



A Strategy towards Team Integration Practice for Improving the Design and Construction Process in the Malaysian Industrialized Building System Projects

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ABSTRACT

The Malaysian construction industry has been urged to change from using a conventional method to industrialized building system (IBS) to attain, (1) better build quality and productivity, (2) reduce risks related to occupational safety and health, (3) alleviate issues for skilled workers and dependency on manual foreign labor, and (4) achieve the ultimate goal of reducing the overall cost of construction. Despite acknowledging its benefits, the construction industry is still not rapidly embracing IBS. This is mainly due to its traditional and conservative nature where anything new or different, faces implementation barriers. An investigation by some researchers identified that one of the main obstacles to IBS implementation in the Malaysian construction industry is related to poor integration among stakeholders involved during the design stage. Responding to the issue above, this research aims to counter this problem and help towards the betterment of the IBS Malaysian construction industry using an integrated design team delivery approach. Therefore, this paper discusses a strategy by the identifying key factors that are pertinent to improving the integration of design and construction activities and summarizes the recommendations from multiple case studies on the key factors towards effective integrated design team delivery.

Keywords: Industrialized Building System, Integration, Integrated Practiced, Key Factor

JEL Classifications: L14, L74, L88

1. INTRODUCTION

The main aim of this paper is to identify and discuss all the key factors that are pertinent to improving the integration of design and construction activities, thus aiding communication and coordination among stakeholders involved during the design stage of industrialized building system (IBS) projects in Malaysia. In order to identify the key factors for effective integrated design team delivery in the Malaysian IBS projects, this paper began by reviewing relevant literature on IBS project within the Malaysian construction industry. This article intends to highlight the key factors that exist within these frameworks and develop a set

of guidelines which can be used to create effective integrated design team for Malaysian IBS projects. The process involved a comprehensive literature review of secondary sources of data including reports, principles, tools and guidelines that mainly relate to team integration. Unfortunately, the findings from previous studies and actual examples of "full" integration, especially in the Malaysian construction industry, are limited. Therefore, this research generated a few observations through the case study techniques of Malaysian IBS projects to gather information related to integration in the Malaysian construction industry, specifically within the design teams of IBS projects. The outcomes of this paper endeavor to identify the key factors for effective integrated teams

to establish the need for the development of an integrated design team framework for overcoming the lack of IBS implementation in Malaysian construction industry. The following section highlights the detail explanation of this research process.

2. KEY SUCCESS FACTORS FOR EFFECTIVE INTEGRATED DESIGN TEAM DELIVERY

According to the literature review and industry workshop, there are 9 factors identified as key for an integrated IBS project. Table 1 summarizes the key success factors for effective integrated design team delivery with a detailed explanation of each factor.

2.1. Personal Working Attitude

The personal working attitude in this study is a hypothetical construct that represents an individual's degree of like or dislike for work. This factor has been identified as one of the key factors for achieving a fully integrated team on a construction project (Liddell, 2010; Koutsikouri et al., 2008; Seligman, 2002; Johansson, 2002; Amabile, 1997). Previous researchers relate this factor to psycho-social dynamics such as motivation, positive can do it attitude, high commitment, flexibility and openness to learning (or willingness to change) for continuous working improvement (Koutsikouri et al., 2008; Holland et al., 2000; Jassawalla and Sashittal, 1998).

2.2. Team Base Accountability

Numerous authors (IPD, 2007; Abdelhamid, 2007; Bowron, 2002; Holland et al., 2000; Jassawalla and Sashittal, 1998; Gunasekaran and Love, 1998; Rowlinson, 1999; Anumba et al., 1997; Ayers et al., 1997) has demonstrated that team accountability has a significant influence on the effectiveness of team integration. In the scope of this study, team accountability is defined as "all team players who are responsible for the progress and performance of the project" (Cooper et al., 1995). To become an effective integrated team, all the members must feel a "sense of ownership," clearly understand their roles and be responsible for the project from beginning to end.

2.3. Team Organization

Fundamentally, the nature and composition of the construction team make the issue of leadership imperative (Baiden et al.,

2003). This is because the practice of the construction industry is to bring together some different departments and functional units with unique identities at the beginning of a project (construction period) to assume a new identity.

2.4. Management of Leadership

Leadership ensures that the vision and strategy required to align the culture and values of the organisation are communicated effectively to all members. This factor focuses more on people rather than processes to create a direct effect on project performance (Baiden, 2006).

2.5. Transparent Communication Process

Transparency refers to the commitment of open, frequent and real communication at all levels of the integrated design team organization. This communication process provides real opportunities and a channel for all members of the team to be directly involved, and to have a direct input into the project goals, changes in policies and procedures and status reports, etc. (Koutsikouri et al., 2008; Smith, 2006).

2.6. Policy

The construction industry is bounded by governmental policies and regulations (Nifa and Ahmed, 2010). Government policy has been noted as one of the key influences in promoting a new technique or products in the construction industry, simply because the government is one of the biggest client in any construction industry (Nifa and Ahmed, 2010).

