

BUSINESS STRATEGY OF LARGE CONTRACTORS IN ADOPTING INDUSTRIALISED BUILDING SYSTEM (IBS): THE MALAYSIAN CASE

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Abstract

Industrialised Building System (IBS) is the term coined by the government and industry in Malaysia to represent the construction industry and the application of prefabrication method in building construction. The purpose of this exploratory research paper is to highlight business strategy being pursued by large Malaysian contractors in adopting IBS. The paper uses case study as research method. The analysis is based primarily on cross-case analysis and pattern matching technique. The paper observes contractors which involved in IBS are part of larger holding companies in a corporate set-up include design and manufacturing subsidiaries. The companies positioned themselves as one-stop total solution provider for IBS and offer a wider range of services from design, production, and installation to clients. To become competitive and able to create total solution, contractors need to establish cluster and consortium of integrated project team by creating a partnership when and where it is needed. A vendor development programme modelled along the lines of the development of automotive industry should also be established. Future empirical studies should extensively examine these areas, especially the development of business model for contractors. The availability of this model could help to accelerate the uptake of IBS among contractors.

Keywords: Business, Contractors, Malaysia, Strategy, Industrialised building system (IBS).

1. Introduction

Industrialised Building System (IBS) is the term coined by the industry and government in Malaysia to represent the adoption of construction industry and the use of prefabrication of components in building construction. IBS is defined as a construction technique in which components are manufactured in a controlled environment (on or off site), transported, positioned and assembled into a structure with minimal additional site work [1-4]. It consists of precast component systems, fabricated steel structures, innovative mould systems, modular block systems and prefabricated timber structures as construction components [3]. Parts of the building that are repetitive but difficult – and too time consuming and labour intensive to be casted onsite – are designed and detailed as standardised components at the factory and are then brought to the site to be assembled [3]. The onsite casting activities in IBS utilise innovative and clean mould technologies [1-3]. The construction industry has started to embrace IBS as a method of attaining better construction quality and productivity, reducing risks related to occupational safety and health, alleviating issues for skilled workers and dependency on manual foreign labour, and achieving the ultimate goal of reducing the overall cost of construction. Apart from this, it offers minimal wastage, fewer site materials, a cleaner and neater environment, controlled quality, and lower total construction costs [4-6].

The chronology of IBS adoption in Malaysia has long historical note, back in the adoption of precast elements in buildings in the 1960s, to address the acute shortage of houses. However, the introduction of IBS was never sustained in this period. As a result of failure of early closed fabricated systems, the industry is avoiding changing its construction method to IBS. Some of the foreign systems that were introduced during the late 60s and 70s were also found to be unsuitable with Malaysia's climate and social practices [4]. IBS has regained its popularity in the present day due to the problem with construction workforces where the industry has been relying for so long on unskilled workers from the neighbouring countries. In 1999, the IBS Strategic Plan was launched to promote the system's usage in the industry. This followed by the IBS Roadmap 2003-2010 [7] and IBS Roadmap 2011-2015 [8], blueprints to industrialised construction by 2015. The roadmaps have been developed to chart and guide the awareness programmes, incentives, vendor scheme development, training, quality control and research and development programmes [7, 8].

The government took the lead in 2008, by mandating that all public-sector projects must attain no less than 70% IBS content under the Treasury Circular SPP 07/2008. This policy was created to build a momentum and to establish demand for IBS components, thus bringing the cost down. For the private sector, there is an exemption to the Malaysian construction levy (contractors in Malaysia have to pay CIDB levy in the amount of 0.125% of the total cost of the project according to Article 520) on contractors that have used IBS in 50% of the building components in residential buildings [4]. The outlook for IBS implementation in Malaysia is bright, but much work is still needed from the Government to convince the contractors, manufacturers and suppliers to adopt IBS. As in September 2010, there is 129 IBS manufactures in Malaysia production 305 types of IBS products, about 217 IBS consultants and 678 contractors registered with the Construction Industry Development Board Malaysia (CIDB) [9].

