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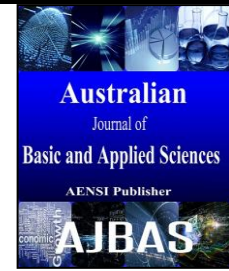
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Technology Acceptance: Malaysian Industrialised Building System (IBS) Case

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ABSTRACT

In embracing globalisation, it is necessary for all industries, including the AEC/FM industry, to be equipped with relevant technology. One such technology available for the sector is the industrialised building system (IBS). Since 1998, a substantial work of campaign in order to encourage the use of IBS in Malaysia has been done by Construction Industry Development Board (CIDB). For example providing large funds for research, creating standard through various training and promotional programmes. Previous studies have shown that using IBS can enhanced the management of project quality, automatically save cost and led to less rectification work of construction project. However, result revealed the adoption of IBS in Malaysia construction industry is still far from government desired. Disintegration among stakeholders during the design stage has been identified as one major barrier for implementing IBS. As such, this paper explores the potential solutions to reduce disintegration. The research presented uses focus groups to obtain qualitative data. It was found that increased collaboration and team integration, such as team accountability, structural organisation and operation in terms of work processes and environment will enhance the IBS adoption in the Malaysian construction industry.

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INTRODUCTION

As Malaysia is witnessing rapid development, the construction industry has been encouraged to shift from the traditional approach to use of offsite-manufactured components. To attain such level of development, it is therefore necessary for the construction sector to be equipped with relevant technology. One such technology is the industrialised building system (IBS). A substantial work of promoting IBS in Malaysia has been done by Construction Industry Development Board (CIDB). Through its IBS Roadmap 2003-2010, IBS has been define as “a construction technique in which components are manufactured in a controlled environment (on or offsite), transported, positioned and assembled into a structure with minimal additional site works”. According to (Kamar, K.A.M., *et al.*, 2012), IBS is the term formulated by the industry and government in Malaysia to address the adoption of construction industrialisation and offsite-manufactured components approaches.

According to the (Gibbs, A., 1997), industrialisation is a process of social and economic

change whereby a society is transformed from pre-industrial to industrial state. It is part of a wider modernisation process through the gainfully utilisation of relevant and viable technologies. Based on the 5-M strategy (Manpower, Materials-Components-Machines, Management-Processes-Method, Monetary and Marketing), Industrialised Building System (IBS) has been recommended as the solution that will mitigate many Malaysian construction issues, and will enable the industry to address the increasing housing demand. Since 1998, Construction Industry Development Board (CIDB) has been actively promoting the use of IBS by allocated large funds for research, creating standards as well as implementing various training and promotional programmes.

While previous research such as (Kamar, K.A.M., *et al.*, 2012; Naw, M.N.M., *et al.*, 2011) and (Thanon, W.A.M., *et al.*, 2003) have examined the barriers to implementing IBS in some parts of Malaysia, through addressing IBS related issues, the study on embracing Malaysian IBS implementation has not been given much attention. Identifying the issues on improving the implementation of IBS across

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all regions of Malaysia requires obtaining the views of all players in the industry. Regardless, the energetic campaign by the government in order to promote the implementation of IBS in delivering construction projects in Malaysia. Unfortunately, the adoption of IBS is still way less from the expected figure (Kamar, K.A.M., *et al.*, 2012) and contractors are still not rapidly embracing IBS (Nawi, M.N.M., *et al.*, 2011; Nawi, M.N.M., *et al.*, 2014). Giving the aforementioned, this paper attempt to identify the alternative or solution factors that influencing full implementation of IBS in the entire parts of Malaysia.

