

New Kid On The Block

Dentons' **Laura Mackett** and **Katy Carden** look at blockchain and the waste industry, saying it could potentially play a pivotal role in how we record and track the journey of products and wastes...

Blockchain is a decentralised, digital data storage and validation system. It is a distributed ledger technology (DLT) – that is, a distributed network of computers (nodes), where each node contains a chain of blocks and each block contains a list of transactions. Each transaction is unchangeable and linked to all previous transactions that have ever been made on the network. The relevant data is hosted on all devices in the network that access it, instead of on a central server.

The “transactions” in blockchain can involve cryptocurrency (blockchain already provides a ledger for cryptocurrency such as Bitcoin), contracts, records or other information. As Don & Alex Tapscott, authors of *Blockchain Revolution*, put it: “The blockchain... can be programmed to record not just financial transactions but virtually everything of value”, so the possible uses for this type of technology really are vast.

Advantages

FIRSTLY, BLOCKCHAIN is secure. Each input of information is protected by digital signatures and secondary verification of the transactions in each block ensure further security of the data.

As an unbroken chain of individual, time-stamped blocks,

it allows all parties in a supply chain to work from one shared, up-to-date set of records showing an item's journey. Real-time monitoring can take place. Buyers, sellers and third parties including regulators and banks can view the records where necessary (and where they have access). The immediacy and reliability of the records can promote confidence, which can be especially valuable in long supply chains where mutual reliance and trust is needed.

Blockchain can also deliver increased accuracy and efficiencies, removing risks of error from humans and analogue tracking systems as well as speeding up processes by saving manual input and checking time. These factors could potentially save cost, although this would clearly need to be balanced against the time and cost of setting up the system and getting people to use that system.

Uses

BLOCKCHAIN COULD theoretically be used for anything in the waste sector that requires or is improved by trust, accuracy, security, efficiency, data sharing and transparency, multi-party reliance or a real-time record of chains of events. It could potentially play a pivotal role in how we record and track the journey of products and wastes, as well as how certain aspects of regulatory compliance are assessed.

We are already seeing blockchain starting to be used in the waste industry. For example:

- We have seen a blockchain pilot scheme where a common tracking system was used to link up various parties in a waste transportation chain including recycling suppliers, port operators and shipping carriers.
- The French rail industry is using blockchain to improve its management of waste. A system developed by SNCF subsidiary Arep uses blockchain to collect information and optimise sorting. This drives efficiencies and cost savings. There is a block for each station bin and Bluetooth is used to provide continuous updates on amounts of different types of waste, who collected or moved these, and when the events took place.
- Plastic Bank, a global recycling venture aiming to reduce plastic waste in developing countries, rewards people who bring plastic waste to recycling centres with blockchain-secured digital tokens or cryptocurrency. This can then be used to purchase things such as food or phone-charging units using the Plastic Bank app. The recycled materials collected in this way can be sold to companies who value the social benefits delivered by the process and may pay a premium for this.

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Product Life Cycles

THE MOST obvious potential use for blockchain in the waste sector is as a digital trail to identify who owned or was responsible in some way for a product or waste at each stage of its life. Tracking the full life cycle in this way could be used to help identify and deter certain types of non-compliance. It could also underpin future extended producer responsibility legal regimes.

Individual consumer bins, waste collection vehicles, weighbridges and infrastructure (eg, waste sorting, processing and recycling facilities) could use blockchain to record weights of particular types and batches of material. Blockchain could also be used to record quality and contamination at different stages, to help identify the source of any physical changes or issues. Regulators could be given access to these records to streamline compliance checks.

QR codes could be stamped on product packaging to track the resulting waste and responsibility for this. In this model, each item could be recorded as a transaction on the blockchain and each transfer or change (eg, a sale, entry into a materials recovery facility, disposal into landfill, etc) could be recorded as a new transaction. It is not difficult to imagine a world where plastic bottles are washed onto beaches, picked up and their QR codes scanned on mobile phones to see the "transaction" history of the items – although this could raise some data protection concerns. Putting in place a legal regime for cross-border or international producer responsibility that responds to this type of pollution scenario would also be challenging.

Smart Contracts

ANOTHER OPPORTUNITY for blockchain to deliver benefits to the waste sector is through smart contracts which run on a custom built blockchain.

Smart contracts are designed to bring about a particular outcome every time a specific set of conditions is fulfilled. They are suitable for binary "if x, then y" type conditions – once a condition is met, the smart contract will take the next step necessary to execute the contract.

They have a lot of plus points. Once in place, a smart contract should require no ongoing management, monitor its own performance and create whatever audit trail is required. Smart contracts can provide security from

document loss or theft as they are encrypted, stored safely on a secure shared ledger and difficult to hack (if implemented correctly). They can also create efficiencies and cost savings from saving time usually spent manually processing, sending and transporting documents, as well as by eradicating the need in certain circumstances for a third party intermediary or facilitator,

notaries, agents and other advisors.

In practice, we are only at the start of the process of automating contractual relationships in this way and most smart contract systems are likely to require a fair amount of traditional legal drafting and other human intervention for some time to come.

Final Thoughts

IF BLOCKCHAIN is to be used as evidence or a means of transferring the ownership of or responsibility for products, wastes and other things that exist in the "real" world outside the blockchain, a supporting framework of law will be needed to mesh with the code. UK Parliament has created a cross-party working group to look at the impact of blockchain, and governments around the world are thinking through how blockchain and cryptocurrencies should be regulated. Areas for further consideration from a legal perspective include: ensuring third party intellectual property is not infringed and proprietary IP is protected; ensuring data protection requirements and confidentiality controls are met (including for blockchain applications that fall within the scope of the GDPR); and ensuring transparent pricing and dominant platforms do not inadvertently create competition law issues.

Industry-wide blockchain based systems would either require mass multi-party buy in or the imposition of law to force change, both of which feel a long way off. That said, we are starting to see smaller scale blockchain based solutions emerging. At this early stage, waste industry businesses will need to carefully consider any purchase of such solutions, to work out whether they will really deliver efficiency, cost-saving or other tangible advantages, and to work out what risk there is of regulatory change impacting the use and benefits of those solutions. ■