2. Problem Statement

Contractors are the stakeholders dealing with project management and solving issues in construction on a day-to-day basis. They are responsible for the means and methods to be used in the construction execution of the project, in accordance with the contract documents, and for the supplying of all materials, labour, equipments (engineering vehicles and tools) and services necessary for the construction of the project. In many cases, the main contractors will delegate portions of the contract work to subcontractors. As in a common rule, contractors will provide direct labour for civil aspects of a construction project, such as placement of concrete and carpentry with specialty areas, such as mechanical and electrical construction furnished by specialty subcontractors. From the perspective of IBS, there is a general consensus that contractors among the wide range of industry stakeholders hold a very important position to ensure the success of IBS adoption in Malaysia [10]. In addition, the importance of capable contractors to construct public building has increased since the government mandating that all public-sector projects must attain not less than 70% IBS content under the Treasury Circular SPP 07/2008.

Despite acknowledging its benefits, contractors were still not rapidly practicing IBS. The construction industry is an established industry with many deep-seated and culturally-embedded practices, so the introduction of anything perceived as new or different faces barriers. The potential barriers to IBS uptake are

- Many small contractors are reluctant to adopt IBS system and prefer to continue using the conventional method of construction. This is due to the fact that contractors are already familiar with the conventional system and for them the technology suit well with small scale projects and therefore not willing to switch to mechanised based system [4].
- Small contractors lack financial backup and not able to set up their own manufacturing plants as it involves very intensive capital investment [4, 11, 12].
- The contractors need to cover the amortised cost of setting up a prefabrication yard, as well as the variable costs of manufacturing components and of their on-site assembly. Some contractors in Malaysia suffered from poor productivity and financial performance to be involved in IBS [7].
- Cost was one probable cause of concern. It states that when there is sufficient labour supply, in-situ construction methods can be more economical. Further, in IBS projects, contractors have to pay the supplier upfront to purchase components. It is a high capital investment where 30% of the value of the project is to be paid upfront [7].
- In addition, contractors also faced problem in securing progress payment from clients, thus forcing them to delay payment to components suppliers. Delayed payment means a delay in the components' delivery, which eventually affects the productivity of the projects.

3. Literature Review

To enter the IBS business, contractors shall need to have new investment approach, and financial planning, including effective combination of cost control and selection of projects that give enough volume to justify the investment [6, 8, 13, 14]. More positive outlook on investment is utmost important in order to spend funds on production facilities, product development and third-party accreditation on products and systems, which requires huge amount of resources. Further, contractors are required to establish a specific business model and to position themselves in the market. This may include an open collaborative environment to do business and create a value-driven business process to penetrate mainstream construction and clear business need statement, supported by a long-term strategic plan [13]. Another important aspect is the cost control element in project decision making [5, 14]. Contractors need to identify the cost driver and adopt a cost leadership strategy in each project [15, 16]. This incorporates prudent cost management and financial detail calculation on initial cost and investment projection [12]. In many developed countries a wide range of specialist contractors emerge in the market to capitalise opportunities. This should be emulated by the Malaysian contractors [4]. Embracing IBS requires strategy in business, and strategy is important in assessing the viability of the project. Currently, there is a lack of systematic and rigorous study on the strategic aspect and a lack of identification of the factors that contribute to IBS business success for contractors. A wider understanding of the characteristics and what is involved in IBS is needed to support the contractors in adopting IBS.

4. Research Method

This exploratory study uses case study as research method. Although case study methods remain a controversial approach to data collection, they are widely recognised in many social science studies especially when in-depth explanations of a social behaviour are sought after [17]. Case study allows the exploration and understanding of complex issues. It can be considered a robust research method particularly when a holistic, in-depth investigation is required [17]. The case study is used in this paper to highlight current business strategies being pursued by contractors involved in IBS. The analysis is based primarily on cross-case analysis and pattern matching technique. In the case study, semi-structured interviews were designed and used to obtain detailed, complex answers from the interviewees, to clarify unclear answers. A list of a few open-ended questions were arranged in a reasonably logical order and were emailed to the interviewees a week or so in advance. This would offer them comfort of the pre-planned questions and reasonable time to think of the issues. All of the semi-structured interviews were carried out with selected respondents who are managing director, senior managers and site personnel. The rigid selection of cases is the key success of the case study research [17]. This is also supported by Eisenhardt [18], as the cases may be chosen to replicate previous cases or extent emergent theory, to fill theoretical categories and to provide examples of polar types of result. The context and scope of this research is on Malaysian contractors classified under the class G7 classification, registered under the Construction Industry Development Board Malaysia (CIDB)'s registration scheme. Being the largest in term of capital, the G7 contractors will most

