Key Factors for Integrated Project Team Delivery: A Proposed Study in IBS Malaysian Construction Projects

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ABSTRACT

The existence of Industrialized Building System (IBS) in Malaysian construction industry was started in 1960s. However, the participation of contractor to get involved in the IBS project is currently poor. The previous researchers have identified that one of the main barrier for IBS implementation is because of lack of information and communication among stakeholders involved during the design stage of project life cycle. Accordingly, an integrated team approach was suggested by the construction lead report such as Latham Report 1994 and Egan Report 1998 which were challenge the current industry to migrate from the traditional fragmented approach towards integrated practice. In this research, will focuses on the process of identifying the key factors for the successful integrated team practice. Although the status of this research is still at the initial stage of progress however it is significantly important to be discussed for the further improvement that can be made in the future.

INTRODUCTION

The Construction Industry Development Board (CIDB) Malaysia, in collaboration with various organisations representing the construction industry, has developed the Construction Industry Master Plan (CIMP) that identified and recommended measures to address these problems and challenges [6]. Thus, the Malaysian construction industry has been urged to use innovative construction techniques, and to shift from the traditional practice of brick and mortar systems to an Industrialised Building System (IBS) of construction, or Offsite Manufacturing/ Offsite Construction as it is more commonly known in the others countries. The importance of IBS was highlighted under the Strategic Thrust 5: Innovate through R&D to adopt a new construction method in the Construction Industry Master Plan 2006-2015 [7] which has been published as means to chart the future direction of the Malaysian construction industry [7]. This initiative has been recommended based on some analysis of IBS from others countries, such as UK government commissioned reports which have proposed IBS as an important contributor to progress in the construction industry [14,3,4].

Numerous studies [28,23,30,16] show that IBS offers a lot of benefits to adopters in terms of cost and time certainty, attaining better construction quality and productivity, reducing risks related to occupational safety and health, alleviating the lack of skilled workers and dependency on manual foreign labour, and achieving the ultimate goal of reducing overall cost of construction whole life performance and profits. Based on these benefits, the government of Malaysia recognised an IBS as one of the strategies in the National Construction Industry Master Plan which aimed to speed up the delivery time, and to build affordable and quality houses.

Problem Statement:

Despite well-documented benefits and strong support from the government, the take-up for IBS was not as high as anticipated [18,34]. Low labour costs in Malaysia could perhaps be the root cause of the problem [18,23]. Although members of the industry are open to the idea, a major proportion of industry stakeholders in the private sector are indifferent, perhaps due to resistance towards change, and insufficient funds and information to support the feasibility of change.

In an attempt to understand the poor diffusion of IBS, some researchers [18,23,29] have investigated the barriers to effective IBS implementation in construction. One of the main barriers of IBS implementation in the Malaysian construction industry is related to poor integration among stakeholders during the design stage.
This central issue specifically can affect the various stakeholders in the IBS value chain: either, manufactures, designers, local authorities, contractors, suppliers or clients. Many industry-led reports [13,14,25] have all called on the industry to change from its traditional modus operandi and perform better through processes and team integration.

As a response to that challenge, and consistent with needs of the construction industry, this research, therefore, investigates what are the key factors are required for a design and construction team that responsible for the design and construction of a project, to achieve a fully integrated team approach.

**Need for the research:**

The need for the research comes from both practical and academic perspectives. From the practical perspective, the construction industry still faces the following problems:

- Egan [13] highlighted the importance of supply chain collaboration and set the target that 20% of construction projects (by value) should be undertaken by integrated teams and collaborative supply chains by the end of 2004, rising to 50% by end 2007. However, in reality the industry as a whole is still highly fragmented. The adversarial culture still prevails in the industry.

- There is a lack of appropriate guidance for IBS Malaysian construction practitioners to understand the key issues of good integrated design and supply chain such as partnering, concurrent engineering (CE) and supply chain management (SCM) and how they can achieve continuous improvement [15,6]. A lack of integration is a primary problem of IBS although there will investigative in another initiative such of this is not been implemented in IBS.

From the perspective of academic research, currently, most of the research in Malaysia is based on promoting the benefits of IBS [18,20,33] but has not provided specific guidelines of how it could be implemented and improve integration, in particular.

**Research Aim and Objectives:**

This research aims to address the gaps in knowledge that exist on how the various (multidisciplinary) teams either on or off site that are responsible for delivering a project can be integrated early during the IBS design stage.

**Objectives:**

The specific objectives of the research are to:

a) review the existing practices of IBS project delivery;

b) identify the key factors that significantly influence the effectiveness of integrated teams;

c) validate the key factors through an industry-based case study IBS Malaysian project.

