UNIVERSITI TEKNOLOGI MARA

A FRAMEWORK FOR SUSTAINABLE CONSTRUCTION IN RAILWAY INFRASTRUCTURE PROJECTS

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ABSTRACT

The delivering process of railway project development is not an easy task as it involves many parties and issues such as huge land use, resources, extensive investment, and long construction time which give great impacts on the environment, economic and social disruption. The concept of sustainable construction in infrastructure projects emerges as a vital approach among the project stakeholders to achieve a balance between environmental, economic and social in infrastructure projects. This is in line with the Malaysia growing need for sustainable construction practices in built infrastructure. Nevertheless, implementation of sustainable construction concept in Malaysian railway projects is still low where 'status quo' of project delivery is ineffective in holistically addressing environmental, social and economic dimensions. One of the reasons is lack of driving factors that enforce construction practitioners to implement sustainable construction. Albeit sustainability indicators, checklists or assessments have been previously identified and prepared, there is still lack of sustainability factors for sustainable construction in railway projects that can guide the construction practitioners to achieve sustainability goals. Consequently, construction practitioners are still facing difficulty of understanding and translating the idea of sustainability approach into project-level. Therefore, the aim of this study is to develop a framework for sustainable construction in railway infrastructure projects. Mixed methods of quantitative and qualitative research of data collection were adopted. Empirical data for quantitative research was gathered via questionnaire survey and qualitative data was collected via semi-structured interviews with respondents from client, consultants and contractors involved in railway projects. The data analysis is carried out qualitatively (thematic content analysis utilising ATLAS.ti software) and quantitatively (descriptive and inferential statistical analysis utilising Statistical Package for Social Science (SPSS), Microsoft Excel and Partial-Least Square of Structural Equation Modelling (SEM-PLS)). The findings from the research were used to develop a framework for sustainable construction in railway infrastructure projects which was validated to confirm its external validity. The results reveal that stronger government strategy and organizational attentiveness leads to increased sustainable construction practices. Apart from that, integration of 22 sustainability factors in railway project life cycle phase is critically important to achieve sustainable construction in railway project. The findings also signify ten project effectiveness and efficiency indicators that are important to evaluate sustainability of railway infrastructure project performance. Furthermore, the validation feedback showed that the respondents agreed with the proposed framework and it is appropriate for the context of this research and construction industry.

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