking companies will be ready long before they are forced to comply. Late compliance could risk the business model and will certainly damage a company's brand."

Achieving and verifying ESG goals requires disclosure and trusted data, Kotecha says. "Trust and transparency are the founding principles of blockchain. Combined with its immutable nature – as well as its ability to digitally represent assets moving along value and supply chains – this makes it the ideal technology for companies to use to track and verify ESG claims.

"Starting with one enterprise and then growing, blockchain could become the single source of truth of enterprise ESG practices. Blockchain's value grows exponentially as the size of the

network grows: the greater the number of parties in the network, the greater the collective value that can be derived from data sharing."

Supply chain integrity

One of the areas in which blockchain can potentially make a big difference is supply chain traceability and provenance. As Jonas Lundqvist, CEO at Swedish-based blockchain specialist firm Haidrun, explains: "The structure of blockchain ensures that each player along the value chain generates and securely shares data points with labels that clarify ownership, which is immutable, tamper-evident and auditable. For example, data entered on a blockchain ledger can eliminate the possibility of a non-organic ingredient later being reported in an organic product. Everyone with permission on the network can view this data, and any tampering or interference will be immediately visible. So, in a food supply chain, the record of a journey from farm to fork is available to monitor in

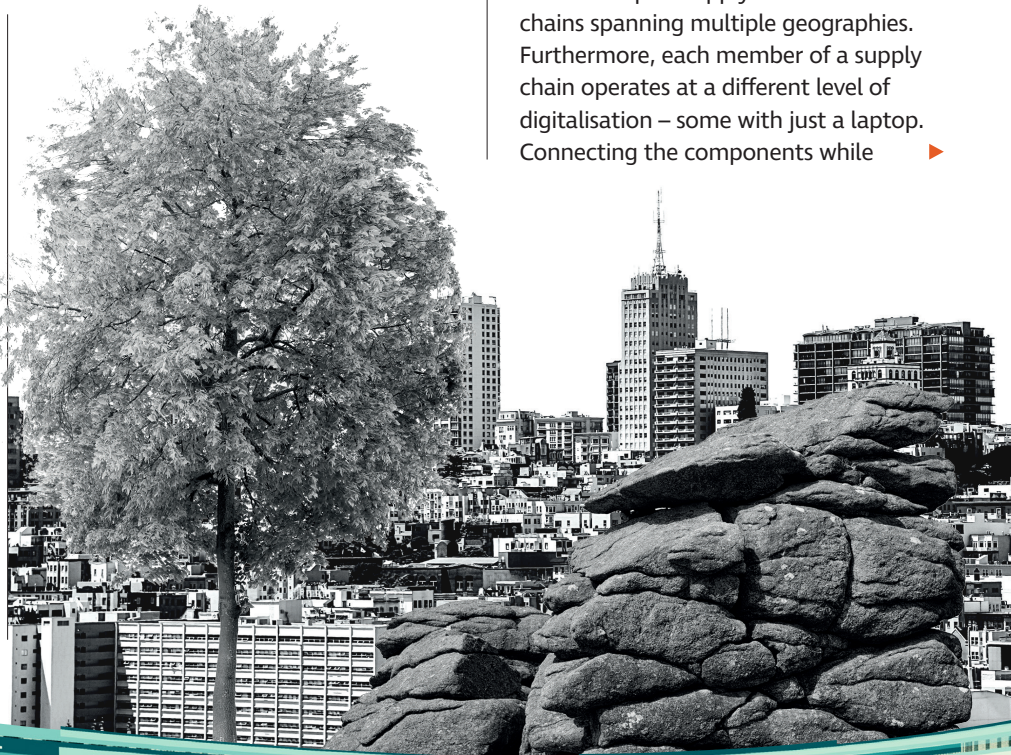


Jonas Lundqvist,
CEO of Haidrun.

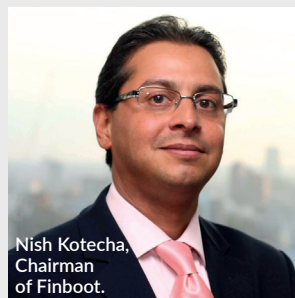
istock.com/Coldimages/RichVintage/MrVell

real time, while the disclosure of data provides accountability for trading transactions and farming practices to support claims such as organic, freshness and superior quality. The data can be independently audited, further assisting in supporting the overall governance of the products and the supply chain itself."

Kotecha, of Finboot, acknowledges the considerable challenges inherent in enterprise operations ensuring product traceability. "Most organisations operate within complex supply and value chains spanning multiple geographies. Furthermore, each member of a supply chain operates at a different level of digitalisation – some with just a laptop. Connecting the components while



How **blockchain** can be an end-to-end solution



Nish Kotecha,
Chairman
of Finboot.

Today's supply chains operate sequentially – each participant is responsible for collecting data from the prior step, processing it and sending it forward to the next participant, says Kotecha. We rely on each constituent to do their part and pass on information quickly and accurately, but, often, the data is never the same at the end as it is at the beginning. However, what if we could guarantee that this information is accurate, immutable and derived from one of the most trusted sources of data capture? How could supply chains be transformed

through the adoption of blockchain technology in times of crisis and of normality?

Most organisations are active in two supply chains, one physical (analogue) and one financial (digital). Both need to be measured, monitored and tracked, so that the data can be analysed and used to drive the next level of industrial automation. Enter blockchain.

