SMART CONTRACT IN MALAYSIA CONSTRUCTION INDUSTRY

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ABSTRACT

The construction industry plays a vital role in supporting Malaysian economic and social growth. However, because of its unique characteristic, the construction industry is more prone to payment disputes than other industries. CIPAA was introduced to facilitate payment disputes among parties. However, without the root solution, payment disputes will continue to arise. Today, there are new technology available in the construction industry to improve work efficiency, such as building information modeling (BIM), drone technology, Industrial Building systems (IBS), and etc. for the construction contract, the new technology available is smart contracts. Smart contracts are a contract that has been coded into computer language as software using the blockchain platform, thus reducing time and cost when performing transactions. Smart contracts have all the blockchain advantages such as data storage and record tracking, trust, and no intermediaries. All information is stored in batches and linked together chronologically in a continuous line, decentralized, and distributed across network computers (the contractual parties). Hence, contractual parties can track information quickly, and the data tampering can be reduced since all parties have the same real-time information. This paper aims to determine smart contracts' transactions in reducing payment disputes and determine the challenges in implementing smart contracts adoption in the Malaysia construction industry. Different types of research methodology are used to achieve both objectives. For the first objective, the study papers were collected, and key points are filtered out to understand the smart contracts' transaction, leading to the creation of theories from various resources on blockchain technology and smart contracts transactions. For the second objective, data was collected through a questionnaire distributed to the selected respondents. The first objective shows that smart contracts' transaction can reduce the factors contribute to payment disputes; hence reducing payment disputes. The second objective shows the expected challenges in implementing smart contracts in the Malaysia construction industry, such as lack of ICT infrastructures, smart contracts drafting, lack of knowledge, etc. In conclusion, there are possible solutions for payment disputes despite the challenges in implementing smart contracts in the Malaysia construction industry.

ABSTRAK

Industri pembinaan memainkan peranan penting dalam menyokong pertumbuhan ekonomi dan sosial di Malaysia. Namun, kerana sifatnya yang unik, industri pembinaan lebih rentan terhadap pertikaian pembayaran daripada industri lain. CIPAA diperkenalkan untuk memudahkan pertikaian pembayaran antara pihak. Namun, tanpa jalan penyelesaian, kes pertikaian pembayaran akan terus meningkat. Teknologi baru telah dibangunkan dalam industri pembinaan untuk meningkatkan kecekapan kerja, seperti pemodelan maklumat bangunan (BIM), teknologi drone, sistem Bangunan Industri (IBS), dan lain-lain. Untuk kontrak pembinaan, teknologi baru yang tersedia adalah smart kontrak. Smart kontrak adalah kontrak yang telah dikodkan ke dalam bahasa komputer sebagai perisian menggunakan platform blockchain, sehingga dapat mengurangkan masa dan kos ketika melakukan transaksi. Smart kontrak mempunyai semua kelebihan blockchain seperti penyimpanan data dan penjejakan rekod, kepercayaan, dan tidak ada perantara. Semua maklumat disimpan secara berkumpulan dan dihubungkan secara kronologi secara berterusan, terdesentralisasi, dan diedarkan kepada semua pihak di dalam rangkaian komputer (pihak kontrak). Oleh itu, pihak berkontrak dapat mengesan maklumat dengan cepat, dan gangguan data dapat dikurangkan kerana semua pihak mempunyai maklumat masa nyata yang sama. Kajian ini bertujuan untuk menentukan transaksi smart kontrak dalam mengurangkan pertikaian pembayaran dan menentukan cabaran dalam melaksanakan penggunaan smart kontrak di dalam industri pembinaan Malaysia. Berbagai jenis metodologi penyelidikan digunakan untuk mencapai kedua-dua objektif tersebut. Untuk tujuan pertama, hasil kajian dan laporan dikumpulkan dari pelbagai sumber mengenai blockchain dan smart kontrak., Subjek utama perbincangan disaring untuk memahami transaksi smart kontrak dalam menghasilkan teori. Untuk objektif kedua, data dikumpulkan melalui borang soal selidik yang diedarkan kepada responden yang dipilih. Objektif pertama menunjukkan bahawa transaksi smart kontrak dapat mengurangkan faktor yang menyumbang kepada pertikaian pembayaran. Objektif kedua menunjukkan cabaran dalam melaksanakan smart kontrak dalam industri pembinaan Malaysia, seperti kekurangan infrastruktur ICT, penggubalan kontrak pintar, kurangnya pengetahuan, dll. Sebagai kesimpulan, ada kemungkinan penyelesaian untuk pertikaian pembayaran walaupun terdapat cabaran dalam pelaksanaan pintar kontrak dalam industri pembinaan Malaysia.

