PERTINENT ISSUES IN INDUSTRIALIZED BUILDING SYSTEM (IBS) CONSTRUCTION BUSINESS IN MALAYSIA

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ABSTRACT

Industrialized Building System (IBS) technology is anticipated to boost construction productivity apart from reducing construction cost, enhance the construction product's quality, and speed up the construction project aligned to Construction 4.0 Strategic Plan 2021-2025 and The National Entrepreneurship Policy 2030. Businesswise, IBS has high potential in the construction business, especially for Small Medium Enterprise (SME) contractors. This paper aimed to feature pertinent issues regarding the IBS construction business among IBS construction practitioners. A grasp of pertinent IBS construction business issues will enhance existing knowledge on IBS issues in the construction business paradigm. An exploratory semi-structured questionnaire was distributed to twenty-five (25) expert respondents related to the IBS construction business after the literature review process was carried out. It was found that there is a need for the establishment of a specific business model for IBS to ensure business continuity. Also resulting from the survey, the IBS construction business in Malaysia is mainly monopolized by big players which causes lesser involvement of local and SME IBS players. Adding to that, the Return on Investment (ROI) was found to be more important than the actual needs of customers; it was also found to be one of the obstacles in the IBS construction business. Generally, the outcome of this exploratory study is expected to highlight the pertinent issues within the context of the IBS construction business. The results will be crucial to support the next level of the main research, which aims to develop a more practical and acceptable IBS business modelling framework.

Key words: Industrialized Building System (IBS), Issues in IBS Construction Business, IBS Issues, IBS Business Model, Exploratory Studies

INTRODUCTION

The Malaysian construction industry has a huge reputation for initiating other industries in developing and generating income for the nation. The performance of the construction industry has hit the lowest due to the pandemic in 2020, and in 2021 according to Trading Economics (2021) which indirectly affect the other industry as well. the performance has bounced back to 42.6 per cent (%) bagging RM28.2 billion (Mahidin, 2021). This indicates the positive manifestation and feasibilities of the opportunities available in the construction business in Malaysia. The Industrialized Building System (IBS) is one of the numerous initiatives introduced and promoted by the government through the Construction Industry Development Board (CIDB) to catalyze the productivity and performance of the construction sector (Mohamed et al., 2019) due to its ability to deliver faster, reducing the cost of materials, reduction of site labour (CIDB, 2019) and numerous more.

The government's ambition to boost the penetration of IBS in the Malaysian construction industry; via Construction Industry Master Plan 2006-2015 (CIMP 2006-2015), Construction Industry Transformation Plan 2016-2020 (CITP 2016-2020) and recently launched; Construction 4.0 Strategic Plan 2021-2025 in hand with National Entrepreneurship Policy 2030 (NEP 2030) to bring the adoption of IBS to another level. Despite countless benefits of IBS and initiatives and promotion by the authorities, Amin et al., (2017) concedes that IBS adoption is still slow regardless. Recent trends of IBS research mostly emphasized the issues regarding the technicality and strategies of implementing IBS (Zairul, 2021). The trend has shown limited insights on the issue of the IBS construction business. This has raised the question of the missing piece of a crucial part of the IBS research area, which is; "what is the problem with our IBS construction business?".

LITERATURE REVIEW

As reported by the Ministry of Finance (2019), the growth of the Malaysian construction industry slowed down from 6.7 per cent (%) in 2017 to 4.8% in 2018 then escalating slowly to 4.9% in 2019 and bouncing back in 2020 and 2021 (Mahidin, 2021). Kamar et al., (2009) in their study emphasized that the construction industry is under constant pressure to improve its performance. Businesswise, there is a bright potential for venturing into the IBS construction business as the government is all in to implement IBS in the Malaysian construction industry (Kamar et al., 2012). Therefore, ensuring a successful construction business venture in the IBS construction industry entails outlining a strategic business model (Abuzeinab et al., 2018). In this paper, the outline of pertinent issues in the IBS construction business is emphasized to strengthen the understanding of the scenario and issues lingering around the IBS construction business horizon. An early grasp of the general issues in the IBS construction business is important to ensure a clearer idea of the scenarios before further business strategizing processes can be done to achieve a business goal.

