

Facilities Management (FM) in Industrialized Building System (IBS) Projects in Malaysia: Challenges and Strategies for Improvement

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Abstract

Facilities management (FM) involves the amalgamation of organizational procedures towards upholding and developing services to better the efficiency of its core activities. FM plays a significant role for success in projects whereby it offers a better working environment, value for money, cost and risk management, etc. which is all important criteria for achieving a successful project. This paper, therefore through literature reviews, explores the elements of FM, its practices in the construction industry including in Malaysia from the perspective of IBS projects. Further to that, interviews were also conducted with five (5) experts of the Malaysian construction industry whereby each of them possesses a minimum of 10 years of working experience towards getting an insight into their understanding as well as to gain information from their vast experiences. They were also asked to highlight the challenges and difficulties that were faced as well as to propose ways forward to improve the scenario. In short, respondents generally had different point of view regarding the FM practices but agreed

that the structural design of the building highly influences the building FM practices. The findings also showed that while conventional projects offer more opportunity to save cost; performing FM in IBS project makes maintenance works quicker although it also requires higher quality and lifelong span of services under efficient management. In overall, performing FM in IBS projects have its own advantages and downfalls which need to be well considered beforehand.

Keywords

Challenges, Facilities Management, Industrialised Building System, Malaysia, Strategies.

Introduction

According to the International Facility Management Association (IFMA), “facilities management is the integration of multi-disciplinary activities within the built environment and the management of their impact upon people and the workplace” [1]. As an emerging discipline, facilities management plays a significant role in the success of many organizations whereby it enables them to function at their highest efficiency which is known as an essential aspect of a successful business.

Facilities management has been known to offer safer working environments, enhance real added value to the operational objectives, navigates the requirements and mitigates the risks and costs. Nevertheless, different project environment has different prerequisites to ensure its successful delivery due to the differing project parties, work nature, complexities, etc. As such, it should also be recognized that Facilities Management practices in conventional and Industrialized Building Projects may also have different fundamentals which are worth exploring thus enabling these projects to improve their delivery.

Therefore, using a combination of primary and secondary data, this paper will be exploring the different aspects of Facility Management in the context of their implementation in conventional and Industrialized Building Systems (IBS) projects, identifying their challenges/difficulties as well as further strategies for improvement.

Definition of Facility Management (FM) and Industrialized Building System (IBS)

Facility Management functions by the way of assimilating a variety of project facets such as the stakeholders, locations, procedures and technology toward ensuring that the construction industry functions properly [2]. This is towards creating an interconnected working environment that delivers the best outcome for diverse business aspects such as

its core operation, end-user fulfillment, best value-for-money and takes a system thinking on service infrastructure [3]. Facilities Management encompass of 11 core competencies which are Communication, Emergencies Preparedness and Business Continuity, Environmental Stewardship and Sustainability, Finance and Business, Human Factors, Leadership and Strategy, Operations and Maintenance, Project Management, Quality, Real Estate and Property Management, Technology[4]. While trying to build up a manageable advancement in the development process, the Malaysian government has stepped up with regards to executing a new and modern construction method called Industrialized Building System (IBS)[5]. According to [6], IBS is a construction system whereby its components are factory-made, either on the site or off-site, positioned and assembled into structures with the involvement of very low extra site works. By using this method, there is potential to minimize wastage, costs, construction time and dependence on foreign labour.

Boon and Bane of IBS Projects

The local construction industry has been commended to shift its erecting practices to espouse Industrialized Building System (IBS) towards achieving a variety of benefits over old techniques such as superiority in term of quality, productivity, risks, etc. towards achieving the best of costs in projects [7], [8]. As mentioned in IBS Roadmap 2003-2010, IBS in Malaysia started via 2 public projects which involved the construction of a number of multiple storey flats and shop lots at two separate locations. As for facility management buildings, IBS was also implemented on many public schools, housing, quarters, hospitals, universities, custom and immigration building projects as well as in some private collages and buildings [9].

