Blockchain in Construction Industry

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Genesis Convergence is Subject Matter Expert in Blockchain and Cryptocurrency.

We offer Crypto Development/Consulting services covering solution architecture refinement, customization, integration, transformation, visualization, and analytics to uncover insights hidden within data and enhance data exploration.

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OBJECTIVE

The construction industry has frequently been mentioned as one of the world's most fragmented, high-impact sectors and has regularly been challenged to improve its efficiency, and productivity, and seize the opportunities presented by emerging technologies.

By decentralizing history, tracking constructors, and refining payment options, blockchain is becoming a valuable tool for the construction industry, transforming the industry worldwide.

BLOCKCHAIN – BUILDING BLOCKS FOR A BETTER WORLD

In simple terms, a blockchain is a peer-to-peer distributed ledger that stores information and keeps track of transactions.

- Each member of the blockchain community has its own copy of the information.
- The information is recorded subsequently into units called blocks and protected by strong cryptography, creating a chain of data.
- Changes to blocks are not permitted by the blockchain system architecture, so every action and event could be traced to its origins.
- A blockchain could store data on agreements between the parties, their credentials, transactions, and any other information presented in a digital form.
- Since this information is distributed and highly secured, any attempt at a fraudulent activity can be seen by the members of the blockchain community.
- This creates trust and transparency for any type of ecosystem that the blockchain is integrated into.

Blockchain in Action

Blockchain is a platform that ensures the integrity of the information stored and maintains interactions between the members of the ecosystem. Here's a high-level overview of the way it works:

- Each member maintains their own blockchain node with the full history of all the events and data appended to the network, including credentials, identities, certificates, etc.

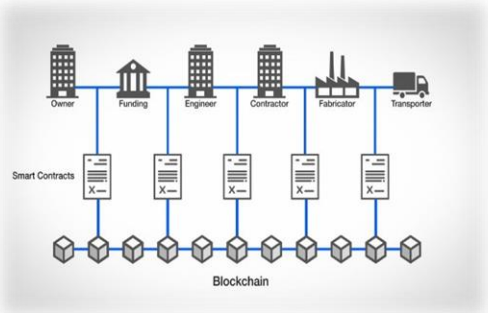
- Every update to the network entails the creation of a new block at the end of the chain. A blockchain protocol dictates how these blocks are recorded, validated, and distributed.
- A consensus mechanism is employed to verify each created block where members of the blockchain network decide if it's valid to be added to the chain.
- Once a block is created and confirmed, it cannot be revoked. All entries on the blockchain are permanent and securely stored. This allows for members of the community to trace the full history of transactions and any other modifications in the7i blockchain.

- Smart contracts are a special type of agreement between the members of the network that have the conditions programmed into them, making sure that they are met before each party receives what was agreed upon. Smart contracts eliminate the need for third parties and middlemen to be involved in agreement resolution.
- Transactions in cryptocurrency play a very important part in the blockchain ecosystem, providing the incentive for all members of the community to make valuable contributions and participate in the development of the system as a whole.

These key pillars of blockchain technology lay the foundation for its uses throughout different industries, including in education. It has the potential to create a global environment where learning materials, publications, student credits, and transcripts are easily accessible. It can also introduce new and innovative ways for accountability, incentivization, and communication between teachers, students, and other participants.

BLOCKCHAIN EMPOWERING THE CONSTRUCTION INDUSTRY

- The Institution of Civil Engineers Institute/association Website Blockchain technology in the construction industry Blockchain technology has arrived, offering immense opportunity for the industry to become more effective, transparent, productive, and sustainable.
- The construction industry has regularly been cited as one of the world's most fragmented, high-impact sectors and has regularly been challenged to improve its efficiency, and productivity, and embrace the opportunities presented by emerging technologies.
- While blockchain has implications for many industries, in the construction industry, it streamlines project management. It's not uncommon for construction projects to encounter snags.



- Communication between builders, vendors, and laborers can delay completion timelines.
- Blockchain adoption is a trend that will help the construction industry become more efficient overall.

BLOCKCHAIN MEANS A MORE EFFICIENT CONSTRUCTION INDUSTRY

Construction is a general term meaning the art and science to form objects, systems, or organizations. Construction is an industry that includes the erection, maintenance, and repair of buildings and other immobile structures, and the building of roads and service facilities that become integral parts of structures and are essential to their use. In its most widely used context, construction covers the processes involved in delivering buildings, infrastructure and industrial facilities, and associated activities through to the end of their life. Construction includes structural additions and alterations but excludes the building of mobile structures such as trailers and ships. It typically starts with planning, financing, design, execution, builds, and also covers repairs and maintenance, and improvement work.

BLOCKCHAIN IN THE CONSTRUCTION INDUSTRY – USE CASES

Blockchain construction industry use cases are being discovered by the day, and with them, the entire construction system can be completely overhauled. Many constructions and blockchain companies are currently working on or have already released blockchain-based systems to improve construction for both professionals and customers. By decentralizing history, tracking builders, and improving payment options, blockchain is becoming a valuable tool for the construction industry, revolutionizing the industry worldwide.

