BIM ADOPTION FRAMEWORK TO ENHANCE EFFICIENCY OF CONTRACTUAL ISSUES IN THE JORDANIAN CONSTRUCTION SECTOR

IBRAHIM MOH'D ABDEL QADER SARAIREH

DOCTOR OF PHILOSOPHY

UNIVERSITI MALAYSIA PAHANG

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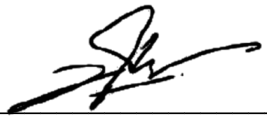

(Supervisor's Signature)

Full Name : DR. AHMAD TARMIZI BIN HARON

Position : PROFESSOR MADYA

Date : 17/2/2022

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I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

(Student's Signature)

Full Name : IBRAHIM MOH'D ABDEL QADER SARAIREH

ID Number : PAP18004

Date : 16 FEBRUARY 2022

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IBRAHIM MOH'D ABDEL QADER SARAIREH

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ABSTRAK

Kontrak pembinaan pada masa kini menjadi semakin mencabar dengan wujudnya peningkatan rekabentuk yang kompleks, margin keuntungan yang kompetatif, keperluan projek yang berbeza-beza dan peningkatan penggunaan aplikasi teknologi pengganggu. Tambahan lagi, ia juga melibatkan pengurusan maklumat dan dokumen yang berkuantiti tinggi. Strategi dan pengurusan yang tidak berkesan akan mengakibatkan pertikaian berlaku di antara pemegang taruh. Di negara Jordan, kebanyakan masalah kontrak mempengaruhi prestasi pengurusan kontrak. Seterusnya, pada skala yang lebih besar, ia melemahkan sumbangan kepada Keluaran Dalam Negara Kasar (KDNK). Penyelesaian terhadap perkara ini pula melibatkan kos tinggi dan masa yang lama. Ramai penyelidik pula telah mengenalpasti Pemodelan Maklumat Bangunan (BIM) sebagai satu pendekatan yang berkesan untuk mengatasi masalah berkaitan kontrak untuk sesebuah projek. Ia berdasarkan kepada keupayaan BIM untuk menyatupadukan maklumat, menyediakan platform komunikasi berpusat, peningkatan pemahaman melalui aplikasi maya 3D and penyelesaian konflik rekabentuk secara maya sebelum aktiviti pembinaan fizikal dijalankan. Walaupun BIM mempunyai pelbagai kebaikan, perlaksanaannya memerlukan rangkakerja peraturan yang bersesuaian untuk berjaya. Oleh yang demikian, kajian ini dijalankan bagi memenuhi keperluan jurang kajian dengan membangunkan rangka kerja konseptual untuk menerima pakai BIM untuk meningkatkan kecekapan isu kontrak dalam sektor pembinaan di Jordan. Kaedah campuran digunakan di dalam proses pengumpulan data bagi mencapai objektif kajian. Ia termasuk temubual bersama 27 orang pakar, tinjauan soal selidik melibatkan 410 orang responden dan bengkel validasi kumpulan focus melibatkan 25 orang peserta. Data yang diperolehi melalui temubual dan bengkel dianalisis menggunakan kaedah analisis kandungan manakala kajian soal selidik pula dianalisis secara diskriptif menggunakan perisian SPSS. Hasil temubual menunjukkan penyumbang utama isu kontrak adalah permasalahan dokumentasi, kerjasama pihak yang terlibat, timbangtara dan penyelesaian pertikaian, masalah penggunaan teknologi, masalah kewangan dan masalah pentadbiran. Manakala, hasil dapatan daripada soal selidik tinjauan pula menunjukkan, halangan utama perlaksanaan BIM adalah termasuk kekurangan kesedaran BIM dengan skor RII sebanyak 0.736, kekurangan pusat Latihan BIM dengan skor RII sebanyak 0.724 dan kekurangan sokongan daripada kerajaan dengan skor RII sebanyak 0.700. Tambahan pula, dapatan soal selidik memastikan bahawa faedah utama penggunaan BIM ialah lukisan terbina dengan skor RII 0.828, perkongsian data antara pihak dengan skor RII 0.766, pengesanan pertembungan dengan skor RII 0.760. Selain itu, menambah baik reka bentuk dengan skor RII 0.756 dan menjimatkan kos dan masa dengan skor RII 0.756. Kajian ini telah mendedahkan masalah kritikal berkaitan kontrak dan bagaimana BIM boleh dijadikan sebagai satu penyelesaian bagi mengatasi permasalahan kontrak dan halangan perlaksanaan BIM itu sendiri.

ABSTRACT

Construction contracts are becoming more challenging these days with the rise of complexity in design, competitive profit margins, diverse requirements and the emergence of many disruptive technologies. Additionally, the construction contracts require extensive information and documentation to be successfully managed. Ineffective strategy and management often lead to disputes between the stakeholders. In Jordan, many contractual problems affect the contract administration. Thus, it weakened the construction industry's contribution to Growth Domestic Product (GDP) in recent years. The contractual problems are costly and time-consuming to resolve. Many researchers have documented Building Information Modelling (BIM) as a considerably efficient approach to reduce the contractual problems in the projects. It lies on the capability of BIM to integrate information, centralize communication, improve understandings of designs through virtual 3D and resolve conflict virtually before the physical activities take place. Despite many benefits, the implementation of BIM, however, requires an appropriate regulatory framework to succeed. Therefore, this study fills the research gap by developing a conceptual framework for adopting BIM to improve the efficiency of the contractual issues in the construction sector in Jordan. A mixed-method of data collection was adopted to achieve the research's objectives. It included interviews with 27 experts, 410 completed questionnaires surveys and 25 experts participated in the focus group validation workshop. The data collected from the interviews & workshop were analyzed by using the content analysis technique. Questionnaire responses were analyzed descriptively and statistically using SPSS software. The results from the interviews show that the major contractual issues contributed from problems related to the tender documents (contracts, drawings), contractual parties, arbitration and disputes resolution, problems related to technology use, financial problems and administrative problems. On the other hand, the results from the questionnaire confirmed that the significant barriers to BIM adoption include the lack of BIM awareness with an RII score of 0.736, lack of BIM training centres with an RII score of 0.724 and lack of support from the government with an RII score of 0.700. Furthermore, the findings of questionnaires assured that the main benefits of BIM adoption are as-built drawings with an RII score of 0.828, data sharing among parties with an RII score of 0.766, clash detection with an RII score of 0.760. In addition, improving the design with an RII score of 0.756 and save cost and time with an RII score of 0.756. This research highlighted the critical contractual problems during the project life cycle. Moreover, the study offers a conceptual framework for BIM adoption as a viable solution to overcome the contractual issues, and the barriers of BIM adoption, which will ultimately boost the performance of the Jordanian construction sector.

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