Pertinent Issues in IBS Construction Business

Rooting for the successful implementation of IBS in the Malaysian construction industry, numerous pilot projects have been conducted as part of the inception projects. Due to the failure of early closed-fabricated systems (Din et al., 2012), the stigma of changing to the new method of construction emerged and the initiative is rather unsuccessful and slow. Hamid et al., (2016) inferred that the system has not gained construction players' trust; hence contributing to the slowdown of adoption. This has resulted in the discovery of other pertinent issues such as the following:

Absence of Specific Business Model in IBS Construction Business

Frankenberger et al., (2013) define a business model as a unit of analysis to describe how the business of a firm works. Kamar et al., (2012) in their studies exacerbate that IBS contractors are required to establish a specific business model to survive in the construction business. To adopt IBS, SME contractors need to have a strategy in their businesses since IBS is different from conventional construction (Mohamed et al., 2019). However, the research field is lacking a comprehensive framework and research papers devoted strictly to the construction business model (Ujwary-Gil, 2017). The need to establish a specific business model in the IBS construction business (Kamar et al., 2012) might potentially boost the rapid implementation of IBS.

The Monopoly of Huge IBS Players

Cost is undoubtedly the most important consideration and concern, not least in the IBS construction industry. In this scenario, huge IBS players are susceptible to providing "One Stop Centre" and offer various IBS services to clients including design, production and installation (Mohamed et al., 2018) because of their capability to provide. Project stakeholders, especially the contractors, require a strong cash flow to ensure construction projects are in progress (Mohamad et al., 2016) as they have to pay 30% of the value of the project upfront to purchase components from the supplier. Provided that there are some risks regarding the payment that contribute to pertinent issues in the IBS construction business. This resulted in lesser opportunity to get IBS project (Nawi et al., 2015b), monopoly of big players (Lim, 2018) and fierce competition of price (Pekuri et al., 2015).

A Non-Customer-Focused Oriented Business Model

Din et al., (2012) in their study found that mass production of components is one of the strategies implemented by common IBS contractors. Design defect and product defect repetition are common issues in IBS (Ismail et al., 2016). Customer's need has always been neglected due to common company strategy; which has to be the best and most profitable concept (Pekuri et al., 2014) whereby; constructing with minimum usage of internal resources and assets to maximize profitability (Lum & Lum, 2017). The emphasis on maximizing the return on investment (ROI) is also essential in profiting from the construction business over the quality of the end product (Pekuri et al., 2015).

Currently, research on the specific business model for IBS construction business is very limited resulting in the requirement to establish one (Mohamed et al., 2019); but provided that there is a lacking of study on the construction business research (Ujwary-Gil, 2017) has raised the requirement to innovate the existing business strategy from conventional method to the IBS method (Frankenberger et al., 2013). Additionally, there is a monopoly in the IBS construction business that limits only financially strong contractors to participate in the IBS construction business to avoid payment issues (Nawi et al., 2015a) that can backlog the progress of the construction. Furthermore, the non-customer focused oriented business model has caused the poor quality of work done by the contractors for the contractors has always plotted the most profitable method of construction at a very minimal usage of resources available (Pekuri et al., 2014).

Conclusively, the pertinent issues of the IBS construction business can be tabulated as Table 1: Pertinent Issues of IBS Construction Business.

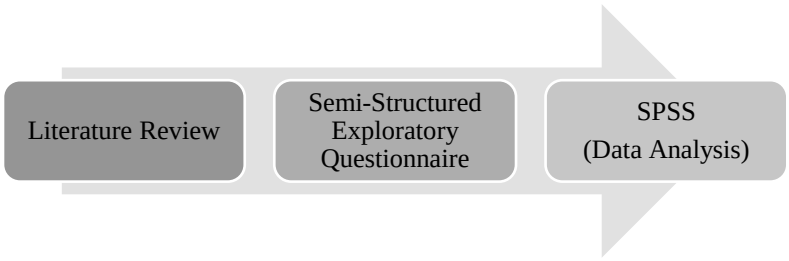
Table 1.0: Pertinent Issues of IBS Construction Business

Key Issues	Sub - Issues	Sources
The specific business model in the IBS construction business is limited.	• Requirements to establish a specific business model. • The need to innovate the conventional construction business strategy to IBS. • Lack of study on construction business research.	(Frankenberger et al., 2013; Mohamed et al., 2019; Ujwary-Gil, 2017)
Monopoly in the IBS construction business.	• Financially strong contractors are capable to provide a "One Stop Centre" to meet clients' needs; hence, huge capital investment is needed to deliver the IBS project. • Payment Issues	(Mohamed et al., 2018; Nawi et al., 2015a; Nawi et al., 2015b)
A non-customer-focused oriented business model	• Contractors always plot the best and most profitable concept of constructing with minimum usage of internal resources and assets. • Poor quality of work and product delivery by the contractors.	(Ismail et al., 2016; Pekuri et al., 2014; Lum & Lum, 2017)

RESEARCH METHODOLOGY

Bist, (2015) defines research as "an art of scientific and systematic investigation to get information about a specific topic". Aligning to that, this paper is oriented to gain insights on pertinent issues in the IBS construction business. This paper essentially employs data collected from primary sources and secondary data from relevant information on the IBS construction business. Secondary data was extracted from journals, newspapers, magazines, government agency reports, conference proceedings and web trawl. Before the distribution of the semi-structured exploratory questionnaire to forty-five (45) IBS experts, pilot testing was made to ensure the smoothness of answering the questionnaire. This exploratory study is crucial to validate the issues identified in the literature review, first-hand information and initial understanding of the subject matter. It will also contribute to the continuity of the main research.