The Malaysian government has long aimed for 100% IBS uptake in their projects. Together with that, they also aim at drastically reducing the reliance on foreign labours which is synonymous with conventional construction methods. A shift of all conventional methods to IBS has been linked with a decrease in remittances for the Government[10]. By enabling factory-fabrication of building components prior to it being transported to sites ensures cleaner working environment on sites as well as enables a drastic reduction in waste and material on site and also better control over cost and quality [11]. An example of how cost saving is achievable via IBS was the use of steel/aluminum formworks which allows for repetitive use [12], thus cancels out the need for timber formworks that have limited number of times for usage. In term of time, saving can be clearly achieved considering that factory-fabrications and site assembly can run in parallel [29], while the high-mechanization involved reduces the dependency on-site labours [13].

With the variety of IBS systems available, it is therefore important that their upside and downsides are carefully considered since stressed on the importance of adopting the appropriate technology to achieve success in IBS [13]. Realizing the numerous advantages of IBS, Government of Malaysia through its agencies such as the Construction Industry Development Board (CIDB) and the Public Works Department has continually urged the use of IBS[14].

Elements of Facilities Management

Quality and User Satisfaction

According to [15] due to expectation and demand from stakeholders and end user, facilities management has developed remarkably. [16] mentioned that facilities management's aim is to provide services needed for the core business. In order to make facility services achieve the quality standard and add value to the core business, facilities manager must have rich knowledge in terms of individual services. Effective and efficient implementation system should be formed in facilities management in order to deliver quality services and products to clients smoothly [17]. Moreover, the target of facilities management is to satisfy the user by optimizing effective resources management. Thus, the quality of services provided by the organization can be determined through the level of satisfaction among end-users towards facilities management of a building. Apart from that, technology is also a driving force towards quality facilities management [18].

Human Factors

According to [18], humans are the greatest and best resources in facilities management. However, they could also become the greatest obstacle if the facilities manager fails to manage them. There are two key persons in facilities management, which are employees and clients [17]. According to the author, clients need to be a part of the integration in developing the product and services; and employees need to work for the management. On the other hand, the researcher [19] identified the lack of motivation from the demand aspect causes the developer to move slowly towards sustainable building practice. This is due to clients' lack of appreciation in accepting sustainable building technology without considering the long term cost saving[20]. Some of the clients may not take energy efficiency and resource management as a top priority in facilities management. Thus, individual and organization awareness towards the importance of asset management should be improved in facilities management.

Project Management

Facilities manager involved in the planning of facilities management need to consider the statutory requirement and adhere to the local policy. Both plan and strategy require active boardroom to support the technical level while at the same time avoid causing changes to the organizational culture [18]. According to the author, the facilities manager must be careful in monitoring and doing the analysis so he has the ability to define the opportunities for improvement in facilities management. For example, doing site induction, training and update with assistance to achieve good management in facilities. [21] identified the importance of facilities management of pre-construction stage from different aspects such as client satisfaction, energy efficiency, operation and maintenance, space management and sustainability. According to [22], facilities management is more than a technical operation; it also focuses on the performance aspect, as the performance of the management could influence the occupants' behavior which in turn affects the environment. It shows that project management of facilities management should concern in delivering a sustainable environment. This is because the building will consume resources and may bring negative effects to the environment by generating wastes.

Business Potential and Growth

Public-Private Partnership project (PPP) is a new exploration in facilities management [17]. PPP project is an innovative alternative to provide returns in investment. Therefore, the role of facilities management is to promote business growth in PPP project. This is because the 10th Malaysia Plan aims to enable Malaysia to become a high income developed nation. Moreover, [18] mentioned that good facilities management must include the process and policy which fulfill the business need. At the same time, the respective facilities management should have clarity in terms of aim and smart objectives. Facilities management must be flexible enough to meet the business requirements. Other than add value to the organization, facilities management also aims to fulfill the non-core business activities for the clients [16].

