

**CONCEPTUAL FRAMEWORK OF KEY PERFORMANCE INDICATOR
FOR INDUSTRIALISED BUILDING SYSTEM PROJECT IN MALAYSIA**

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CONCEPTUAL FRAMEWORK OF KEY PERFORMANCE INDICATOR FOR
INDUSTRIALISED BUILDING SYSTEM PROJECT IN MALAYSIA

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*To my beloved family, friends
and lovely world*

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ABSTRACT

Proper understanding on Key Performance Indicators (KPIs) related to Industrialized Building System (IBS) is important in assisting contractors to formulate effective planning strategic for their company. On the other hand, there are lack of evaluation method to determine degree of successful Industrialised building (IBS) project delivery. Hence, by identify and analysis the critical success factors (CSFs) provide better performance measure to the successful IBS delivery. This study aims to determine the CSFs that lead to successful IBS delivery and it's also aims to develop key performance indicators (KPI) conceptual framework of industrialised building system. The CSFs were determined by comprehensive literature review. The validation of the CSFs were conducted through Delphi Method where 7 experts have been chosen as respondents. The validation was conducted in two rounds. During the first-round of the survey, the experts were asked to give rating on the importance of CSFs that have been compiled earlier using 0-10 likert scale. At the same time, the experts were also asked to suggest additional CSFs that suggested by other experts based on their experiences. In the second-round of the survey, the same experts were again asked to give rating on the additional CSFs that have been suggested during the first-round survey. The weighted data from Delphi Analysis has been done through a series of statistical analysis like mean, standard deviation and frequency percentage to justify the acceptable level of CSFs. Based on analysis result that have been conducted 23 out of 26 CSFs have been identified which are important to be include in developing KPI conceptual framework. The KPI conceptual framework can be used as performance measure tool. The KPIs can also be used as benchmark indicators to help the related industrialised building system industry players to achieving success in highly competitive market.

ABSTRAK

Pemahaman terhadap Petunjuk Prestasi Utama (KPI) yang berkaitan dengan Sistem Bangunan Berindustri (IBS) adalah penting dalam membantu kontraktor untuk merangka perancangan yang berkesan. Selain itu, terdapat kekurangan kaedah penilaian prestasi dalam menentukan tahap kejayaan sesuatu projek IBS. Oleh itu, dengan cara mengenal pasti faktor-faktor kejayaan kritikal (CSFs) akan dapat memberikan satu kaedah penilaian prestasi untuk menentukan tahap kejayaan sesuatu projek IBS. Kajian ini bertujuan untuk menentukan CSFs yang membawa kepada kejayaan sesuatu projek IBS dan juga bertujuan untuk membangunkan konsep kerangka KPI bagi sesuatu projek IBS. Dalam kajian ini, CSFs ditentukan secara menyeluruh melalui kajian-kajian yang lalu. Ini diikuti dengan pengesahan hasil kajian-kajian tersebut dengan menggunakan kaedah kaji selidik Delphi. Kaji selidik dijalankan sebanyak 2 pusingan dengan melibatkan 7 orang pakar IBS sebagai responden utama. Dalam kaji selidik pusingan pertama, responden diminta untuk menentukan tahap kepentingan CSFs berdasarkan senarai CSFs yang dikumpul daripada kajian-kajian yang lalu. Dalam masa yang sama, responden juga diminta untuk mencadangkan tambahan CSFs yang baru yang difikirkan penting untuk turut disenaraikan. Dalam kaji selidik pusingan kedua pula, responden diminta sekali lagi untuk menentukan tahap kepentingan CSFs yang telah dicadangkan oleh responden yang berlainan yang diperolehi dari kaji selidik pusingan pertama. Berdasarkan keputusan analisis yang telah dijalankan sebanyak 23 daripada 26 CSFs telah dikenal pasti penting untuk diambil kira dalam pembangunan Kerangka Konsep KPI (KPI conceptual framework). Kerangka konsep KPI ini boleh dijadikan sebagai alat bagi menilai prestasi sesuatu projek IBS dan juga sebagai satu penanda aras bagi membantu pemain industri untuk bersaing dalam pasaran yang sangat kompetitif di masa hadapan.