Following Use Cases, we Study here:

- Predictive asset maintenance
- Smart contracts that stay on track
- Proactive third-party oversight
- Accelerated payment processing
- Instantaneous collaboration
- Streamlined supply chains

Predictive Asset Maintenance

- Leading construction solutions and services firm Aon estimates that 95% of information about a construction project is lost in the transition to the completed project’s first owner.
- The distributed ledger in blockchain can store lifecycle information about every asset in a building project, like warranties, certifications, and replacements.
- Using Building Information Management (BIM) technology, an immutable, digital replica of the construction project is set up within the blockchain.
- This acts as a model to ensure the project is within scope, but also as a virtual home for assets so they can be easily searched and quantified.
- Monitoring an individual asset’s lifecycle and scheduling maintenance become automated processes, especially if equipped with artificial intelligence.

Smart contracts that stay on track

- Smart contracts infuse blockchain technology into traditional, written agreements.
- Because data is decentralized and readily available throughout the network, the need for document duplication is eliminated.
- All contracts live in the blockchain and are accessible with a simple search.
- The sequential nature of a blockchain setup holds contractors accountable by requiring a project to meet specifications, or else the contract is unfulfilled. Change orders and delays are immediately traceable to a point of origin, eliminating the need for time-consuming oversight.

Proactive Third-Party Oversight

- Dozens of subcontractors are hired to complete tasks, additional oversight is needed to ensure a complex project will adhere to local standards and regulations.
- This might be legal consultation to comply with government regulations, safety management to monitor worksite processes, or union representation to advocate for site workers.
- For projects that adopt blockchain technology, these third parties can be seamlessly integrated into project oversight.
- They have access to crucial documents from the moment they're included in the blockchain, reducing time wasted in submitting information requests.

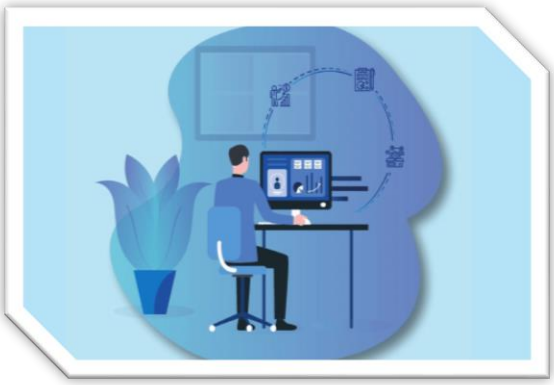
Accelerated Payment Processing

- Processing payments via blockchain is free in most cases.
- No authorization or processing fees mean faster payments and less back-and-forth.
- Blockchain's strict boundaries, enforced with smart contracts, ensure payment is received for work that's done according to the project framework.
- Smart contracts work on milestones, so when each milestone is achieved, payments will automatically proceed.
- The blockchain framework ensures that work is completed to specifications, and the hassle of authorizing or collecting payment is nonexistent.

- Payment automation reduces overhead and cost overrun, keeping all parties happy.

Instantaneous Collaboration

- We've established that all eyes have access to the entire blockchain in enabled projects.
- While this boosts transparency, it also fosters an environment of open collaboration where parties make recommendations to improve an aspect of the project.
- The specific benefit of blockchain is that it encourages round-the-clock input from all involved parties—no waiting for meetings or phone calls to discuss ideas.



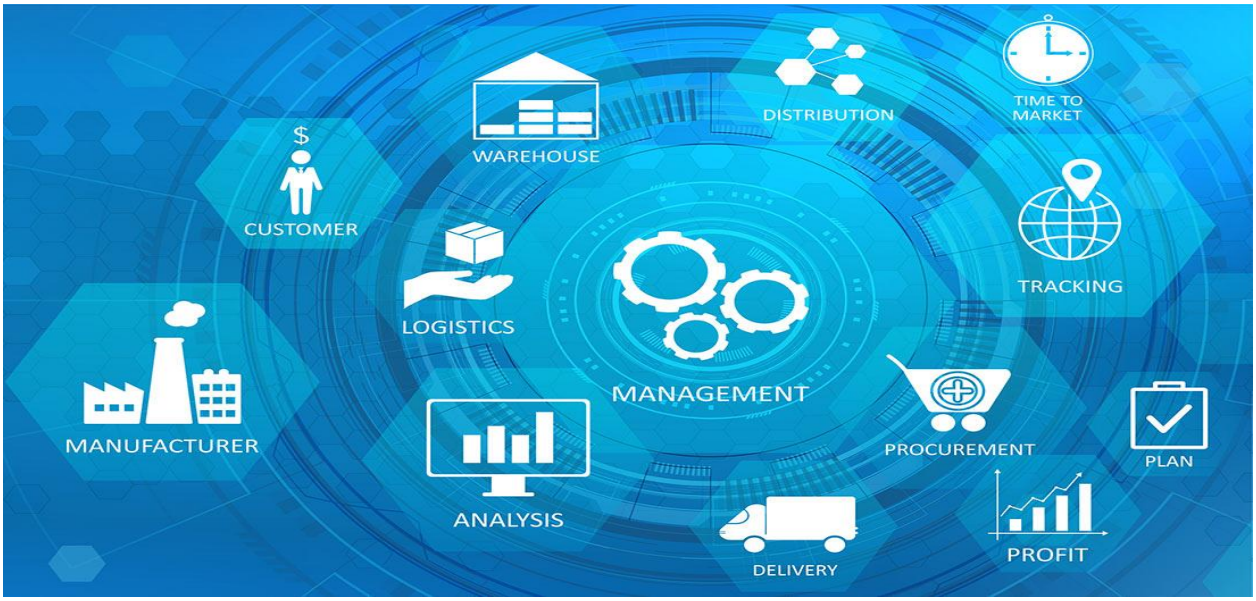
- Smart contracts restrict projects from modifications that might derail them.
- They don't eliminate the opportunity for change, however — they just ensure that changes are properly vetted and implemented.