A blockchain is simply a database that keeps track of things, but unlike a centralised database, it has two unique selling points: (a) it exists between the parties using the database and keeps a log of all interactions, while also keeping each party honest because no one party can make a universal change; and (b) each record of data is encrypted using a cryptographic algorithm that makes it virtually impossible for anyone to change – and the information is only visible to users with the right cryptographic key.

The impact of Covid-19 will force us to reconsider what we want from our supply chains, such as cost efficiencies, traceability and transparency. We also need them to withstand the next pandemic with a circle of trust, and not a sequential line with points that can fail.

preserving the integrity of the data requires blockchain."

He adds that the key to traceability is to implement a common data platform that can collect data in a secure, timestamped way from each participant in the supply chain. "There should be minimum investment requirements for any member to participate in a data-sharing platform, otherwise you bring barriers to entry," he says.

In the case of Finboot's Marco blockchain platform, Kotecha says all that is required to participate is a connected device such as a smartphone. "If these barriers are removed, then a data-sharing platform such as blockchain can be used throughout the chain using a connected device."

He concedes that end-to-end traceability is still "a journey", but while we may currently manage to cover half

of the operations, more and more of the supply chain can be mapped, traced and tracked as the cost of technology reduces and the use of sensors and other Internet of Things (IoT) devices increases.

Validation along the chain

In terms of ESG applications, blockchain can deliver transparency on the provenance of raw materials and other elements along the supply chain – from source to end use – and, with all transactions chained to each other using cryptography, create a tamper-proof record that exists and is visible between parties using the database. This could be used, for example, to authenticate the ethical sourcing of materials, such as rare earth metals widely used in electric vehicle batteries or electronic products such as smartphones – the supply of which,

from some markets, has been linked with ethical issues such as child labour, war crimes and human rights abuses.

As blockchain technology matures, says EY's Kaskikallio, more complex logic can be embedded into transactions and validated on chain. This could include sustainability data along the supply chain, which "can even be used as criteria for the automatic execution of transactions".

Kotecha points out quality assurance data from a product throughout its lifecycle could also be captured and recorded in a blockchain, ensuring transparency is maintained along the entire value chain – and possibly into a second life through reuse or materials recovery. Any form of quality assurance checklist data or automatic reading from a sensor, or sign-off from a tester, could be added to the blockchain 'data backbone', enabling any issues to be traced along the production process and identified more quickly and efficiently, saving time and resources.

Challenges

One of the challenges for the potential role of blockchain in ESG reporting is the lack of globally enforced reporting and compliance standards for ESG and other sustainability data. "Adoption is not the same across the areas of ESG. Quantitative data is more easily tracked and analysed – particularly with the increase of IoT, sensors and so on – while qualitative data can be stored but not easily analysed or compared," Kotecha explains.

"Currently, there is more data coming from the environmental category than social or governance, but this will change as standard KPIs are established, and a scorecard will drive what data is required and how often it needs to be collected."

Taylor, of EY, agrees that blockchains do have their limitations

and can only secure a component. “A good example is the carbon offsets markets – we could put the digital certificates of carbon credits and offsets into a blockchain, for example, with reforestation. This would mean that there could be no double-counting of carbon removal for the forests developed. However, upstream of this, you could need to verify that over time the carbon credits claimed matched the realities on the ground – are the trees maturing as planned, has there been destruction, either natural (such as wildfire or disease) or manmade (such as illegal logging). Technology can play a role here – such as space technology and geo-mapping, but these would be critical to making sure the digital blockchain-enabled certificate matched realities.”

Conclusion

While it may not be the all-encompassing answer on its own, the transparency and consistency of data generated via blockchain could help in the development of such frameworks and standards for ESG criteria that quality professionals are seeking to verify.

“Blockchain has an important role to play in corporate governance by ensuring that data being presented to a company board is the single source of truth,” says Kotecha. “This data is collected from the myriad systems and processes that control and manage company resources and activities. Upholding corporate accountability involves a variety of policies, processes and people to meet the expectations of a company’s shareholders, and other stakeholders, with integrity, responsibility and transparency.”

One issue often raised when discussing blockchains in the context of cryptocurrencies – and which is

particularly significant in the area of ESG – is their energy consumption. According to Lundqvist and Kotecha, however, this is largely associated with certain blockchain applications on a public blockchain ledger, such as bitcoin, where huge amounts of power are consumed by ‘miners’ working on the proof of work consensus protocol for the cryptocurrency and creating the next block for bitcoin chains.

“Private blockchains, on the other hand, are low-energy applications, designed for the enterprise, organisation or ecosystem to intrinsically create a single version of the truth in their transactions, processes and reporting,” maintains Lundqvist.

“Blockchain will play an important role in the intelligent value chain”

“The technology has evolved and new ways of implementing blockchain databases are requiring significantly less energy consumption,” agrees Kotecha. “When compared directly with the amount of duplication in our daily processes, checking data, calling, printing, resending documents, and so on, the energy consumption becomes competitive. Reducing energy consumption is a key objective for further innovations within the blockchain world.”

Lundqvist concludes: “Blockchain will play an important role in the intelligent value chain, and while technology and sustainability do not always go together, the rise of blockchain and demand for improving ESG reporting can change that.” ■