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LIST OF ABBREVIATIONS

ABBREVIATIONS		DEFINITION
CSFs	-	Critical Success Factors
IBS	-	Industrialised Building System
KPIs	-	Key Performance Indicators

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CHAPTER 1

INTRODUCTION

1.1 Background of study

In recent years, the construction industry plays a crucial role in the Government's efforts to stimulate domestic economic activities and enhance growth. This industry contributes on average, 3% to the total Malaysian Gross Domestic Product (GDP). It provides job opportunities to some 800,000 peoples making 8% of the total workforce (CIMP, 2005). The traditional construction method, which is commonly practiced, is high in cost, unable to respond to this huge demand within a short space of time and failing to produce acceptable quality construction products (Agus, 1997 and Senturer, 2001)

To address these issues, the government, through its "caretaker", the Construction Development Board (CIDB) Malaysia, tries to encourage a paradigm shift in the construction process from the conventional or traditional approach to industrialization perspective.

According Construction Industry Development Board Malaysia (CIDB) an Industrialized Building System (IBS) refers to a technique of construction whereby

components are manufactured in a controlled environment - either onsite or offsite - placed and assembled into construction works.

From 2012 to 2015, Malaysia Investment Development Authority (MIDA) has approved a total of 96 IBS manufacturing companies with investments worth RM1.1 billion. In line with the Construction Industry Transformation Programme (CITP) initiatives (2016–2020), MIDA target is to attract at least 100 new IBS manufacturers with investments of RM2 billion by 2020.

1.2 Statement of Problem

IBS is not the new things among the construction industry player in Malaysia, the system can be track back as earlier as 1960 where the precast concrete elements were adopted to address the acute shortage of houses. Even though the government took the lead in 2008, by mandating that all public-sector projects must attain no less than 70% IBS content under the Treasury Circular SPP 07/2008.

This policy was created to build a momentum and to establish demand for IBS components, thus bringing the cost down. For the private sector, there is an exemption to the Malaysian construction levy (According to article 520 CIDB a levy of 0.125% of total construction cost will be impose to the Contractor in Malaysia) on contractors that have used IBS in 50% of the building components in residential buildings. According the latest data Quarter 1, 2016 from the Implementation Coordination Unit (ICU) of the Prime Minister's Office, only 24% of public projects valued at RM10 million and above have achieved an IBS score of 70 when the target of the IBS Roadmap 2011-2015 is to have all public projects to obtain an IBS score of 70 or more.

While CIDB reports that only 14% of private projects have achieved an IBS score of 50. The adoption of the system is still lagging behind the plan. The questions are, what is the next IBS roadmap? how practical the road map to be implement? As earlier of the year 2000, many researchers like Farah Deba, 2016 on her research “A review of Industrialised building system issues in Malaysia” and Mohd Nasrun 2011 on his paper of Barriers to implementation of the industrialised building system in Malaysia” have highlighted the barriers faced in adoption of industrialised building system and several ways have been suggested to promote the system. But until recently the mind-set of industrial players is still preferring the conventional construction method that have been used so far.

1.3 Aims and Objectives of Study

The aims of this study is to develop KPI conceptual framework for industrialised building system in Malaysia. In order to achieve the aims, the objectives of this study are define as follow:

- (i) To identify the critical success factors of Industrialised building system successful delivery.
- (ii) To validate the critical success factors for IBS delivering.
- (iii) To develop IBS project KPI conceptual framework.

1.4 Scope of Study

In this study, there are several predefined boundaries which the study will only focus on the area within it to reduce the study time frame. Hence, the scopes of study are as follow:

- (i) The study only limited to first degree of industrialisation which is prefabrication stage.
- (ii) The study is intended to identify the key indicator of IBS project for successful project delivery.
- (iii) The study only focuses on the industrialised building system development in Malaysia.
- (iv) The developing key performance indicators conceptual framework will not include the Benchmarking and KPI data collection.

1.5 Significance of Study

This study plans to discuss and find out what are the critical success factors for successful IBS delivery. It also aims for determine the Key performance indicator based on the identified critical success factors based on Delphi method. By performances measures of the indicators or Metrics. it will better help industry players to identify the weaknesses and threats they may facing which benchmarking to other industry player and provide solutions to the identified problems for the foundation of future research.

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