

# Payment Issues in Industrialized Building System (IBS) Projects in Malaysia: Towards a Better Approach

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**Abstract**— Industrialised Building System (IBS) was first implemented in Malaysia during the year 1960s and since then it has shed light on the many advantages this system has to offer such as having a systematic and efficient deliverable of fabricated factory-made products, reduced construction period, improved safety on site and many more. Nevertheless, despite the benefits, the level of uptake till today is still way lower than expectation and one of the main contributors to this dilemma is the payment issues that surround projects that uses IBS system. Due to the different nature of work between IBS and conventional in-situ construction, there is a need for proper handling of payment mechanisms so as to not cause burden to any party which would contribute to poor IBS adoption rate. This paper therefore explores the risks associated with IBS uptake, the payment issues surrounding its projects in Malaysia, the way forward and to propose other payment method that suits Malaysia. Besides performing extensive literature reviews, expert opinion was also obtained by interviewing four (4) Malaysian construction industry practitioners from different supply chains of an IBS project with each of them possessing a minimum of 25 years of working experience. Their vast experience was important in getting an insight on the real-world scenario of the subject matter. In the end, it was found that IBS adoption in Malaysia is generally still at far from convincing and poor payment mechanism was a major contributor to this scenario thus, to improve the situation, initiatives should come not only from the government bodies but also from financial institutions; and attention should be placed from both technical and procurement aspects if any improvement on IBS uptake are to be expected.

**Keywords**— *Construction Industry, Industrialised Building System (IBS), Malaysia, Payment Issues, Payment Mechanism.*

## 1. Introduction

The construction industry is known as the main drivers to the development of Malaysia economic growth and tortuously has a major impact on other industry. Due to the increase in a number of developers in the market, many developments had been made. The increasing number of development in Malaysia has given rise to a problem in the industry such as insufficient delivery and methods of construction and also given rise to many fatal cases in the industry. Due to the problem faced in the construction industry, a government had decided to take into practices IBS system into Malaysia construction industry to produce more efficient and productive way of product delivery in the industry.

In definition, Industrialized Building System (IBS) can be known as a system that involved the usage of prefabrication practice in producing construction materials for the industry [1]. There are several benefits of implement IBS system in the construction industry which are reduce the construction period, cost saving, reduce the foreign workers, increase the quality of products, provide safe and healthy working platform and increase the cleanliness of the construction site [2]. IBS system also can be seen as an organized and well manage system whereby it takes into consideration of cleanliness and productivity in delivering a product [3].

Even though IBS system had been implemented and practiced in Malaysia since the year 1960 by one of its pilot flat project but the level of adoption and acceptance by the industry players in still low [4]. The method of construction by using traditional method is still one of the most selected types of construction delivery that being used by the industry players. There are many barriers at which could be identified as the main causes that contribute to the less adoption of IBS system in

Malaysia construction industry. The barriers can be defined such as the high cost of the project that involved, lack of communication among players in the industry, followed with inefficient of collaboration and time management [5]. According to [6], among the main barriers to adopt IBS in Malaysia are identified as payment mechanism that involved industry players such as the client, contractor and manufacturer.

## **2. Risks in IBS Implementation**

A study by [6] found that one of the main issues that lead to low adoption of IBS in construction project is due to difficulties in terms of payment mechanism and procedures. The importance of coordination and management followed by good collaboration is vital in ensuring success of IBS projects. A lack in proper communication, management and coordination could contribute to delays and payment issues especially to the IBS supplier due to waste of material delivered to site.

There are also certain risks associated with adopting IBS in construction project and requires proper consideration by contractors [7]. According to [8], traditional construction methods are still the most preferred ones among contractors considering that during slack periods it would be easier for them to lay off their labours. Also, [9] elucidated that the reluctance to move to a mechanised based system is generally due their unwillingness to get out of their comfort zone since they are already well adapted to it and that the procurement methods involved also suit well with the small scale projects. On the other hand, [10] asserted that the construction industry players, especially private ones were also unconvinced with the cost-saving aspect of IBS especially with the lacking number of building projects.

## **3. Payment Issues in IBS Projects in Malaysia Construction Industry**

### **3.1. Payment Mechanism**

Payment can be generally defined as a transaction that involve an exchange of money with goods or services [11]. In the construction industry, payment will be made after the contractor has done their job scope with good performance [12]. The payment issue has long been a trouble and has caused several negative effects to the Malaysian construction industry. According to [11], the payment in construction project plays an important role to make sure the objective of the construction project can be achieved [6]. If there are late

payment issues, it will affect the progress of the work and may cause project delay due to the contractors not receiving their invested money from the client. Besides, payment issues will also lead to the problem of liquidation and affect the profitability of a company. For example, should client fail to properly pay the main contractor, it will lead problem in payments between the main contractor and sub-contractor, sub-contractor and suppliers, and so on which would certainly affect the progress of work. This situation will lead to decreased profitability [13], project delay [11], and threaten contractors' reputation [14].

