



Toward Blockchain-enabled Construction Supply Chains: Potential, Requirements and Implementation

Benefits to public and private clients, housing associates, councils, procurement, tendering and contract managers, project managers, developers and investors, higher and lower tier contractors.

“Simply going digital is not helpful. Trust is an issue (in the AEC industry). It (Blockchain) might make some companies go digital due to increased trust.”

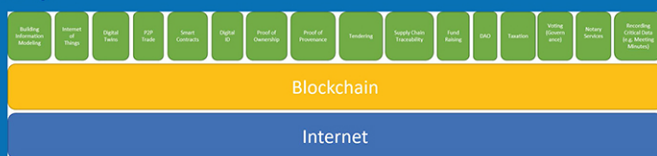
– Senior Consultant, AEC Industry

Impact and value:

- Identifying various Blockchain opportunities, risks/barriers and key implementation parameters for AEC supply chains
- Creating three working mock models for Blockchain-based tendering, payment, and fundraising for projects and assets.
- Collecting feedback for the implementation of the models from industry actors, Blockchain developers and academics
- Raising awareness of the subject among and collecting feedback from practitioners through a workshop.

Key Findings

- Blockchain will increase trust, transparency and inclusiveness in the industry.



- The need for trust will not disappear with Blockchain but shift focus to correct data inputting.
- The conventional multi-party transactions can be streamlined with Blockchain to save time and costs.
- There are many challenges; lack of knowledge and awareness, legal and contractual frameworks, not streamlining internal processes with Blockchain etc.
- Three Blockchain based models on payments, tendering and fundraising were developed, coded and deployed online:



- The models were generally found of high value. However, there are also issues like changing the payment/money control culture in the industry, streamlining internal processes for the models, compliance with regulations and standard contracts etc.
- The workshop attendees expect more research on real-use cases, increasing knowledge of Blockchain, identifying critical project information to be Blockchain etc.

Summary:

The project investigated the value and implementation parameters for Blockchain in AEC supply chains. After a detailed literature review on the use of Blockchain in different industries, 33 interviews were conducted with subject experts. A large list of Blockchain application opportunities as well as critical points for the implementation and different actors' (e.g. government, clients etc.) roles were identified for the AEC industry. Of the identified application opportunities, three Blockchain based models on Project Bank Accounts/payments (<https://contract-eth.herokuapp.com/>), reverse auction (<https://auction-eth.herokuapp.com/>) and asset tokenization (<https://token-eth.herokuapp.com/>) were developed, coded and deployed online for demonstration and industry engagement purposes. The models were validated through three focus group studies conducted with contractors, clients, Blockchain developers and academics. Finally, an industry/research workshop was held on the subject with 28 participants in June 2019 to demonstrate and validate the findings, and to raise awareness of the subject.



Next Steps:

- Integrating the feedback from the focus groups and workshop into the models
- Implementing the developed models in real project(s) creating the use case.
- Conducting implementation work or case study on BIM/Blockchain integration.

Long-term Vision:

- Linking the models with digital passports (ID) on Blockchain
- Identification of macro and micro-level requirements for the penetration of Blockchain in the AEC industry
- Identification of key project or asset information/document types to be Blockchain over project life-cycle.
- Understanding the change requirements for Blockchain in the current procurement systems and standard contracts
- Investigating the potential for Decentralised Autonomous Organisations (DAO) in the AEC industry



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