Diagram 1: Research Paper Methodology Flow



From Diagram 1: Research Paper Methodology Flow, the research has been carried out by three (3) main processes namely Literature Review to outline a set of Semi-Structured Exploratory Questionnaires which then being distributed to targeted respondents before analyzing it via SPSS Version 27.

Literature Review

The first phase consists of a process of a literature search and finding sense-making sources focused on IBS and the construction industry to assess the in-depth knowledge on an IBS construction business issue. Selections of articles are from selected databases as shown in Table 2.0: Research Methodology. The key filter criteria were the presence of the phrases "construction business" or "IBS construction business issues" in the article title, abstract, and keywords to narrow down the selection to the most appropriate results for the research area.

Semi-Structured Exploratory Questionnaire

A set of semi-structured questionnaires were distributed to 45 respondents who have experience in IBS, namely regulators, manufacturers, contractors, suppliers and researchers. These respondents come from different disciplines that revolve around the IBS ecosystem. Twenty-five (25) or 55% of the forty-five (45) respondents had completed the questionnaire distributed. A set of questionnaires containing two (2) parts were drafted and pre-tested before the distribution to targeted respondents. The 2 parts of the questionnaire are namely Part A: Respondent's Background (Open-Ended Questions), and Part B: Pertinent IBS Construction Business (Likert Scale Questions) to gather information on the pertinent issues of the IBS construction business.

Data Analysis

Collected responses were then keyed in and analyzed using the descriptive analysis via SPSS Version 27. The mean, mode, median and standard deviation has been extracted and tabulated in Table 4.0: Data Analysis.

Diagram 1: Research Paper Methodology Flow

TITLE:
PERTINENT ISSUES IN INDUSTRIALIZED BUILDING SYSTEM (IBS) CONSTRUCTION BUSINESS IN MALAYSIA

Methodology	Aim	Research Process	Justification
Literature Review	**Build knowledge in the field** To gain a better understanding & argue relevantly to a theme in a written report.	**Search Engines** A series of keywords are keyed in on search engines and other databases like Elsevier, Scopus and Web of Science equipped by Universiti Teknologi MARA to find suitable articles related to the theme: - IBS Issues - Construction Business - IBS Construction Business - Construction Business Issues	**Pros** •The key step in the research process. **Cons** •Tendency to overlook at "grey literature" i.e., Report
Exploratory Study: Questionnaire	**General insight into subject matters** Exploratory research is the initial research, which forms the basis of more conclusive research.	**Literature Review** The gist of information was collected to form a semi-structured questionnaire. **Exploratory Study** The semi-structured questionnaire was carefully designed & adopted from previous research to be distributed. **Google Doc** Google Docs is being used to ease the process of collecting data.	**Pros** •Flexibility and adaptability to change. **Cons** •Usually make use of a modest number of samples that may not adequately represent the target population.
IBM SPSS Statistic Data (Version 27)	**Analysing collected data** To help in interpreting the data collected from the questionnaire.	**Key in of Data** All collected data from the Likert Scale questionnaire was keyed into the system. **Min, Median, Mode, Std. Deviation** These elements were tabulated after the key in using the system	**Pros** •Can handle large amounts of data & reliable **Cons** •Expensive

RESULTS AND DISCUSSION

Table 3.0: Data Collection

1 – Strongly Disagree | 2 – Disagree | 3 – Neutral | 4- Agree | 5 – Strongly Agree

Item	Issues	1	2	3	4	5
B.1	The opportunity to get an IBS project in Malaysia is difficult as most IBS technology is only applicable in Government construction projects.	3	7	10	2	3
		40%		**40%**	**20%**	
B.2	The IBS Construction Business in Malaysia is monopolized by big players causing lesser involvement of SME players.	0	1	6	11	7
		4%		**24%**	**72%**	
B.3	Return on investment (ROI) is more important than actual customer needs in IBS Construction Business.	1	4	4	11	5
		8%		**28%**	**64%**	
B.4	IBS companies need to establish a specific business model in the new playing field to ensure business continuity.	0	1	4	12	8
		4%		**16%**	**80%**	
B.5	IBS Construction Business is about fierce price competition but with mostly uniform construction activities and structures.	0	1	9	12	3
		4%		**36%**	**60%**	