probably take the lead in the domestic construction industry and eventually will influence the overall constituents of the industry to change from conventional to IBS. The G7 contractors sub-contract a large amount of the contract to smaller contractors, thus creating work demand in IBS and influencing further adoptions. The G7 contractors also employ the largest group of professionals, where their perspective towards IBS is worth being measured.

5. Case Study Report

Company A was formed on 18th March 1981 to undertake this task under the management and purview of the state government economic development cooperation. The company has established under joint venture agreement with construction firm from Germany (Praton Haus) to produce pre-fabricated houses on plots of land provided by the government in town centres and surrounding suburbs. Based on their smart partnering agreement with Praton Haus, they built and operated a very modern prefabrication yard at Shah Alam using Praton Haus's belt conveyor and semi-automatic precast production from 1981 to 1991. The company was involved in a full circle of the IBS life cycle. They engaged the project from the design, manufacturing and construction phases. The close supply chain loop allowed the company to maximise profits and to deliver output much faster since they are independent from the supplier's manipulation and price hike. According to the management team, more strategic approach on investment planning is vital in IBS. Investment and capital costs involved in setting up the factory are the governing factor in total IBS costs as compared to conventional methods.

Company B was incorporated in August 2001 under a holding company and made its first modest business forays in the trading of fertilizer and supplying products to the government and private organisations. The company headquarters is based in Kuala Lumpur and it has a total workforce of 80 personnel. The company has moved from its role as a traditional contractor to be a total solution provider for clients in IBS. The company's strategy is to create a complete corporate set-up which include manufacturing and design subsidiaries. The company is involved in the design and production of shop drawings, construction and consultancy on planning and project management. It was highlighted during the case study interview that the volume of work was important for the company as IBS requires repetitive and continuous projects to be profitable. To address this issue, the company has penetrated public projects as their main target market. The company describes itself in its website as 'a leading IBS contractor specialising in public housing and institutional buildings in Malaysia'. The huge volume and repetitive design in public buildings would literally pay off their earlier investment to set up prefabrication facilities.

Founded in 1996, Company C has an annual turnover is in excess of RM 10 million. The company headquarters is in Klang, about 70 km west of Kuala Lumpur, near Port Klang, and their prefabrication yard is located at Rasa Industrial Park, 60 km north of Kuala Lumpur. From its inception in 1996, the company has been reputed as a progressive infrastructure contractor in Malaysia. In 2000, the company embarked on an expansion plan to transform it into a holding company with diversified interests in construction, property, development, manufacturing and machinery. By the end of 2001, the company

had started expending the potential use of IBS method in buildings and become a part of larger holding companies in the corporate set-up which include manufacturing and design firms. To position itself in the market, the company is moving from a contractor role and producer role to be a total solution provider for clients to use IBS. The company established as a one-stop centre for IBS providing a wide range of products and services from design to installation with the capability of providing turnkey services.

6. Analysis and Discussion

6.1. Business Entry

The case companies as observed are not conventional contractors changing to adopt IBS. They started to use IBS method from the beginning of their inception. It was observed that the contractors are part of larger holding companies in the corporate set-up which include manufacturing and design subsidiaries. Company A started their trade by doing a joint venture or partnership agreement with international firms. This has accelerated the company's learning curve. Company C has come from an infrastructure background and have utilised their precast expertise and knowledge in the building industry.

6.2. Positioning

The case companies possessed in-house capability in design and manufacturing at some point but also outsourced systems and implementation. The companies positioned themselves as one-stop solutions for IBS and offered a wider range of services from design, production, and installation. Company B is very similar to Company C in being specialised in public sector building works, in its vertical integration into both property development and the sale and manufacture of building materials and precast products, and in the development of precast construction methods and technology in their patented propriety system.