2.7. Procurement and Contract

Construction teams have traditionally been formed along professional and functional lines and have unfortunately remained separate thus making the "team" industry, "teams" industry (Baiden et al., 2006). The impact of this practice indirectly influences the delivery of a project. The influence has resulted in calls for the integration of the entire supply chain with traditional project delivery methods (Bourn, 2001). This process, which includes procurement, covers development across the processes from briefing to construction; relationships between parties involved in the process; and apportion of risk between the parties participating in the process (Bowron, 2002).

2.8. Operational

Operational in this study refers to the process or series of actions to create a collaborative work environment for achieving a successfully integrated team. This factor includes components related to integrating people and processes such as interactive space, team co-location, non-operational boundaries, intensive planning, working concurrently, and a collaborative, co-operative climate supportive of teamwork.

2.9. Appropriate Technology

Technology plays an important role as a medium or suitable mechanism for co-coordinating activities, enhancing interaction and sharing knowledge within a project team (Nursal et al., 2014; Koutsikouri et al., 2008; Stough et al., 2000; Holland et al., 2000). Technology also needs to support team communication to

Table 1: Cross-referencing key success factors based on the triangulation of findings from the literature review and the case studies

Key success factors	Literature
Personal working attitude	✓
Team base accountability	✓
Team organization	✓
Management of leadership	✓
Transparent communication process	✓
Policy	✓
Procurement and contract	✓
Operational	✓
Appropriate technology	✓

coordinate detailed design and construction methods, cost, and schedules in a project (Mohammed et al., 2004).

3. RESEARCH METHODS

As discussed above, to determine the key factor for effective integrated design team delivery in Malaysian IBS projects, it is necessary to employ multiple approaches in order to ensure that the data is gathered comprehensively and accurately. The approach included a literature review and multiple case studies. The literature review collected data and information directly from websites, libraries, books, articles and other printed material sourced from international and national journals, proceedings and bulletins. During the data collection stage, the observation from the selected case study is to gain in-depth information about their practices and reactions to the topic.

For the purpose of this study, the combination of primary data from observation with secondary data based on the literature review to ensure that the findings are comprehensive, up-to-date and appropriate for the precise needs of the study. The following sub-sections will discuss the triangulation process of the results from both the literature review and case studies.

4. FINDING

Data from simple observation used in this research are presented in Tables 2-4.

5. CONCLUSION

The issue of fragmentation in the construction process, such as isolation of professionals, lack of coordination between design and construction, and the sequential manner of its operations, has impacted on construction performance leading to a lack of integration, wastage, low productivity and efficiency. Team integration is perceived as paramount. Therefore, key factors that contribute to the success of integrated effective team' must be clearly identified. As discussed above, this research aims to garner information related to integration in the Malaysian construction industry, specifically within the design team of IBS projects. The findings of secondary (literature based) and primary (case study based) data have been merged for improving team integration in Malaysian IBS projects. It is expected that the prioritised key factors will guide Malaysian IBS practitioners when selecting the most appropriate framework to develop a new policy or guideline for improving team integration and achieving successful project outcome in Malaysian IBS projects.

6. ACKNOWLEDGEMENTS

The authors gratefully acknowledge the support by Universiti Utara Malaysia (UUM) for providing the funding under Research University Grant (Geran Penjanaan; S/O code: 13432). We

Table 2: Summary of observations on key issues of integration - Case 1

CSFs	Observation of practices
Personal working attitude	Most of the members within a particular functional were generally pleasant towards each other
Operational	All the members still maintain their original identities and worked strictly within their given office space All the functional teams that made up the delivery team were in separate office locations

CSFs: Critical success factors

Table 3: Summary of observations on key issues of integration - Case 2

CSFs	Observation of practices
Personal working attitude	Members of the team are dedicated and open to learning and sharing of information among the senior and junior level of management
Operational	The environment of work and the team office arrangement encouraged the movement of members. The location of toilets, printing equipment, and meeting room created conditions that would have members move into the commons spaces from time to time All the teams maintained an open plan office but within their organisations
Transparent communication	Most of the team members from different functional departments have mutual respect for each other They are always communicating with each other either during working or lunch hour
Appropriate technology	Each of the functional teams was supplied and equipped with a networking computer system for the coordination of information process in the project Some of the computers were installed with the same program such as ArchiCAD for design and printing process

CSFs: Critical success factors

Table 4: Summary of observations on the main issues of integration - Case 3

CSFs	Observation of practices
Personal working attitude	Most of the members within a particular functional were pleasant towards each other
Team base accountability	The contract document clearly stipulates the roles and responsibility of the team member. All the members have been explained earlier regarding their duty before receiving the letter of award from the client
Operational	All of the members still maintain their original identities and worked strictly within their given office space All of the functional teams that made up the delivery team were in separate office locations

CSFs: Critical success factors

also thank the contribution by other members in Construction Innovation Research Cluster in UUM.

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