Research Methodology:

Following (Gibbs, A., 1997; Powell, R.A. and H.M. Single, 1996) and (Kitzinger, J., 1995), data was obtained from a focus group during a workshop organized by researchers. This endeavours to provide an avenue to obtain information from different participants' viewpoints, based on the reality of experience and practice (realism ontological stance) with direct interaction and corporate views (knowledge gained from current of practices and experiences) in which requires the involvement of project's multiples stakeholders and experts (practitioners) who specifically collaborate with the researcher or become part of the study. The

main selection criteria for inviting the survey participants to the focus group workshop is to have at least 5 years of working experience in IBS related projects. Moreover, in order to achieve the objective of this focus group, the participant has been selected from different geographically and department (such as planning, design, construction, and manufacturing).

Through the selection criteria that were mentioned above, 60 respondents were identified as sampled. Two weeks prior to the date of the workshop, the invitation letter has been sent to the potentials participants. As a result, 15 from 60 participants positively responded to the invitation. During the workshop, all the 15 participants were brief to the issues of confidentiality and anonymity, none of their name would be revealed in this study. Participants have been labelled as P1, P2 and etc. Table 1 illustrated the brief profile of participants. During the workshop, the participants were asked a few questions verbally to be discussed among the groups. Research assistants were assigned to write down and record the discussions including all proposed solutions that were highlighted during the process. The workshop took approximately 3 hours at a Seminar Room in Hotel Grand Season, Kuala Lumpur.

Table 1: Profile of the Participants

Name	Position held	Experience	Company/Discipline	Location	Gender
P1	Principle/Project Planner	13 years	Designer	Southern	Male
P2	BIM Manager	18 years	Designer	Southern	Male
P3	Construction Manager	16 years	Contractor	Southern	Male
P4	Operation Manager	9 years	Manufacturer	Western	Male
P5	Area Manager	21 years	Manufacturer	Northern	Male
P6	Principle/Contract Manager	15 years	Designer	Eastern	Male
P7	Design Manager	7 years	Contractor	Western	Male
P8	Principle/Marketing & Sales Manager	23 years	Manufacturer	Western	Male
P9	Project Manager	8 years	Contractor	Western	Male
P10	C&S Engineer	7 years	Government	Western	Female
P11	Innovation Manager/Researcher	7 years	Government	Western	Male
P12	Architect	6 years	Designer	Northern	Female
P13	Quantity Surveyor	8 years	Contractor	Northern	Male
P14	Managing Director	17 years	Manufacturer	Western	Male
P15	Project Manager	8 years	Developer	Northern	Male

Discussion and Conclusion:

Based on the findings identified from the workshop, this research confirm that IBS has not been fully embraced across the Malaysian construction industry. Some improvements in the current IBS practice need to be critically addressed in order to solve the issue of disintegration in IBS projects. Some efforts towards this approach could be summarized as below:

- Requirement of a fundamental structural change in the current IBS Malaysian construction industry in terms of personnel structures and work task such as;
 - The consultant must be able to review the shop drawings and be willing to take responsibility

and liability for the new design and drawings either in full or semi collaboration with the manufacturer.

- The client should encourage the consultant to redesign, review and be more responsible for the IBS design (i.e. shop drawing) by providing an additional consultation cost for the job.

- Requirement of a transformation from traditional to integrated practice in the IBS design process, procurement and management of the supply chain such as;

- The original design and drawing of the IBS system must be provided by the supplier or system maker while the manufacturer focuses on fabrication of IBS components.

- Training or working together (collaboration) with IBS manufacturers is a vital in order to increase

a thorough understanding of design and manufacturing processes among consultants.

In addition, disintegration has been identified as a major factor hampering implementation of this construction method. Given the current condition of the Malaysian construction industry, full implementation of IBS will enhance utilization of available resources and improve project quality, thus reducing construction rework and lowering the total cost of construction. The Malaysian construction industry is required to change from its traditional *modus operandi* towards better performance through increased collaboration and team integration, such as team accountability, structural organisation and operation in terms of work processes and environment. This paper demonstrated that the approach towards team working collaboration was perceived to be a major strategy to addressing the issue of disintegration in Malaysian IBS projects. Future research should give further thought on this strategy in more detail in order to develop a business model for an effective integrated design team delivery in the IBS projects.

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