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ICT	Information and Communication Technology
BIM	Building Information Modeling
CIPAA	Construction Industry Payment Adjudication Act
AIAC	Asian International Arbitration Centre
PAM	Pertubuhan Arkitek Malaysia
PWD	Public Work Department
CIDB	Construction Industry Development Board
QS	Quantity Surveyor
BQ	Bill of Quantities
UTM	University Teknologi Malaysia
MCO	Movement Control Order
SPSS	Statistical Package for the Social Sciences
SO	Superintending Officer
IBS	Industrialized building systems

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CHAPTER 1

INTRODUCTION

1.1 Problem Background

Asian International Arbitration Centre (AIAC) has interpreted the construction works as various activities that involved construction, extension, installation, repair, maintenance, renewal, removal, renovation, alteration, dismantling, or demolition of any building or structure, infrastructure, mechanical and electrical works, or civil engineering works. Because of the variety of works involved, the construction industry plays a vital role in supporting Malaysian economic and social growth.

The construction industry has a unique characteristic, such as the complexity of the construction process, and involves multiple parties with various disciplines and skills. A typical construction project requires a different process, tools, plants and machinery, materials, and contracting parties. Therefore, with the complexity, the construction industry is more prone to dispute compare to other industries.

Hussin, Ismail, & Ehsan (2013) have summarized the categories of disputes available in the construction industry: owner/client-related, contractor-related, consultant/design-related, contractual matters, project related, human behavior-related, and external factors. The most common dispute in the construction industry is related to payment which usually involves the combination of the said categories.

Many construction projects in Malaysia are facing payment disputes. Every year, AIAC recorded an increasing number of payment disputes under the CIPAA. It is either Client refused to pay or late in payment. Payment issues can have a domino effect on the entire project; if the contractors do not have enough finances to run the project, they might stop the work or minimize the work activities on site, which sometimes resulted in the contract's termination.

Many factors contribute to the payment disputes. Until the factors are reduced or eliminated, the payment dispute will keep on arising. The industry should take the initiative to find solutions to this matter for the benefit of the stakeholders. Without the proper solutions, the case will continue to arise as per Table 1-1 below:.

Table 1-1: CIPAA Statistic Registered and unregistered matters by fiscal year (16th April to 15th April)

Fiscal Year	Registered Case	Unregistered Case	Total Claim (RM)
2015 - 2016	207	19	184,653,815.93
2016 - 2017	547	15	224,186,788.29
2017 - 2018 (as of 15/4/2018)	765	14	99,692,535.49

Source: AIAC

1.2 Problem Statement

There are many factors that contribute to payment disputes. Most of the factors are caused by the traditional method of interim claim transactions. Indirectly, the manual transaction of interim claim procedure and payment transaction can cause payment disputes because the employers have controls to the transaction. Such powers are easy to abuse and manipulate. The traditional interim claim method has been practiced in the Malaysia construction industry for centuries with minimal changes. Every month, the Contractor has to face the long process of claim preparation from claim submission to valuation, issuance of certificates, and received of payment. In some projects, the Contractors have to chase the consultants and the Client for the interim certificate and payment.

The Malaysia construction industry has benefited a lot from the technology adopted with the new Construction Industry 4.0 Technology Policy. There are new technology in the construction industry that provides efficiency in project management, such as building information modeling (BIM), drone technology, industrialized building systems (IBS), and green building construction (Chee Fui, 2020). The new application available is smart contracts that can provide possible solutions in reducing payment disputes for the construction contract.

Smart contracts are a contract that has been coded into computer language as software using the blockchain platform. Smart contracts will be enforced automatically when the condition of the contract is satisfied according to the embedded contractual clauses. Smart contracts provide significant advantages, such as improving the efficiency of work by reducing the dependency on the intermediary. The financial transactions for the monthly interim claim will automatically take place once the predefined conditions are met. Therefore, it will cut down the administrative time and cost. Due to the blockchain's immutability, smart contracts cannot be modified or altered once it has been issued. In addition, the decentralized data stored using the blockchain platform provides transparency, and the transactions are traceable.

In light of the discussion above, this research will explore how smart contracts transaction possibilities in reducing payment disputes.

1.3 Research Question

To achieve the research objectives, few research questions need to answer:

(a) How can smart contract minimizes or resolves contract disputes in the construction industry?

(b) Are there any challenges in adopting smart contracts in the Malaysia construction industry?

1.4 Research Objectives

The research aim is to study the possibility of implementing smart contracts in the Malaysia construction industry. Hence, there are two objectives:

(a) To determine smart contracts′ transactions in reducing payment disputes.

(b) To determine the challenges in implementing smart contracts adoption in the Malaysia construction industry.

1.5 Research Scope

This study will be focused on exploring the general perspective of blockchain technology and smart contracts based on the Malaysia construction industry situation.

1.6 Significance of Research

The advancement of information and communication technology (ICT) has reshaped many industries worldwide, including the construction industry. However, the construction industry shows reluctance to adopt technological advancement between other industries, especially for the small and medium-sized Contractor (Arslan, Tuncan, Birgonul, & Dikmen, 2006). They need to reshape their existing strategies and business method, and high investment costs give them the thought that it is not beneficial to their business. Let alone the fact that they have no idea what the smart contract is all about and how it is working.

This research will explore and provide the awareness of the potential of smart contracts' automated transactions payment in reducing payment disputes and the challenges to adopting in the Malaysia construction industry on the Master's level.

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