Energy Management, Operation and Maintenance

According to researcher [18], successful facilities management should have a system which stated how, why, where and what energy is used. Facilities manager should be able to master the energy management with associated initiative. The reality of the business is not about prioritizing the investment of energy saving measure[23]. In fact, it is about strengthening the business by minimizing maintenance and increasing productivity simultaneously. In this way, the risk of the owner can be reduced by protecting the value

of the asset. On the other hand,[24] stated that facilities management is a management system for maintenance and service process. According to[25], facilities management covers supervision, repair and maintenance services to a building system. [26]stressed that one of the biggest expenses in the life cycle of a project is inthe operation phase. Apart from that, cost of facilities is just a fraction of operation cost of buildings[27], thus facilities management plays an important role in improving building performance through low-cost maintenance by proactive operational control [28].

Methodology

A series of the interview was conducted with 5 experts of the Malaysian construction industry whereby each of them possesses a minimum of 10 years working experience towards getting an insight into their understanding and experience in Facilities Management (FM) application in IBS projects. They were also asked to highlight the challenges and difficulties that were faced as well as to propose ways forward to improve the scenario.

Respondent 1 (R1)was a senior quantity surveyor who has 11 years of working experience in the industry. He has experience working with sub-contractor, main contractor and now working as a senior quantity surveyor with a developer. Respondent 2 (R2)had 19 years of experience in the construction industry. He is a subcontractor specialized in sanitary and plumbing works. Respondent 3 (R3) had 12 years of experience and is a subcontractor specialized in consultation on safety services and fire protection system, as well as renovation, works in civil and structure. Respondent 4 (R4) on the other hand had 15 years of experience and is a consultant specialized in the design of high rise buildings, both for residential and commercial purposes. Lastly, respondent 5 (R5) works in a company that specializes in project management and facilities management and has 10 years of working experience.

Data Analysis

Understanding of Facilities Management (FM)

Based on the interview, R1 understanding of facilities management comprised of an operation and maintenance system of a building after its completion. It involves the functionality of a building system after the occupation of the building by end users. When asked to R2, he asserted that facilities management is the operation and maintenance system in a building and had the understanding that IBS buildings are those that are constructed using precast concrete system, formwork system, block work system or steel framing system while conventional ones use the traditional method of construction.

According to R3, facilities management is the management of assets which considers all factors such as costing, monitoring team, execution progress and quality of final submission to get client's approval and endorsement while R5 mentioned that facilities management in the construction industry usually means the management of assets or buildings. R5, on the other hand, described that facilities management involves the integration of people, systems, place, process, and technology to deliver support services. In short, a facility management company provides everything to support and improve the effectiveness of the client's business.

Experience in Handling Facilities Management Involving IBS Projects

R1 who had experience being involved in a 48-storey condominium residences projects that used IBS system expressed his understanding that IBS is more of a modern construction approach compared to the traditional conventional methods whereby IBS offers savings in term of material and resources needed. An example that was provided by R1 is related to the IBS system was the use of aluminum formwork and pre-cast material for buildings such as pre-cast concrete frames, prefabricated timber frames, and steel frame system. On the other hand, R2 who had experiences with IBS in a number of his projects (i.e. an 8-storey shopping complex, 10-storey hotel, etc.) as well as conventional ones opined that IBS required shorter construction period as the casting of building material has been previously done at factories. Besides that, due to the repetitive use of aluminum formwork, IBS leads to a huge amount of cost saving. However, R2 also stressed that a limitation of IBS system is that it does not permit for any renovation work to be carried out on the erected structures which is a downside compared to conventional methods that are more flexible in term of performing renovation and reworks. Nevertheless, conventional methods are more labour intensive and take much longer time to construct as compared to IBS but it is important for the contractor to practice good workmanship on erecting IBS pre-fabricated panels because any lacking could result to problems such as poor joints and building defects. R3 was also an active participant in handling both government and private sector projects, such as housing and commercial units, however, he pointed out that he was generally reluctant to uptake IBS projects due to the high budget that is needed. R4 was also active with government projects, such as PRIMA and PPA1M in Kuala Lumpur of which all of them involved the IBS system. Lastly R5 who also had diverse experience in projects such as constructing education centers, telecommunication buildings, and aviation industry said that an important measure she would take in her projects is to make sure that all services that are provided including technical infrastructure, custodial, pest control, lighting, HVAC, safety, were in best condition.