**Research Target and Scope:**

This research is focused on the multidisciplinary project delivery team that is responsible for the design and construction of an IBS project. This is because most confrontations among the various (multidisciplinary) project team members become problematic at the implementation stage where designs are translated into reality. On other hand, the design phase is considered critical because the decisions made at this stage have high a degree of influence towards the eventual project cost. Therefore, this research is targeted at design and construction team leaders at project, organisational and functional levels. The research findings and conclusions provide an understanding of key factors that influence the effectiveness of early involvement of manufactures and contractors within an IBS construction project. Such knowledge is necessary for achieving any meaningful improvements in how the IBS design and construction project delivery team works together as a single unit. The research is conducted within the scope of design delivery team (early stage such as briefing and conceptual design) of the IBS project. This is the team responsible for the management of the design and construction of the IBS project.

**Research Process and Methodology:**

The underlying principle of this section is to describe the philosophical background that has been adopted and adapted in this research. This section presents a brief description of research approach, design and method for data collection.

According to Philiphs and Pugh [31], research is processes of finding out something you don’t know and as a systematic and methodical process that increases knowledge [1]. On the other hand, research methodology is a systematic and orderly approach taken towards the collection and analysis of data [8].

Selecting an appropriate research methodology is very important for defining a research problem and addressing the questions to be explored [35]. It embraces the overall approach of the research. Therefore, it requires the logic of a research strategy/ philosophy which is embedded in the links between ontology (what
counts for reality), epistemology (what is the relationship between the enquirer and the unknown) and methodology (how do we know the world, or gain knowledge of it) [12,17].

**Research Approach:**

The research approach is defined as the knowledge claims, the strategies, and the method that contributes to the study [10]. The approach depends on research inquiry and it could be a quantitative or qualitative inquiry in order to undertake the study. For example, qualitative case study is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources [3].

As the aim of this study is more descriptive and exploratory in nature with ‘what’ and ‘how’ questions as guides, it can be classified as a mix method study (combination of quantitative and qualitative approach).

**Research Design (Case study):**

Robson [32] suggested that research design in social sciences should typically consist of choosing one of three methodologies; a survey, experiment or case study. Through the literature review, [24] concluded that there are four main methodological approaches to investigate team interaction: experimental direct observation and naturalistic direct observation; research interview; research questionnaire; and documentary evidence. Yin [35] highlighted that when the phenomenon under study is not readily distinguishable from its context, case study is considered the appropriate method to apply. According to him, a case study design should be considered when: (a) the focus of the study is to answer “how” and “why” questions; (b) you cannot manipulate the behaviour of those involved in the study; (c) you want to cover contextual conditions because you believe they are relevant to the phenomenon under study; or (d) the boundaries are not clear between the phenomenon and context. Since the aim of this study is more investigative and requires in-depth information to answer the questions of ‘what’ and ‘how’, the case study approach is considered as an appropriate approach for this study. Therefore, in this study, the survey and case study methodology will be adopted for the purpose of the research for this study. It is because the approach fits well with the problem of the research as well as achieving the research aim and objectives.

**Methods for Data collection:**

Creswell [10] asserted that within a case study approach, there are four main methods of data collection namely; observation, interviews, documents and audiovisual materials. Previously, Yin [35] had listed six types of qualitative data which includes; documentation, archival records, interviews, direct observation, participation-observation and physical artefacts.

**Fig. 1:** Flow diagram of research process.

For the purpose of this research, a document review, interview and questionnaires, will be deployed as data collection techniques. In the primary stage, however, literature (document) review is very critical and necessitates in providing the sound basis of the inquiry especially in developing initial conceptual framework.
This process will be conducted in the entire of research. Document review will be complementing the semi-structured interviews and the questionnaires. It is hoped that the document review will give a way to triangulate data collection techniques. Documents of various types will be collected and analyzed, including government reports, case study report project or published information about the team integration.

Structured and semi-structured interviews will be adopted in this study for the primary data collection in order to gain insight into the views and opinions of the respondents. The respondents will be represented by different professionals that involved during the design process in IBS projects in Malaysia. The overview of the research process is presented in the figure below.

**Conclusion:**
Problems associated with fragmentation in the traditional construction process such as isolation of professionals, lack of co-ordination between design and construction, and as it is carried out in a sequential manner, has impacts on construction performances such as lack of integration, wastage, low productivity and efficiency. The approach towards team integration is looked as a significant strategy to solve this disintegration issue. Numerous of research either in relational contracting or procurement, partnering, constructability, supply chain management, or concurrent engineering advocates that integrated multidisciplinary design team approach probable can improve integrations within construction players. Therefore, this paper has described the main points of the research background. It emphasised the research problems and literature review covering overview on current situations of IBS in the Malaysian construction industry and provides some information on integrated project team. In addition, the paper explained the research aim and objectives, scope of the research, and justified the proposed research methodology. It is hope this research will contribute to the existing knowledge either on IBS, integration and construction industry as well.

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