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Success Factors Among Industrialised Building System (IBS) Contractors in Malaysia

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Abstract. Construction joint ventures in Malaysia are become increasingly popular both with local and foreign companies in order to achieve their individual objectives. The contractors need to know the success factors, which were consider critical for their JVs to be successful. This paper aims to identify the success factors of joint venture projects among IBS contractors in Malaysia. Questionnaires were distributed to 200 IBS contractors registered under the Construction Industry Development Board (CIDB) in Malaysia with fifteen percent (15%) replied. Questionnaire consists of information regarding the level of joint venture acceptance and the success factors of joint ventures among IBS contractors. It was found that there were nine (9) factors of success which were experienced workforce and technical capability, skilled labour for site installation, good working collaboration, coordination of design, manufacture and construction, effective communication channel and close relationship with suppliers or contractor. It is recommended that these nine factors are considered as the key success factors of joint venture among IBS contractors. It is hope that those factors will provide useful guidelines for all contractors whom intend to pursue the joint venture on IBS projects.

1. Introduction

Due to these circumstances, the government has taken a lot of effort to promote the usage of Industrialised Building System (IBS) as an alternative construction method compared to conventional building system. Therefore, 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 of skilled workers and dependency on manual foreign labour and achieving the ultimate goal of reducing the overall cost of construction. Aside from this, it offers minimal wastage, fewer site materials, a cleaner and neater environment, controlled quality, and lower total construction costs [1-3].

Even though IBS has been introduced in Malaysia over a decade ago, until today most of the IBS project is still based on the traditional construction project [4-5]. Thus, the construction sector itself must play a role in creating a market for the (IBS) project and this opportunity for sharing knowledge and innovative ideas to be incorporate into new buildings of IBS can be created by joint venture agreement [6].

1.1 Joint Venture

The problems and difficulties faced during the implementation and operation of the IBS project are one of the reasons most of the contractors are not involved in IBS projects. Contractors need to take a new investment approach and financial planning, in addition to an effective combination of cost



control and selection of projects that gives enough volume to justify the investment to enter the IBS project [7-8]. All parties are required to have a close collaboration and by forming a joint venture, it can expand their business and simultaneously bring positives changes to the industry.

A joint venture is a contractual business undertaking between two (2) or more parties involved in one project. A joint venture normally involves at least two companies to achieve the same goals where these companies may have differences. These companies generally have the tendency to expand their business [9] and to compete in a global economy where investment is important. [10]. With good collaboration and commitment, it will help the joint venture firms to perform better in accessing new markets, knowledge, capabilities, and other resources [11].

1.2 Industrialised Building System

Industrialized Building system (IBS) is a construction system that is built using pre-fabricated components. Machine, formworks and other forms of mechanical equipment are systematically done for manufacturing of the components. Construction sites are only for assembly and erection while the components are manufactures offsite and once completed, it will be deliver to sites [12].

Cost saving and quality improvement will be enabled through the reduction of labour intensity and construction standardization since IBS which enables on-site prefabrication or pre-cast building components manufactured at factories. In addition, IBS offers minimal wastage, less site materials, cleaner and neater environment, controlled quality and lower total construction cost [13]. .

The success of IBS in those countries is prompted by anxiety of home buyers about long term energy saving, indoor air quality, and other health and comfort related issues, commitment and cooperation between the public and the private sectors as contribution to greater technological improvement and innovation. If Malaysia wishes to emulate the success of those countries, a long term comprehensive policy towards the industrialization of building and construction sector should be pursued [14].

Despite all the advantages of adopting IBS from observation number of the construction industry players still hold a biased perception of IBS. However, IBS has revealed that the savings in the construction time is able to compensate the higher construction cost incurred.

2. Methodology

The information and data gathered from the survey were arranged and prepared using the frequency and percentage method and average index method in relation to the targets, objectives, scope, and extent of the study. Two statistical methods were applied, namely descriptive statistics and inferential statistics. The formula used is:

$$\text{Percentage (\%)} = (n/N) \times 100\%$$

Where,

n = Number of respondents

N = Total number of respondents

Two hundred (200) copies of questionnaires were distributed to IBS G7 contractors registered under the Construction Industry Development Board (CIDB) in Selangor, Malaysia with only fifteen percent (15%) of the questionnaire were returned. The questionnaires were divided into four (4) Sections, which consist of 23 questions. Questions based on the Likert scale were analysed by using the average index method, and the outcomes were presented in the form of an average score or mean. For the Likert scales questions, answers were to given in the form of a scale of 1 to 5. A scale of five (5) categories was used for the average index method to show priority. The weightage for the analysis was based on the thirty (30) respondents. The Likert scale was based on 5 points, 1 for strongly disagree, 2 for not agree, 3 for neutral, 4 for agree and 5 for strongly agreed. The questionnaire also required the demographic profiles of the respondents.

3. Results and Discussion

3.1 Section A: The Respondents Profile

This section also helps to identify the background details on their companies and their experience in IBS construction field.