- When all parties including subcontractors have access to project plans, efficiency-boosting changes are welcome from any source.

Streamlined Supply Chains

- Procurement can become especially tedious when dealing with complex projects like airports or hospitals.
- Inviting suppliers into a decentralized blockchain network allows project managers to track materials throughout the entire project, and even ensure the efficient utilization of those materials.
- The blockchain would also incorporate construction equipment to manage rental timelines or depreciation costs.

- Digital keys function as unique IDs for one party in a blockchain network.
- In construction, assigning keys to vendors would allow their work to be tracked through the blockchain.
- This would create a permanent work portfolio that could be used to appraise vendors for projects.



BLOCKCHAIN TRANSFORMING THE FUTURE CONSTRUCTION PROJECTS

- Blockchain's possible benefits to the construction industry as a whole are exciting.

- Australia is home to many of the world's leading blockchain construction projects, thanks to a National Blockchain Roadmap implemented in February 2020 that highlights present blockchain success and opportunities for implementation within different sectors.
- Australia's National Blockchain Roadmap Steering Committee, responsible for oversight of the implementation plan, estimates that the global market for blockchain construction projects will be near USD$200 billion by 2025.
- However, blockchain's impending takeover raises some important challenges that will slow implementation.

COMPANIES LEADING IN CONSTRUCTION BLOCKCHAIN TECHNOLOGY

Currently, no construction company using blockchain technology, but different supply chains and real estate companies are using blockchain technology. Some of them elaborate below.

De Beers

DE Beers is one of the companies using blockchain in the supply chain.

- To Help regulate their supply chain management system, they came up with a blockchain platform called **Tracr**.
- More so, on this platform, you can track any size of diamonds from the mining site to the retail store.
- It's actually a great way to prove that the diamonds coming from DeBeers are 100% real.

Unilever

Unilever is also one of the companies that use blockchain in their supply chain list. In reality, Unilever is currently using tech to manage its tea industry.

- With the help of technology, they will track all of their transactions in the supply chain.
- More so, they can also track the suppliers to maintain the quality every step of the way.

Walmart

Walmart has been a blockchain enthusiast for a very long time. In reality, the company is using IBM's supply chain technology – the Hyperledger Fabric platform to back up its supply chain process.

- Moreover, they also plan to track their foods right from their farmers and offer their customers to check the provenance before they buy an item.

Ford

Ford is another popular company that is using unique technology. In reality, IBM is working with them, and together they plan to track its raw materials like cobalt from the suppliers.

- They want to make sure that they are getting an authentic product to maintain their quality.
- As soon the cobalt is mined, it will get on the ledger, and Ford can track where it's going from there.

Brookfield Asset Management

Brookfield Asset Management is one of the very well-known companies in the world. It is one of the big companies using blockchain technology.

- In reality, they have more interest in blockchain and plan to integrate it as a part of their systems.
- Using the tech, they plan to reduce transaction costs and automate contacts.

JLL

JLL is another one of the big companies using blockchain technology.

- They are currently using it in Spanish commercial real estate valuation.
- According to them, they can use this tool in the construction and financing of the real estate sector and even sell and rent properties.
- Mainly the initiative came from JLL Japan.

Coldwell Banker

Another one of the big company using blockchain technology is Coldwell Banker.

- At present, they are an active client of the company Propy.
- Coldwell is using the platform to list sellers and agents, along with offering transactions as well.
- More so, with this platform, they can secure all their transactions and contracts without any issues.

CONCLUSION

Blockchain can improve construction efficiency, reduce paper-based manual operation and address fragmentation and communication issues. However, the development of Blockchain in the construction industry is still impeded by some challenges. Traditional work modes might be existing even though Blockchain-enabled systems are introduced, which may increase the workload of construction practitioners. Thus, a feasible and practical development roadmap is proposed to instruct the implementation of Blockchain in construction.