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READINESS ASSESSMENT FOR IMPLEMENTATION OF INTEGRATED PROJECT DELIVERY (IPD) IN INDUSTRIALISED BUILDING SYSTEM (IBS) PROJECTS

W. N. Osman*, M. N. M. Nawi, H. S. Anuar, K. Radzuan, N. N. Osman.

School of Technology Management and Logistics, Universiti Utara Malaysia, 06010, Kedah, Malaysia

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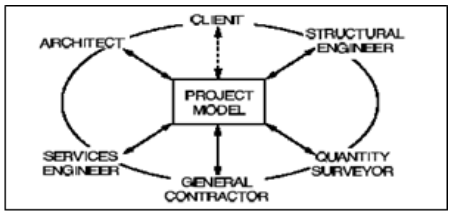
*Corresponding author
wannadzri@uum.edu.my

Graphical abstract



Abstract

The Malaysian government has taken the initiative of implementing Industrialised Building System (IBS) in which components are manufactured in mass production under a controlled environment (on or off site), transported, positioned and assembled into a structure with minimal additional site works. It is hope that IBS can improve the performance of construction industry. However, the main barriers in IBS implementation is project delivery process. In order to overcome this barrier, 'Integrated Project Delivery (IPD)' as a project delivery system using a multi-party contract (more than two parties selected) was introduced. Integrated Project Delivery (IPD) is defined as a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all project participants to optimise the results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication and construction. Although, many researchers have argue the importance of IPD in project delivery process, but the readiness of construction industries must be established. This research will use a quantitative study. This quantitative research process will involve a few phases including literature review stage, data collection stage, framework development stage, validation and recommendation stage. As the aim of this research is to obtain data based on multidisciplinary IBS stakeholders' perspectives, respondent include project managers, resident engineers, and architects, contractors etc. are among the potential candidates. At the end of the process, this research will develops the readiness assessment model to implement IPD in IBS construction projects.

Keywords : Readiness, integrated project delivery, industrialised buidling system

1.0 INTRODUCTION

In an attempt to develop a sustainable development in construction process, the Malaysian government has taken the initiative of implementing a new or modern construction method called Industrialised Building System (IBS). IBS (known as offsite manufacturing in UK construction industry) is a construction technique in which components are manufactured in mass production under a controlled environment (on or off site), transported, positioned and assembled into a structure with minimal additional site works [1].

Although IBS has been introduced for over 40 years, with well-documented benefits and strong support from the government, however the pace of implementation and usage of IBS is still slow and below the government target [2]. Investigation by some researchers identified that one of the main barriers of IBS implementation in the Malaysian

construction industry is related to traditional project delivery process [3]4][5]. As a result of this fragmentation, the traditional construction process tends to incur additional costs from rework stemming from errors, quality issues and inefficiency of project delivery times [6]7], poor performance [8] and client dissatisfaction of products delivery [9] [10]. Furthermore, this practice allows the manufacturers and contractors to be involved only after the design stage thus creates problems for the supply chain process (such as delays, late supply, etc) and constructability related issues. This practice is worsened by the knowledge that M&E is not aligned with C&S and architectural drawings thus resulting in the issue of redesign drawings during the design stage of IBS projects [11].

In an attempt to overcome this issue, many industry-led reports [12] [13] [14] have all called on the industry to change from its traditional modus operandi (fragmented approach) and perform better through increased integration (refer Fig. 1). Recent follow-up reports such as the [15], challenged the construction industry to create a fully integrated service capable of delivering predictable results to clients through processes and team integration.