There is also evidence, though anecdotal, that the contractor's key strategy is their ability to get volume and the ability and knowledge to manage the design, manufacturing and construction under one roof. To position well in the market, all case companies are indeed becoming a total solution provider to clients. They claimed that they were an IBS one-stop centre, providing a wide range of products and services from design to installation with the capability of providing turnkey services for every stage, from contract, design, and production to construction. This is important if they are to capture a larger market for the entire project's value chain since not many in the industry are knowledgeable in IBS processes and implementation. The contractors also remarked that the main business strategy is to monopolise and adopt close system. The case companies or their subsidiaries play the role of designer, producer and installer of an IBS proprietary system across the supply chain. This can only be done by having all the activities to be conducted in-house, in one link of subsidiary companies and in a close system.

6.3. Market Target

Company A produces pre-fabricated houses on plots of land provided by the government in town centres and surrounding suburbs. Company B and C were focused on government's projects since the government mandating that all public-sector projects must attain no less than 70% IBS content under the Treasury Circular SPP 07/2008. It is a huge market given that the government is still the main construction client in the country.

6.4. Business Structure

The case companies are subsidiary of a holding company. There is also evidence that their holding company has normally initiated a target plan or estimation plan on the volume of construction. In many cases, they guarantee a volume of construction to be constructed by the company. This huge guaranteed volume or critical mass allows contractors to plan for investment and helps them in terms of production continuity. This has also allowed innovation to take place. Other benefits of this set-up are the ability to share know-how and risk sharing in terms of trying untested processes and systems. The holding company also acts as a safety net for the company during the economic downturn. The companies which are standalone entity would face difficulties in planning for investment or in embracing IBS production since the critical mass is not guaranteed.

6.5. Business Operation

The case companies as observed are not a user of technology or limit its role as project manager and assembler. Most successful IBS contractors have an in-house manufacturing and design capacity operated by their subsidiaries. They also invest in and sometimes invent systems, and so do not just depend on existing manufacturers. The in-house production capability to supply in their project is important and perhaps also a decisive factor, since profit distribution is not same as embracing conventional method. Unlike in the conventional project, IBS contractor operating without the manufacturing capability is required to purchase components from other manufacturers and this has put away a huge amount of the contract sum from them. As a result, the contractor was left to work on a very low profit margin. The price of components was also easily manipulated by the suppliers. By acquiring manufacturing capability operated by their subsidiary, one can have control of the process, and the wealth distribution can be adjusted accordingly across IBS projects embarked upon by the company. Satisfying IBS requirements at low costs is a necessary but not sufficient condition to achieve sustainable competitive advantage. That ability does, however, enable contractors to secure more contracts. With more contracts in hand, they are able to exploit economy of scale and move up the learning curve, thus going through the virtuous circle of lowering overall construction costs further still and becoming ever more competitive and consequently winning more contracts.

A summary of the analysis and discussion of the three companies in Sections 6.1 to 6.5 is shown in Table 1.

Table 1. Analysis and Discussion.

Company	Company A	Company B	Company C
Finding			
Business Entry	Joint venture/Partnership agreement Not conventional contractor change to IBS – start IBS from beginning of it inception	Not conventional contractor change to IBS – start IBS from beginning of it inception	Infrastructure background – utilise precast expertise and knowledge Not conventional contractor change to IBS – start IBS from beginning of it inception
Positioning	Total solution provider to clients	Total solution provider to clients	Total solution provider to clients
Market Target	pre-fabricated houses	government’s projects	government’s projects
Business Structure	subsidiary of a holding company	subsidiary of a holding company	subsidiary of a holding company
Business Operation	In house capability in design, manufacturing and construction	In house capability in design, manufacturing and construction	In house capability in design, manufacturing and construction
Strategy	Close supply chain loop allowed the company to maximise profits and to deliver output much faster since they are independent from the supplier’s manipulation and price hike. More strategic approach on investment planning is vital such as capital costs involved in setting up the factory.	The volume of work was important for IBS requires repetitive and continuous projects to be profitable. Therefore, the company has penetrated public projects as their main target market. The huge volume and repetitive design would pay off their earlier investment to set up prefabrication facilities.	To position itself in the market, the company is moving from a contractor role and producer role to be a total solution provider for clients to use IBS. The company established as a one-stop centre for IBS providing a wide range of products and services from design to providing turnkey services.

