

Development of Blockchain-Based Smart Contract and BIM in Construction Project to Overcome Delay or Failure in Payment

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Abstract

Delays or failures from service users in making payments will greatly affect service providers. Frequently, this incident causes many construction service business entities to go bankrupt due to financial disruption to the business entity. A contractual agreement between the parties regulates the payment system between service users and providers. However, the contract does not reduce the risk of delay or failure of payment. Problems often occur due to the lack of competence in human resources at the management level. Management who should play an important role in the project often fails to carry out their duties. The next problem arises from service users who do not want to pay service providers after the work is completed. Therefore, this research tries to find a solution by improving the payment system with an automated and transparent procedure so that all parties can monitor the process. This system will be built using a smart contract built on the blockchain's (Ethereum) platform and integrated with BIM (Building Information Modeling) data models and CDE (Common Data Environment) with its review and approval system. With this automation system, the payment duration can be accelerated to maintain the financial capabilities of all stakeholders.

Keywords

Smart Contract, BIM, Blockchain, Ethereum, Project Management

Biography

Rangga Taruna Atmaja is magister student in Project Management, University of Indonesia. He first studied Civil Engineering at University Parahyangan Bandung in 2008. His research studies are based on BIM implementation in construction project. His recent studies are focusing in applying BIM platform into automation.

Prof. Mohammed Ali Berawi is a professor in the department of civil engineering, faculty of engineering, Universitas Indonesia and has extensive research experience in value engineering/value management and innovation in the context

of infrastructure, construction, and manufacturing industries. Before joining the Faculty of Engineering at the University of Indonesia in 2008, Prof. Berawi was appointed senior lecturer at the Faculty of the Built Environment and Director of the Value Management Centre at the University of Malaya (2006-2008) and a lecturer in the School of Technology at Oxford Brookes University in the United Kingdom (2003-2006). He was a scholar in the Department of Civil Engineering and Environment, University of Washington, USA (2017), and since 2019, Prof. Berawi has been appointed as Professor in the Graduate School of Industrial Economics, Peter the Great St. Petersburg Polytechnic University, Russia. Prof. Berawi's work on value engineering/value management, knowledge and quality management, engineering design, and innovation has led to various publications in books, international journals, conferences, and consultancy proceedings. He currently serves as Executive Director of the Center for Sustainable Infrastructure Development (CSID) Universitas Indonesia, and Director of ASEAN University Network for Sustainable City and Urban Development (AUN-SCUD).

Mustika Sari is a senior researcher at Center for Sustainable Infrastructure Development (CSID) Universitas Indonesia. She is a Ph.D student in civil engineering, Universitas Indonesia and is focusing in construction technology, smart cities, project management, and infrastructure development.