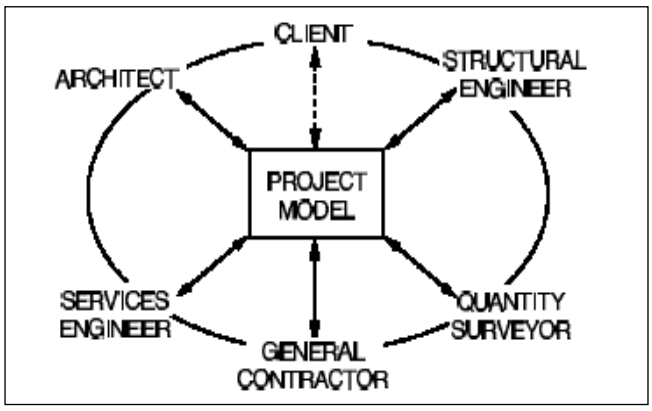


Figure 1 An integrated project team approach

Many researchers [16][17][18][19] have proved that 'Integrated Project Delivery (IPD)' as a project delivery system using a multi-party contract (more than two parties selected) has a major impact on the state of the industry to improve team integration in current construction project delivery. Integrated Project Delivery (IPD) is defined as a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all project participants to optimise the results, increase value to the owner, reduce waste, and maximise efficiency through all phases of design, fabrication and construction.

Despite the above benefits, IPD faced some barriers or difficulties in implementation on construction projects. According to [16], a number of criteria must be implemented to achieve fully integrated projects requiring companies to have procurement ability and to be inherently structured. To be successful, it needs legal support from both public and private sectors to support IPD. In addition, the criteria for organisational participants, training of individuals, and establishing a collaborative framework within IPD teams are required for this approach to be successful. Unfortunately, construction industries, especially in developing countries (such as Malaysia), are still not ready to change from traditional construction practice of 'over the wall syndrome' and move towards an integrated and collaborative approach [4][11]. As highlighted by [17], this barrier of unwillingness by the industry to adjust their traditional processes in order to take advantage of the opportunities of IPD has been the key to the lack of successful implementation. Therefore, the transformation of traditional practice towards the collaborative approach is a significantly important and essential factor in order to establish IPD in current and future construction projects.

Therefore, this research aims to explore the development of a tool or metrics which could be used to investigate the readiness of the construction industry to improve its project delivery process through the implementation of Integrated Project Delivery (IPD), and formulate strategies for the effective implementation of IPD within the industry.
This study was conducted to see the readiness of stakeholders from various aspects involved:

i. System capacity
ii. Organizational capacity
iii. Functional considerations
iv. Organizational culture
v. Senior leadership
vi. Staff capacity
vii. Implementation plan
viii. Training

1.1 Research Objectives

There are two (2) main objectives of this research which include :

i. To assess the readiness of the Malaysia's construction stakeholders for IPD implementation on IBS based project.
ii. To develop a readiness assessment model to implement IPD in IBS based project.

1.2 Research Methodology

As this research attempts to develop a readiness assessment model to implement IPD in Malaysia IBS construction project for improving team integration by considering the stakeholders perspectives, therefore, the nature of this research will be more geared towards a quantitative study (questionnaire survey). This quantitative research process will involve a few phases including literature review stage, data

collection stage, framework development stage, validation and recommendation stage. This methodological framework is very important in order to alleviate that the stages or layers within the research process give a sense of a 'sequence' and as a guideline for the researcher to monitor that the research undertaken is more or less on the right track.

As the aim of this research is to obtain data based on multidisciplinary IBS stakeholders' perspectives (such as project managers, resident engineers, and architects, contractors etc), therefore data survey is particularly suited as the principal technique for data collection. Another reason for the selection of this technique is to draw upon respondents' experiences and reactions in a way in which would not be feasible using other methods, for example observation, or questionnaire surveys.

1.3 Scope Of Study

This study focuses on the construction industry. The construction industry is one of the productive sectors that constantly contribute to the economy. Malaysian construction industry is generally separated into two areas. One area is general construction, which comprises residential construction, non-residential construction and civil engineering construction. The second area is special trade works, which comprises activities of metal works, electrical works, plumbing, sewerage and sanitary works, refrigeration and air-conditioning works, painting works, carpentry, tiling and flooring works and glass works.

The construction industry makes up an important part of Malaysian economy due to the amount of industries linked to it such as basic metal products andelectrical machinery. Hence, the construction industry could be described as a substantial economic driver for Malaysia. In order to inject greater dynamism into the construction industry and enable it to be globally competitive, in 2007 the Construction Industry Development Board (CIDB) elaborated and submitted a strategic Construction Industry Master Plan (CIMP).

