UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF BUILDING INFORMATION MODELING (BIM) ADOPTION ASSESSMENT TOOL FOR BIM-BASED PROJECTS IN MALAYSIA

WAN NUR SYAZWANI BINTI WAN MOHAMMAD

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ABSTRACT

Recently, the construction industry has been moving towards industrial revolution 4.0 which has transformed the construction industry into a competitive digital ecosystem by adopting BIM. BIM has emerged as a major accelerator in Engineering and Construction industry operations since it is used to improve visualization and productivity, the coordination of construction drawings and communication, planning, delivery, take-off and estimation, and off-site manufacturing. Thus, contractors have a vital role in adopting BIM for transferring data from drawing to reality. Despite potential benefits for contractors through the adoption of BIM, they are commonly regarded as slow adopters, lagging far behind when compared to other stakeholders. A preliminary study affirms that contractors are slow adopters and that the tools to assess and evaluate their BIM performance are absent. The failure to appreciate and comprehend existing BIM assessment models/tools from developed and developing countries have limited construction players' and contractors' benefits from BIM. For this reason, the research aims to develop a BIM Adoption Assessment Tool for BIM-based projects in Malaysia. Data was obtained from unstructured interviews with 4 participants and semi-structured interviews with 8 participants as a preliminary study. Then a questionnaire survey (114 respondents) and semi-structured interviews (12 respondents) with G7 BIM-based project contractors provided the main data. Consequently, four (4) essential elements of a BIM Adoption Assessment Framework for BIM-based projects were identified through the comparative results of both collections. These are: Eight (8) BIM Objectives (E1); Thirteen (13) Uses of BIM from planning/design to the construction phases (E2); Three (3) BIM adoption components (i.e., technology (11), organisation (14) and information culture (13) (E3); and four (4) project performance criteria (E4). Furthermore, these four (4) elements were considered in the development of a BIM Adoption Assessment Tool (BAAT) for BIM-based projects. The development of BAAT was established using a Microsoft Excel Spreadsheet and is suitable for project lifecycle phases (i.e., from planning/design to the construction phases). Six distinct levels of the BIM Maturity Index were identified: Level 0 (0.0%) - non-existent; Level 1 (>0.0% < or = 20.0%) - initial; Level 2 (>20.0% < or = 40.0%) -defined; Level 3 (>40.0% < or = 60.0%) - managed; Level 4 (>60.0% < or = 80.0%) -integrated and Level 5 (>80.0% < or = 100.0%) - optimised. The BAAT was validated by seven (7) expert panels and will benefit the BIM-based project teams in assessing their BIM performance. The BAAT acts as a baseline for BIM-based projects in achieving the project performance outcome (time, cost, quality, and safety).

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