The migration of construction method from traditional into IBS system had brought changes in terms of delivery and payment methods in the industry. On current practice in the Malaysia construction industry, there are certain issues in terms of payment security and mechanism in relation to any IBS project in Malaysia. Therefore, under this circumstance, it requires the contractor to make an early deposit to the manufacturer which led to the issues of cash flows among contractors [15]. According to [6], payment issues had been one of the major barriers among players in the industry to adopt IBS system in any project. Referring to IBS system process and how is it fit in a project, a contractor needs to have a strong cash flow to buy materials and components from the manufacturer [16]. The inconsistent of cash flow among contractors led to the problems to adopt IBS in the industry. According to [6], there is a gap between early payment that received from the client by the contractor and the required payment from contractor to the manufacturer.

The contractor that involved will receive 10% initial payment from client meanwhile another 75% will be required by the manufacturer from the contractor in order to make and deliver the manufactured components to the site [16]. The gaps that involved had contributed to the cash flow problems for contractors practising IBS system. These circumstances have also become unfair to certain parties in the industry especially to the subcontractors that do not have a strong cash flow background to perform in IBS projects. These issues had given rise to the problem of IBS adoption among the new and small players in the construction industry. It also contributes to the unhealthy type of competition among industry players. There are also certain conditions that requires small contractors to deal with financial institutions to make a bond of the guarantee before involving in any IBS project [15]. These complex procedures have also become a major concern in the industry among the contractors to start to implementing IBS. According to [17], problems

related to low IBS implementation in Malaysia is also caused by the lack of proper contract type to cater for IBS projects. A study by [17], stated that cost issues, followed with financing problems, an inefficient procedure in getting a loan from a financial institution and the high price of material cost as the main issues related to payment problem faced by IBS contractor. The payment received by the IBS contractor is different compared to the conventional method. The gaps that exist between the payment from client to the contractor and the amount to be paid by the contractor to manufacturer is one of the main issue that has led to problems by contractors to maintain their business in the industry.

Inefficient type of collaboration that is led by poor management also cause payment problems. Smaller contractors with poor financial capacity, combined with the low number of financial institutions that could provide a loan for IBS project, also has contributed to the low adoption of IBS adoption within the industry. Beyond that, unstable material prices also makes the task of maintaining contractor's profit even harder since price fluctuations directly affects production costs [17]. It is difficult for contractors to compete and sustain their business along with another foreign investor in the industry that possesses high financial capability [18]. In light of all these problems, it has led to the contractor in Malaysia to maintain using a conventional method as they find it easier to implement and gain profit in the market [8]. Moving from conventional to IBS required more time, financial resources and manpower at which is difficult to implement compared to conventional method and this has led to the rejection of IBS practice among contractors in Malaysia [6].

### **3.2. Factors Contributing to Payment Issues**

According to [19], there are five main factors contributing to the payment issues for the IBS contractor. They are:

#### **3.2.1. High Initial Cost**

According to [20], IBS require large cost and capital including the need to set up factories, supplying machinery and moulds, and the whole expenses of travelling (totalling 3% - 5% of their total cost for distance of not more than 50km – 100km. To cover these expenses, a deposit of about 30% of the total payment for the project will be needed from the contractors. However, due to the payment culture in the construction industry is

based on total work done on site, this deposit of 30% is not claimable yet since there is not progress on site at that moment. Furthermore, to practice IBS, a factory may not have sufficient budget to accommodate for new equipment, machinery, training and expertise to complete cycle of IBS practice.

#### **3.2.2. Difficulty in Securing Timely and Adequate Financing**

As have been mentioned, setting up IBS factories require a huge sum of money and that the payment mechanism which is based on work done on site makes IBS uptake very difficult financially. This difficulty has led to contractors feeling insecure in term of financial aspect. Hence, the IBS projects should be treated differently since the project does not progress as those of conventional ones. A mechanism to pay for initial payments to manufacturer should be created to ensure contractor's survival in this tough industry.

#### **3.2.3. Lack of Integration at Design Stage**

The design stage has the most influence toward the total construction cost as every decision made in this stage will severely affect the cost pattern during construction and post construction stage. Thus, the involvement of IBS practitioners in this stage is essential as they are the experts and their advice and opinions are vital in the effort to improve the budget allocations. Indirectly, this action will ensure that the correct amount of payment is made in projects.

#### **3.2.4. Difficulties Obtaining Loans from Financial Institution**

The IBS practitioners generally face a hard time getting their loans approved by financial institutions since many of them are quite reluctant to provide loans to the IBS practitioners. While there are chances for funding, typically the conditions are quite tight and needs tedious documentation procedure to increase the chance for approval.