From Table 3.0: Data Collection, it can be concluded that respondents who responded to the questionnaire are fully aware that there are pertinent issues that exist within the IBS construction business in Malaysia. According to the data collected from 25 respondents involved, 40 per cent (%) that equivalent to 10 respondents disagreeing that it is difficult to get an IBS project in Malaysia due to the limitation to only government construction projects, while 20% (5 respondents) agreed to the otherwise and remaining 40% (10 respondents) are being neutral to the issue statement. The issue of big players' monopoly is agreed by 72% (18) of the total respondent, while the other 4% (1 respondent) disagreed with this issue statement and 24% (6 respondents) remained neutral. Next, in line is the issue of neglecting customers' needs over ROI; 64% (16 respondents) agreed, while 8% (5 respondents) disagreed, and the remaining 28% (4 respondents) remains neutral. Due to lack of studies on the business model within IBS players, absence for specific IBS construction business model has been agreed by 80% (20 respondents) and disagreed by 4% (1 respondent) and the rest of 16% (4 respondents) respondents are being neutral. Lastly, fierce price competition issue in the IBS construction business is agreed by 60% (15) of the respondents, while 4% (1 respondent) disagreed. A total of 36% (9 respondents) of the remaining respondents are neutral on this issue.

The analysis of the data collected from the exploratory questionnaire is further tabulated as Table 4.0: Data Analysis.

Table 4.0: Data Analysis

Pertinent IBS Construction Business Issues in Malaysia		Difficult to get IBS Project	IBS is monopolized by big players	Return on Investment (ROI) is more important than customer's needs	IBS companies need to establish a new business model	IBS construction business is about competition
N	Valid	25	25	25	25	25
Mean		2.8000	3.9600	3.6000	4.0800	3.6800
Median		3.0000	4.0000	4.0000	4.0000	4.0000
Mode		3.00	4.00	4.00	4.00	4.00
Std. Deviation		1.15470	.84063	1.11803	.81240	.74833

Based on Table 4.0: Data Analysis, the patterns for mean and mode values of the issues are aligned. The average deviation for the items is less than 1 except for "Difficult to get IBS project" & "Return on Investment (ROI) is more important than customer's need". This implies that IBS projects are not difficult to get and the customer's need is indeed important rather than just weighing in on the ROI only. From the data analysis, the top three (3) pertinent IBS construction business issues are the competition and rivalry among IBS players, the absence of new business models, and the monopoly of big players on the playing field. From this exploratory questionnaire, it is found that competition and monopoly have pertinent roles in affecting the IBS construction business.

The absence of a new business model is also contributing to the pertinent issues in the IBS construction business in Malaysia which have arisen since there is a lack of studies on the business model (Ujwary-Gil, 2017). The IBS construction business in Malaysia is growing and it requires a lot of elements to be considered including the pertinent challenges faced by IBS contractors. This paper is outlined to explore and highlight the relevant pertinent IBS construction business issues that exist within the construction business ecosystem in Malaysia. It is also prepared to confirm findings from a review of the literature that hinders the fast pace of IBS adoption in the Malaysian construction industry. The findings from this paper are crucial before proceeding to plan the next course of action for the main research.

RECOMMENDATIONS

Hence, the following research recommendation has been outlined; (1) to have a thorough study regarding Business Model Framework specifically for IBS construction business, (2) to provide deeper insights on the strategies in outlining the business model in IBS construction business to allow a structured and comparable visualization of business models, and (3) to conduct further study on internal and external challenges faced by IBS contractor in IBS construction market. In conclusion, there is a need to venture into a deeper study on business models focusing on IBS to increase the adoption of IBS construction businesses. If greater attention is given to IBS's business modelling strategy, it will have great potential in agitating the adoption and penetration of IBS in the Malaysian construction industry.

CONCLUSION

The finding is anticipated to encapsulate general insights on the pertinent issues in the IBS construction business which has been lingering among IBS construction players in Malaysia. The urgency of addressing the issues of the IBS perhaps would widen the angle of initiatives in terms of catalyzing the business do-ability and promoting collaborations among players. The finding of this research perhaps could provide a lesson learnt and may only be reliable across related industries. Businesswise, the application of IBS possesses great opportunities in the Malaysian construction market as it would help to agitate the rate of IBS usage and adoption in the industry. Coping with this, knowledge of the business model is crucial in providing insight on outlining strategic business models for IBS contractors. Indirectly, this will provide a clearer path in doing business in IBS especially among SMEs. Conclusively, studies on issues with IBS are very important to be the first step in structuring the strategic business model.

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