

UNIVERSITI TEKNOLOGI MARA

**BUILDING INFORMATION
MODELLING EXECUTION PLAN
(BEP) FRAMEWORK FOR
MALAYSIAN CONSTRUCTION
PROJECTS**

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ABSTRACT

The advancement of technology has significantly influenced the Malaysian construction industry, particularly through the adoption of Building Information Modelling (BEVI). BIM offers numerous advantages, including improved visual management, enhanced information management, and better collaboration among project stakeholders. To ensure effective BEVI implementation, a structured framework known as the BEVI Execution Plan (BEP) is essential. However, confusion surrounding the BEP arises from four main factors: (i) inconsistent practices due to variations in key BEP components, (ii) issues in BEP implementation, (iii) lack of consistent governance and enforcement throughout project phases, and (iv) inadequacy of existing BEP frameworks. This situation reveals a clear gap in the absence of a structured and contextually relevant BEP framework tailored to Malaysia's construction environment. This research aims to propose a BEP framework to support BEVI implementation in Malaysian construction projects. A multi-method qualitative approach was employed, comprising document analysis and semi-structured interviews. The document analysis of fourteen BEP documents identified current BEP practices, while interviews with professionals involved in government BEVI projects examined issues, potential improvements, and framework validation. The data were analysed using content analysis to enable a systematic and in-depth examination of qualitative findings. The document analysis revealed unstandardised BEP practices that contribute to miscommunication, incomplete planning, and inefficiencies during implementation. The interviews further identified five key issues: (i) lack of customisation, clarity, and knowledge in BEP development, (ii) inconsistent implementation across the project lifecycle, (iii) limited awareness, competency, and commitment, (iv) weak governance and alignment, and (v) poor oversight and mismatched practices. In response, four improvements were proposed: (i) structuring BEP development, (ii) strengthening application across project phases, (iii) reinforcing governance and enforcement, and (iv) enhancing training and competency. The resulting BEP conceptual framework consolidates these findings and contextualises BEP implementation within the Malaysian construction setting. This research is significant as it facilitates more consistent and effective BEVI implementation, aligns with national strategies, and serves as a practical reference for industry stakeholders. Moreover, this research addresses the urgent need for a structured and locally relevant BEP framework suited to Malaysia's BEVI construction projects, thereby establishing a foundation for future studies on automated BEP processes and the localisation of international standards.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Building Information Modelling (BIM) is defined as a process of preparing, using and sharing three-dimensional (3D) modelling through digital technology that contains multiple information, which may be utilised by construction professionals to a project, in achieving objectives throughout the implementation of a project (PWD, 2021). BIM is a rapidly growing technological component in the construction industry within the context of the Fourth Industrial Revolution (IR 4.0), alongside the Internet of Things (IoT), Big Data, and Additive Manufacturing and Digital Twin (DT), (Begic & Galic, 2021). Furthermore, BFM is identified as one of the 12 emerging technologies in the Construction Industry Development Board (CIDB) Construction 4.0 Strategic Plan 2021-2025, targeted for implementation within a year (CIDB, 2020). Concurrently, the Malaysian Public Works Department (PWD) has set a goal in its Strategic Plan 2021-2025 to implement BFM in 50% of construction projects valued at RM 10 million and above, with an additional 10% increase each year until 2025 (PWD, 2020).

Besides this, BFM also offers numerous benefits to the Malaysian construction industry, which will transform the perspective of construction professionals. In general, BFM is capable of improving visual management, fostering information management and enhancing collaboration among project stakeholders (Al-Ashmori et al., 2020; Lidelow et al., 2023; Tan & Latiffi, 2024; Wang et al., 2022). Furthermore, BFM facilitates the IBS design process, contributing benefits such as improved design team collaboration, better delivery of design details and better data and design-sharing and storage (Ern *et al*, 2022). Moreover, apart from increasing productivity and efficiency, BFM supports integrated construction scheduling & planning and assessing the time and cost implications of design changes (Al-Ashmori *et al*, 2020). As for Facilities Management (FM), BFM enhances the building performance, streamlines operation and maintenance (O&M) activities, improves the quality and reliability of the O&M data transfer and the ability to capture data and the integration and access of visual data (Ariffin *et al*, 2023). Additionally, BFM can benefit building conservation through