#### **3.2.5. The Increase of Material Prices**

Material prices in construction industry tend to fluctuate a lot in the market. An increase in material prices can severely affect the total production cost. In IBS practice, the increase of prices for materials to make moulds would directly increase the initial and recurring cost of productions, especially with the current economic

situation which is unstable and inflation rates are quite high. Typically, material prices tend to fluctuate every quarter-yearly and this causes difficulty for IBS practitioners to sustain the equilibrium of their profit.

#### 4. 4.0 Approach in Improving Payment Issues in IBS Projects

A study by [7] stated that there are numbers of approach that can be taken towards a better payment mechanism in IBS project in Malaysia. Firstly, the need for Research and Development (R&D) initiatives on IBS to be developed in Malaysia that function as a reference point for the players in the industry for them to get assistance in form of consultation and training for properly conducting IBS projects. Secondly is by the government introducing incentives schemes towards lowering the cost of adopting IBS in Malaysia.

##### 4.1. Government Incentives

Incentives can become an important assistance especially for the small contractors that have lacking financial capabilities. This approach can be seen as one of the good starting points to give a chance for every player in the industry to involve in the IBS project and at the same time help in promoting good practices of construction method through IBS clean practice. A healthy competition can also be developed by offering a fair chance to contractors at all level to involve in the IBS market.

##### 4.2. Minimising Monopoly Powers

Current practice in the industry suggests the existence of few monopolies in IBS projects. This could increase IBS production costs which can lead to contractors shying away from its uptake. Through the formation of group of suppliers as well as encouraging new IBS technology providers, the monopoly environment could be minimized thus better promoting IBS uptake in the construction industry.

##### 4.3. Industry payment benchmark

The payment procedures involved in IBS project should be taken into consideration by the client organizations. Every player in the supply chains that involved in IBS project need a guarantee in terms of payment and it would be better that the current payment methods are revised to suit the environment in which IBS projects operate in. Parties involved in the industry should be

encouraged to propose payment benchmarks that best suit IBS projects.

##### 4.4. Financial Assistant

As per the current status, the number of a financial institution that provide financial loan to IBS project in Malaysia are extremely limited. Therefore, there is a need for an initiative, preferably by the government, to assist in increasing availability for these financial assistances to help the small contractors to take part in the IBS market. Guidance and training from the government especially for the small contractor firm are also important to help them develop good financial strategy to capitalise on IBS project in future.

##### 4.5. Partnership

Other promising approach to increase IBS uptake is by promoting partnership among small contractors and manufacturers on long-term basis thereby enabling the bigger organizations to assist smaller ones to survive in IBS projects thus rejecting the stereotypes of lack in abilities for the small company to take part. A partnership can also be promoted involving local and foreign IBS contractor at which allows for not only combining financial capabilities but also for transfer of knowledge and expertise in handling and managing IBS projects.

## 5. Interview Findings

Towards proposing new payment mechanism and approach for IBS projects, a number of interview has been conducted the Malaysia construction industry experts with all of them having a minimum of 25 years of experience working in construction industry in attempt to obtain their opinion and suggestions. The following are the characteristics of respondents approached for interview:

- **Respondent 1 (R1):** R1 is Project Manager in a contractor company with 28 years of working experience in construction industry. R1 has adopted IBS system in his projects.
- **Respondent 2 (R2):** R2 is a Director in a Supplier / Technology Provider company and has 30 years of working experience in construction industry. His company specifically supplies technology systems that relates to IBS System such as Light Weight Block, Light Weight Panel, supply

equipment, raw material, and building technology.

- **Respondent 3 (R3):** R3 is a Director in a Quantity Surveyor consultant firm with 40 years of working experience and he has experiences in IBS projects.
- **Respondent 4 (R4):** R4 is a Project Manager in a developer company and has 25 years of working experience. He has used IBS system some of his projects such as the construction of affordable housings, a 12-storey multi-storey car park and 5 towers of condominium.

Based on the interview with respondents, it was evident that all respondents had good understanding on the concept of IBS system – which is obvious looking at the number of years of experience they have had in the construction industry (i.e. 25 to 40 years). In overall, it was found that there generally a few types of IBS system, such as - using partially precast concrete components blocks and panels but the frame is conventional; steel framework system but the frame is conventional; and using full precast concrete components. Other than that, there are also five categories of IBS in general namely precast concrete system (wall, slab, column and 3D components), steel formwork system, pre-fabricated timber framing system, block work system and steel framing system. The interviewees also generally agreed that IBS is environmentally friendly, cost saving in long run and offers better productivity when compared to the conventional system.

