

- How is blockchain used in real estate industries and waste management?

## REAL ESTATE :

It's hard to identify a sector that hasn't been impacted by blockchain given the technology's disruption of financial services & subsequent widespread deployment across industries. From payments to stocks to venture capital firms to the food supply business, blockchain is everywhere. The real estate sector is also touched by it.

Here's how:

- Record Keeping: Blockchain technology can provide for property or land title management through immutable records and auditable transaction history for land registration & transfers. The technology can also be leveraged to provide efficiencies in property management through use of smart contracts. If and when implemented, it can vastly streamline and speed up the process of purchasing, enjoying the dividends & financial benefits of owning real estate assets across the world in fractional units.
- Fractional ownership: It is helping small retail investors own a part of dream properties. It will create a new business model of owning a part of real estate property that can be traded using blockchain-based tokens.
- Certification: Another use case that blockchain experts believe

could help in the growth of the real estate sector is issuance of No Objection Certificate (NOC) and other compliance certificates, which can be recorded through blockchain technology. This will automatically bring trust and transparency.

Blockchain and smart contracts can potentially transform paper-driven and offline commercial real estate transactions, such as sales, leases, financing, etc. Distributed ledger technology has broader application in smart city ecosystems such as smart parking and enables smart decision-making in city management by offering real-time insights.

**② Platforms & Marketplace for Traders:** A report by global community for blockchain leaders Enterprise Ethereum Alliance, named Real Estate Use Cases for Blockchain Technology, which was released in 2019, said that asset management investors are constantly looking for ways to increase or preserve liquidity options, allowing them to improve positions and management risk.

The report also adds that, A pension fund, for example, might own several large commercial buildings in one city but might want to expand into another city either as part of a diversification or portfolio expansion strategy. They might not, however, have the desire to buy an entire building or an investment bank. Instead, they might want to buy a smaller securitized portion of a property.

■ Blockchain can help tokenise real estate and exchanges like cryptocurrencies, thanks to the inclusion of smart contracts in blockchain platforms. In the first place, real estate tokenisation creates alternative ways for financial projects, while enabling the transfer of assets in a transparent and trusted manner.

- ① Blockchain in real estate can help with product & proven tracking and thus enhance the transparency in supply chain. If applied to real estate, the technology could help track how building materials are produced, used and recycled. It will be much easier to check how green a building really is by simply tracing building materials back to their origin.
- ② Blockchain also allows for a single digital identity to access multiple data platforms while protecting data against breaches and falsification. Furthermore, using a blockchain-based ledger means no dependence on physical documents and registers.
- ③ In the real estate industry, a blockchain-based management system could be used to solve problems such as data inaccessibility, data insecurity and data fraud. Stakeholders can be assigned role-based access to real estate information and evidence of all data transactions will be securely kept on the blockchain.
- ④ Using blockchain in real estate means that we can track and measure the digital footprint of each building. Better data will lead to more conscientious and climate-friendly decisions.

Additionally, for real estate developers and investors, there is a lack of data regarding how buildings are operated and maintained and reliable data about capital market conditions and sources of financing.

Deploying a blockchain-based data management system can be a win-win when we need to ensure that —

- (1) data is securely stored and protected against fraud;
- (2) historical data is easily available for each property; and
- (3) data is accessed based on roles and permissions.

Using a trusted decentralised ledger to record data of all properties can potentially help investors in a few of the ways:

- ∅ Increase confidence in decision-making
- ∅ Manage the risks related to regulatory fines
- ∅ Improve data security
- ∅ Optimize team effectiveness
- ∅ Monitor process performance

## WASTE MANAGEMENT:

Such a permanent and trusted data ledger like Blockchain's may be useful within the waste management sector for a number of reasons. At their core, blockchains are particularly adept at enabling and tracking transactions — such as transfers of digital assets or value, or transactions involving physical objects with digital identifiers, for example via QR codes or RFID tags — thereby providing provenance and facilitating the initiation of smart contracts.

The provided provenance enables auditing to identify wrongdoing and impose penalties (e.g. to track whether toxic waste has been lawfully disposed of) and corroboration to resolve disputes between users (e.g. where companies disagree about a waste transaction).

Smart contracts can be used to automate penalization and avoid disputes in the first place. These benefits of blockchain facilitate the trustworthiness of users and provide users and their incentives to act honestly in their transactions & recording of events.

Within the context of waste management, current applications of blockchain typically focus on — (1) payment or rewards facilitation; or (2) monitoring and tracking of waste.

In the first case, an entity depositing waste is rewarded or paid with a blockchain secured digital token, which can be redeemed for goods or exchanged for other currencies. The Plastic Bank uses such blockchain rewards to incentivize individuals to become plastic waste collectors, particularly in developing countries, with an aim of reducing the amount of plastic that ends up in the ocean. The gathered waste is brought to collection locations where the waste is weighed, before making a payment to the collector, through a blockchain-based banking application. The immutability and transparency of blockchain prevent fraudulent and corrupt practices. The cheating of waste is often performed by a human, but could be automated in some cases.

In the second case, data on the type of wastes collected & waste transfers is recorded on the blockchain. Arep, a subsidiary of SCNF, used blockchain technology to monitor the amount, type, and frequency of waste collected in train station waste bins in order to optimize the waste collection. SCNF recorded the waste data and transfers in blockchain transactions using the digital identities of bins on train platforms. The incentive for this was financial; there was insufficient data to produce precise invoices from the waste collector, so there was a risk that the station was being overcharged, which could be overcome using blockchain and the bin sensors.

In the long term, it was hoped that there would be environmental benefits by using the data to inform the introduction of more separation of waste. This application has been discontinued as waste management was not a priority for the station management. Initiatives with similar intentions of collecting waste type and amount data in order to inform more effective and effective waste management are being developed.

② Incentivization: The existence of a database containing waste ownership and provenance information can be used to incentivize sustainable waste management. First, it is possible for auditors to analyse the data to identify organizations and individuals that are not practicing sustainable waste management. Fines can be given to those that are non-compliant with laws, or advice given to those that have the potential to improve.

Second, the existence of the database can act as an incentive mechanism in and of itself, especially if the data or reports generated from it are publicly accessible. In particular, organizations may fear reputational damage if they are found to have poor waste management — though there are questions regarding the strength of reputational penalties in relation to "irresponsible behaviour" (in this case, unsustainable waste management).

As well as being an incentive for improving waste management, in particular for the current holder, potential recipients may be discouraged due to the extra administration, including validating the blockchain transaction.