7. Conclusion

The IBS market is an emerging and important market in Malaysia. The application of IBS is made mandatory by the government in order to construct public buildings. The purpose of this exploratory research paper is to highlight current business strategies being pursued by contractors involves in IBS construction. It is important to understand that IBS contractor should transform their business process toward engaging design and manufacturing in their supply chain. The target markets for the contractors in early stage are on public building projects and residential project. Most of the contractors which involve in IBS are a subsidiary of a larger group of companies. The companies positioned themselves as on stop total solution provider for IBS and offer a wide range of services from design, production and installation for clients.

8. Recommendation

The urgency to have capable IBS contractors has increased since the government mandating that all public-sector projects must attain no less than 70% IBS content under the Treasury Circular SPP 07/2008. The government is not able to wait for the establishment of a large number of IBS contractors from its inception in a short period of time as depicted in the case study. There is a need for the 64,000 existing conventional contractors at all level in Malaysia to shift their practices to IBS. Therefore the following recommendation has been derived

- The contractors might consider creating cluster or a consortium of integrated team by creating a partnership when and where it is needed. The positive integration of supply chain has become a major factor in delivering successful construction projects. The integrated team brings together a series of different organisations consisting of IBS key players (client, designer contractor, and specialist/manufacturer), which is linked by a flow of practices, information, financial, and contractual relationships. This is to allow them to work together toward design and construction practices within the context of the project procurement delivery arrangement approach with the same common goals and objectives. This approach will help to create a new environment within which IBS can flourish in a much shorter time and create more integrated and capable supply chain.
- A vendor development programme modelled along the lines of the development of automotive industry should be established to target delivery of building components for the construction. The selected vendor are to be provided training, seed capital, components design, and selected private sector consultant to start up production factories. The location of this vendor's manufacturing plant has to be located in the areas with available IBS project to be constructed in the future. The government can help by conducting market research to ascertain market opportunities to the vendors. The vendors also need inventory management consultancy and advice and development of better tools and infrastructures required for location of manufacturing plant.
- The government should launch a forum on a regular basis of academics and associated practitioners active in IBS for exchange of information and experience, development of new techniques and advice on promotion and implementation of IBS. An online portal was also suggested to disseminate international trends, products and processes associated with the IBS.
- The government should facilitate joint venture agreement between local contractors with semi-government bodies or government-linked companies to develop housing using IBS systems and aggressively assist joint ventures agreement between local and international IBS contractors.
- IBS association to create "one voice" for the industry should be established among the contractors hence better defines and communicates their needs. This cluster could also undertake the role of lobby group for IBS.
- The competition in the public construction market could be further maintained by the entry of specialist prefabrication sub-contractors. When there is a need, a cluster of specialist contractors, similar to others in

especially the building services sector, would enter into the market to compete for IBS works outsourced by the contractors who do not have their own in-house plants to manufacture the modules. Instead, one needs to start strategising and capitalise market positioning in this new playing field that have been created to spur our growth.

- The Malaysian contractors need to venture overseas to tap on global market. The CIDB and other related government organisation should play a key role in encouraging local construction companies to establish strategic partnership to venture overseas markets using our local expertise on IBS method.

9. Future Study

Future empirical studies should extensively examine these areas, especially the development of business model for contractors and its implementation. There is a need to thoroughly examine the role of medium-sized contractors in IBS to support the adoption such as to be a product vendor or installer under an umbrella system. It would investigate the holistic value chain of IBS and how technology transfer and benchmarking can expedite their learning curve. It is also important to study in detail the business process involved in the application of IBS in construction and the financial aspect, as in the loan and payback system that can be implemented in the current banking system and to study the most appropriate safety net that can be instituted to motivate the contractors to be more innovative in IBS and involved in high technology such as robotics and modular building. This knowledge on this will accelerate IBS uptake in Malaysia among contractors.

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