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A FRAMEWORK OF CLIENT GOVERNANCE FOR BUILDING INFORMATION MODELLING (BIM)-BASED CONSTRUCTION PROJECTS

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Recently, the Fourth Industrial Revolution (IR 4.0) has driven the construction industry to utilise Building Information Modelling (BIM) as a central repository for digital information of a project. To this extent, BIM has emerged a major driving force in the Architecture, Engineering and Construction (AEC). However, it has been observed that, client governance of BIM is to promote BIM adoption as a new collaboration approach which has not been investigated in explicit detail. Almost all organisations face increasing information governance challenges, which can be met by an effective governance approach supported by standards. However, there is a lack of overall governance within current construction projects. Hence, it is essential to develop a generic data governance model or framework to facilitate BIM adoption in a collaborative built-in environment across multi-disciplines and multi-actors during the building lifecycle. For this reason, the aim of this study is to develop a framework of client governance for BIM-based construction projects. Through that manner, six research objectives are established. These are: to determine client governance of BIM-based construction projects; to identify key attributes of BIM-based construction projects across project phases; to explore governing success measures of BIM- based in construction projects; to investigate governance control of BIM- based in construction projects; to establish the market structure for BIM-based construction projects; and validate the developed framework. Mixed methods of quantitative and qualitative research of data collection were adopted. Empirical data was gathered using brainstorming workshop and questionnaire surveys conducted among government agencies/clients, consultants, and contractors. The data analysis was carried out qualitatively (thematic content analysis utilising Atlas t.i.8 software) and quantitatively (descriptive and inferential statistical analysis utilising Statistical Package for Social Science (SPSS) and Partial-Least Square of Structural Equation Modelling (PLS-SEM)). The findings from the research were used to develop a framework of client governance of BIM-based construction projects which was validated by expert panels. To reckon, four inevitable parts of client governance of BIM-based construction projects are apprehended. These are: national agenda, driving factors of governance and construction practices i.e., client governance; key attributes; governing success measures), response mechanism, and outcome which consists of two elements namely market structure and BIM level 3 (full integration) for Malaysian construction industry. The results indicated three critical components of governance and construction practices, namely client governance - time, cost, and quality; key attributes - project and client attributes; governing success measures of BIM-based construction projects - characteristics and success measure. The results established that organisational transformation have significant influence for governance control. Based on the analysis, Macro Maturity components through Macro Maturity Assessment are important to evaluate market structure to achieve BIM level 3 (full integration). The research output sought to facilitate the BIM-based construction projects players, particularly government agencies/client, contractor, and consultant by providing a guide to be deemed BIM-compliant and seeing the adoption process in order to achieve BIM level 3 (full integration) for Malaysian construction industry.

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