UNIVERSITI TEKNOLOGI MARA

A MODEL FOR IMPLEMENTATION OF GREEN CONSTRUCTION

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ABSTRACT

The recent shift from conventional construction to green construction has brought about efficiency and improvement to the construction industry. However, the construction industry is still reluctant to embrace this new development. This circumstance is primarily due to a fundamental problem of the lack of clarity in grasping the concept of green construction. Consequently, it has called for a need to explore the current practice of green construction in the construction industry with which this research has attempted to deal. In this research, a considerable effort was made towards identifying the solution to the problem through the establishment of a green construction model. In the process of establishing the model, four objectives were outlined; (1) To identify the current practice of green construction, (2) To investigate the level of awareness and understanding of the benefits and disadvantages of green construction, (3) To investigate factors of green construction innovation, and (4) To determine the major challenges for the implementation of green construction. The findings used for the establishment of the model were structured and analysed based on the data from 346 usable questionnaires and 25 semi-structured interviews with the aid of SPSS19 and NVivo-9 respectively. The datasets from the questionnaire survey were analysed using several statistical analyses; exploratory factor analysis, reliability analysis, assessment of normality, descriptive analysis (mean and ranking), and analysis of variance (ANOVA), while the datasets from the semi-structured interview were analysed using content analysis. A structural equation modelling (SEM-AMOS) was further employed in order to establish and validate the statistical model analyses that involved pooled-confirmatory factor analysis, structural equation modelling, and moderation effect for the latent constructs. From the findings, it was found that the implementation of ISO 14001: Environmental Management System attained the highest mean score for the current practices. The mean scores for the level of awareness and understanding in green construction were almost equal; the highest mean score for benefits was "Improve customer satisfaction" and the highest mean score for disadvantages was "High cost of green construction material." Subsequently, the highest mean scores for green construction innovation and challenges were "Environmental Policies and Procedures in Green Construction" and "Lack of Awareness of the Environmental Preservation" respectively. Based on the overall establishment and validation of the model, it was found that the model performed well and all five hypotheses of the model establishment were supported. From the practical perspective, the model should be able to encourage construction stakeholders to be more attentive in the area of green construction. Hence, it can be used as a diagnostic tool for the continuous improvement of green construction in the Malaysian construction industry.

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CHAPTER ONE RESEARCH INTRODUCTION AND BACKGROUND

1.1 BACKGROUND OF THE RESEARCH

Construction is a major industry around the world, accounting a sizeable proportion of most countries' Gross Domestic Products (GDP) (Thomsen, 2008; Bon & Crosthwaite, 2000). The growth of many countries, especially the growth of the developing countries, is measured with reference to the tangible development of construction projects. Therefore, construction projects have become more critical and gained more attention from the government and stakeholders, such that the main focus is placed on improving the performance of the construction industry in terms of cost, time, and quality (Ofori, 2001).

The construction industry in the developed nations plays a vital role in meeting the needs of society, enhancing the quality of life (Burgan, 2006; Tam & Tsui, 2004), and providing extensive economic benefits (Miller et al., 2015). In the United States for instance, the construction industry is valued at over \$1 trillion and provides critical infrastructure to support many other subsidiary industries, while creating over 6.5 million jobs at the same time (Chong et al., 2009). In Europe, the construction industry provided the largest contribution to the employment rate with over 7.5% of all employment, and the largest contribution to the economy with 9.7% of the GDP and 47.6% of the gross fixed capital formation in 1999 (European Union, 2001). Further, in Australia, the construction industry from 2008 to 2009 was valued at \$151.3 billion, which contributed 7.0% of GDP and employed 9.1% of the workforce, making it the fourth largest industry in Australia (Australian Bureau of Statistics, 2010).

In view of the construction industry in Malaysia, the industry has contributed 3.0% to 5.0% to the GDP over the past 20 years and has played a vital role in the country's development (Wong, Holt & Cooper, 2007). As Malaysia moves towards a sustainable lifestyle and progressive development, the need to prepare for the change is imperative. Sustainability has become an important initiative being discussed and implemented for both private and public buildings, including residential, office, and