The CIMP was developed to overcome some of the weaknesses that were inherent in the construction industry before this. They include, inter alia, quality deficiencies, over-dependency on foreign labour leading to a leak in the economy as a result of repatriation of earnings by foreign labour as well as numerous ensuing social and health problems, several major catastrophes, and the low productivity of the construction industry. The construction industry gave itself ten years, from 2006 until 2015, to rectify the weaknesses and to improve the industry's performance as well as its image.

The following are seven strategic thrusts of the CIMP:

Strategic Thrust 1	Integrate the construction industry value chain to enhance productivity and efficiency
Strategic Thrust 2	Strengthen the construction industry's image.
Strategic Thrust 3	Strive for the highest standard of quality, occupational safety and health, and environmental practices
Strategic Thrust 4	Develop human resource capabilities and capacities in the construction industry
Strategic Thrust 5	Innovate through research and development and adopt new construction methods
Strategic Thrust 6	Leverage on information and communication technology in the construction industry
Strategic Thrust 7	Benefit from globalisation including the export of construction products and services

However, as mentioned earlier, this research only focuses on the issues of integrating the construction stakeholders in the local construction industry. The issues of IPD are part of the seven strategic thrusts (first strategic thrust) in the CIMP. The rationale of the first strategic thrust is to integrate the construction industry value chain to enhance productivity and efficiency.

1.4 Population and Sample

The population of this study comprised of construction stakeholders that are operating in Malaysia. The list of the companies was obtained from Real Estate and Housing Developers' Association Malaysia (REHDA), Construction Industry Development Board (CIDB), Association of Consultants Engineer Malaysia (ACEM), Board of Architects Malaysia (PAM) and Board of Quantity Surveyors Malaysia. The companies that had been selected are only companies located in Peninsular of Malaysia. Sabah and Sarawak would be excluded because of the geographical scope of the study. To be more representative, it was decided that the samples come from northern, central, southern and eastern regions of Peninsular Malaysia. Based on the Development Composite Index (DCI), the central region which includes Melaka, Negeri Sembilan, Selangor and Wilayah Persekutuan Kuala Lumpur are the most developed regions in 2005 (Ninth Malaysian Plan, 2006b, p.356). Sabah, Sarawak and the states in the Eastern region which comprises of Kelantan,

Pahang and Terengganu are the least developed region, while the Northern region which includes Kedah, Perak, Perlis and Pulau Pinang, and Southern region which includes Johor is the most and moderately developed states (Economic Planning Unit, 2005). Besides DCI, the development gaps between regions and states were identified in terms of the level of gross domestic product (GDP), and its growth, household income and incidence of poverty as well as attractiveness to new investment in construction industry.

This research applied stratified data sampling. A stratified sampling is a probability sampling technic. For this research, the entire target population had been divided into different strata and then randomly selects the final subjects proportionally from the different strata. These subgroups are including the clients, contractors and consultants. Before sampling, the population is divided into characteristics of importance for the research. Then the population is randomly sampled within each category or stratum. For this research, the sample design was divided in 3 phase which are:

The reference population is subdivided into subpopulations (called strata) that are as homogeneity as possible to be studied

A sample is selected from each stratum by means of random procedure.

The sample drawn from each stratum are pooled in order to produce an overall sample

A set of structured questionnaire was sent to 650 companies.

1.5 Conclusion

Based on the literatures, it shows that the findings of the previous studies and tangible examples of readiness assessment model especially in the Malaysian construction industry are limited. By highlighting the key factors which underpin the dimension of model expectantly will help IBS stakeholders to get some overview of current practice without having to learn lessons the hard way. Furthermore, the researcher believes that this readiness assessment for IPD will provide a significant step for the IBS industry towards improving the performance of the project delivery. More importantly, IBS stakeholders need to ensure that the assessment is properly structured for effective implementation and monitoring as to avoid introducing too many new techniques at once without having identifying the current situation or level of integrated practices before implementing a new strategy in future.

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