The following are responses from interviewees in relation to their experience with the problems in IBS as well as their suggestion to improve the situation and the payment mechanisms for IBS project

#### *i. Support from Financial Institutions*

This was mentioned by R1. According to him, he has had payment issues in the past whereby the initial cost for implementing IBS was high and his company almost could not cover the cost in the initial stages. However, with help of a loan by a financial institution, they survived the hard situation. They manage to achieve their break-even point after several progress payments and thereafter managed to cover the whole cost used for the project. R1 acknowledged the importance of assistance from financial institution in the quest for them to continue with their project until finish.

#### *ii. Having Sufficient Company Asset / Cash Flow*

This was mentioned by R2. Although R2's company generally did not face any payment issues being a supplier (because normally contractors will make payment to them when purchasing their products) however, he highlighted that the secret to their success in handling financial issues was mainly due to the strength of his company cash savings which played a significant role in helping them survive during hard times. On top of that, they also had some credit from their suppliers which further strengthened their financial position.

#### *iii. Shortening the Payment Term from 45 Days to 30 Days to the Contractor*

This was highlighted by all respondents. According to them, the IBS system is a valuable construction method as it provides significant cost savings compared to using conventional formwork, for example, debris/waste due to conventional formwork are greatly reduced and cost savings due to expensive timber prices. IBS system is neither valuable nor invaluable to their company but what it does is that it provides them with the different scope of preparing their documentation especially since most IBS components were structural in nature such as slab, column, and beam. Besides, they felt that the traditional method of taking-off / quantification of all those elements are replaced by IBS components and that has allowed them to expedite their services to Client e.g. in preparing the Bills of Quantities. The only downside is that there is a lack of information from IBS companies due to the low number of IBS system provider in the country – that was restricted to only 5 – 6 companies. Therefore, cost wise, it made sense for clients to compare the use of in-situ conventional building system with IBS.

Although IBS system brings lots of benefits to environment and respondents' company, there were still payment issue. According to R3, he once received a message from a small contractor company highlighting their tight cash flow due to the big sum of initial investment in IBS. From his past experience, the return of investment starts from the second or the third usage of the IBS. From time to time, when there are modifications on existing design, missed out details, etc., it will cost hundreds of thousands. Therefore, when the main contractor is expected to pay upfront to the IBS fabricators before the fabrication works can start, they had to delay payments to their sub-contractor and thus affect the sub-contractor's productivity.

The respondents typically fancied a payment term of 30 days rather than the current practice which is 45 days to provide greater flexibility for the contractor and at the same time not affecting the client too heavily.

**iv. *Proposing a New Payment Mechanism that Suits the Current Practice of IBS in Malaysia Construction Industry***

According to R4, the current standard form of contract documentation in the Malaysian Public Works Department (PWD) does not allow the IBS components to be paid according to the traditional material on site mechanism. This is due to the traditional method of evaluating claims were based on progress on site but not the total expenses spend for the construction project. It was advised for PWD to amend the current payment mechanism to a more appropriate one to suit IBS practices in Malaysian construction industry. The initial cost to practice IBS is significantly high and the conventional approach will not ensure the survival of those organization that newly adopt them. Therefore, it is not peculiar that most of the organization fail in the implementation of IBS due to the unfair payment mechanism which does not consider the total expenses incurred by the contractor despite no work has started on site yet.

**v. *Payment Based on IBS Company's Performance on Site and Allow Construction Company to Claim for Fabricated Components***

In R4's opinion, payment must be made based on IBS company's performance on site and mechanism must be established to ensure that the construction company is allowed to claim for components already fabricated (ready) but not delivered to the site. This means that they can do assessment or evaluation on the company based on the IBS Supplier's completion of the components and that components safely kept in the storage area and once passed down to the site, full payment can be made. The advisable payment mechanism are as follows: 10% to 15% upon deposit, 15% to 20% upon completing fabrication of the products, 50% to 55% upon delivery on site and the rest upon final assembly or installation.

## **6. Conclusion and Recommendation**

At this point, it would be safe to say that IBS implementation in Malaysia still at an average

level. Hence, its application and acceptance within the industry is still not encouraging enough and this is due to several problems in which payment issue was one of the main ones. Due to an unclear payment mechanism and several other barriers that exist among IBS users in the market, these issues have kept rising throughout the year. This study shows that there are several approaches can be made in order to provide a more efficient payment method in IBS projects and at the same time could erase the problems that led to payment issues in the industry. The approach to solving payment issues in the industry starts should from the government body itself to provide sufficient and professional helps to the IBS project stakeholders, followed with financial institutions and other systematic approach that suits with current practice in the industry. For IBS construction method to be effective, attention needs to be placed not only on the technical aspects but also on procurement methods. A reasonable standard form of contract is needed to adapt to IBS construction platform and to suit with current practise and scenario in the industry if an improvement in IBS adoption is to be achieved. Also, considerations should be given to both onsite and offsite work activities as immense cost is involved at both phases which need to be covered to ensure the sustainability of contractor's cashflow to continue with their work progress.

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