Table 1: Company specialisation

Specialisation	Respondents
B01: IBS Precast Concrete	3
B02: IBS Steel Formwork System	8
B19: IBS Formwork System	6
B22: IBS Block System	3
B23: IBS Timber Frame System	0
TOTAL RESPONDENTS	30

Table 1 shows most of the respondents represent companies that had been registered in CIDB for company specialisation of IBS, 40% of which was contributed to the IBS Steel System followed by IBS Formwork System Specialisation, IBS Precast Concrete, IBS Block System.

Table 2: Consulting activities in IBS project

Activities	Respondents
Civil Engineering and Structures	12
Industrial Building	1
Commercial Building	2
Property Department	3
Residential Building	4
Infrastructure Works	5
M&E Maintenance	3
TOTAL RESPONDENTS	30

Table 2 shows the respondents' consulting activities in IBS project. It can be concluded that civil engineering and structure sector are involved in IBS system.

Table 3: Company involvement in IBS

Total Years	Respondents
Less than 1 year	5
Between 1 to 5 year	10
More than 5 year	15
TOTAL RESPONDENTS	30

Table 3 shows that 50% of the respondents have been involved with more than 5 years in IBS projects.

3.2 Section B: The Level of Joint Venture Acceptance Among IBS Contractors

Table 4: The level of joint venture acceptance among IBS Contractors

Cost factors	Mean / Average Index	Overall Rank
Reduce labour cost	3.70	1
Sharing in construction cost	3.63	2
Reduce capital cost	3.60	3

Reduce transportation cost	3.07	4
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Table 4 revealed that most of respondents agreed that reduce labour cost received the average mean of 3.70 followed by sharing in construction cost. Capital cost received the average mean index of 3.60 followed by transportation cost. It was confirmed by Kamar et. al. (2011) [15], the heavy capital cost involved in (IBS) will result in the contractors' insufficient capacity to secure project.

3.3 Section C: The Implementation of Joint Venture Among IBS Contractors

Table 5: The implementation of joint venture among IBS contractors

Factors	Mean / Average Index	Overall Rank
Technology transfer and skilled worker	4.07	1
Quality of material and speed of construction	4.00	2
To access greater expertise	3.97	3
Integrated culture and practices	3.90	4
Good relationship with client/ authorities	3.87	5
Risk reduction and financial	3.83	6
Satisfactory profit & return on investment spread	3.83	6
Maximizing the profit	3.77	7
Government promotion (Eg: Government offer more Incentive)	3.73	8

Table 5 shows that there were (9) factors that contributed to the implementation of joint venture among IBS contractors. Technology transfer and skilled workers received the highest mean average index of 4.07 followed by quality of material and speed of construction. Hereby, by forming JV will improve the quality of material and speed of construction of IBS project. [16],

Access greater expertise is the third highest average index with 3.97 followed by integrated culture and practices and good relationship with client/ authorities (3.87). Risk reduction and financial and satisfactory profit & return on investment received the same mean average index of 3.83 while maximising the profit received 3.77 followed by government promotion.

3.4 Section D: The Success Factor of Joint Venture Among IBS Contractors

Table 6: The success factor of joint venture among IBS contractors

Factors	Mean / Average Index	Overall Rank
Experienced workforce and technical capability	4.20	1
Skilled labour for site installation	4.13	2
Good working collaboration	3.97	3
Coordination of design, manufacture and construction	3.93	4
Effective communication channel	3.90	5

Close relationship with suppliers or contractor.	3.83	6
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Table 6 shows that experience workforce and technical capability received the highest mean average index followed by skilled labour and good collaboration. The respondent agreed that good working collaboration and coordination of design, manufacture and construction were in the 3rd and 4th rank with an average index of 3.93. The effective communication channel and close relationship with suppliers or contractors were in 5th and 6th place with the average index of 3.90 and 3.83.

Most of the respondents agreed that the current construction industry is facing problems due to too much dependency on foreign workers. By forming joint venture among IBS contractor, it could reduce labour cost and lessen dependency on foreign workers since IBS will involve on skilled labour only. A planned approach is necessary to ensure successful implementation and to build company's strengths, spreading costs and risks, improving access to financial resources, economies of scale and advantages of size and access to knowledge transfer. Respondents agreed that speed of construction on using IBS will reduce time consuming and avoid delay in term of formwork erection. The success factors of the construction project depend highly on the quality of competent human and entities or organization that are able to work as a team in joint venture. IBS systems need skilled labour compared to conventional system as they need high capital cost and construction cost. Furthermore, good working collaboration and coordination of design, manufacture and construction, effective communication channel and close relationship with suppliers and contractors were important to produce the IBS project completed on time.

4. Conclusion

Joint venture is recognised to be a suitable approach to be implemented by IBS contractors in construction industry. It can lower the risk of project failure while increasing their profit margin. Most importantly, by entering joint venture, it may give contractors a chance to experience and involve in a long-term collaboration that requires a high level commitment for both partner, thus providing benefits for both parties in the long run. They agreed that experienced workforce and technical capability, skilled labour for site installation, good working collaboration, coordination of design, manufacture and construction, effective communication channel, close relationship with suppliers or contractor were factors crucial towards the success of implementation JV. As a whole, joint venture offer many benefits to those involved in IBS project. As a result, they hope that they can practice joint venture in any IBS project and in similar economies.

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