Challenges/Difficulties of Applying Facilities Management (FM)

According to R1, the conventional method of construction consumes more time and cost compared to IBS system due to the method that creates more wastage, involves a large number of building materials and affects construction site cleanliness. On the other hand, IBS helps to reduce cost and time of the construction project by creating less wastage, less volume of building material while at the same time increases the environmental and construction cleanliness. R2 on the other hand stated that many problems and issues that can occur in an IBS project include defect repetition, leaking, jointing problem, and cracks. In fact, repetition of defects is quite common in IBS projects thus these types of project are at higher risk especially if the contractors are not competent enough which could lead to a higher possibility of deterioration of the structure and facilities. R2 further noted that due to the unspecific accessibility to defect locations, it makes handling facilities management in IBS building difficult as compared to conventional ones that are more flexible and non-repetitive which lower the risk of maintenance fault and deterioration of building structures. Further to that, R2 also did share his experience being a plumbing subcontractor in some IBS projects and noted that coordination between the design and maintenance team is the key factor in handling the IBS projects to avoid repetition of defects such as surface cracking, leaking and joint problems. In term of plumbing works, R2 also highlighted few examples of problems that could affect the facilities management activities which were poor waterproofing, lack of supervision, low-quality design control, deep crack due to settlement, poor plumbing fitting and issues with plumbing installation method; in which is highly dependent on the competency level of contractors hired to do the work. When asked to R3, he mentioned that most of his difficulties come from the lack of support from the client's top management since many clients do not place enough emphasis on the management of asset, probably due to cost-cutting purposes. Hence, the budget allocated for facilities management activities are limited. On top of that, R3 also highlighted the problem of limited supplier for IBS product makes costs of acquiring the product for renovation works to be much higher. According to R4, there are currently very few factories in Malaysia that could handle large orders for IBS products. Hence, contractors are forced to bear the higher cost for transporting IBS components to sites especially if the factory location is quite far from the work site. R4 also stressed that, unlike for those more outskirts states such as Terengganu and Kelantan, limited land to make space for assembling yard causes the use of IBS in big cities such as Kuala Lumpur and Johor Baharu not easy. He opined that for a feasible and cost-effective project, the assembling yard should preferably be situated next to the construction site to ease transportation of component. Lastly, R5 less favored IBS projects due to her belief that conventional buildings offer more opportunity to save cost because

generally, clients prefer building environment to suit their business style, so renovation is inevitable. Hence, she prefers to use a refurbished building or warehouse.

Strategies to Improvement Future Facilities Management Applications

For this section, the respondents were asked to suggest any strategies to improve future facilities management practices. While many did give suggestions, some did not. The following sub-section presents the aspects of improvement that were suggested by respondents.

Operation and Maintenance

R1: Architect and Engineers are responsible to carry out structural and architectural planning for the whole building system. Thus, architect and engineers should review their drawings and design on structural and architectural plans to improve the future facilities management in a building system.

R2: To improve the facilities management not only in IBS projects but also for conventional ones, the Engineer should have proper structure management planning to reduce the possibility of defect repetition. It is also important to implement effective integrated decision-making process between the building design team and the maintenance team. This is because in the design stage, which decides the installation of the components, can significantly affect the repairing method of the IBS building system.

R3: It is important to give consistent training to employees on how to operate the system from time to time.

R4: More focus should be placed on the design phase. This is because IBS building does not require as much maintenance as the conventional building however, it does not permit for any renovation ones erected.

Sustainable/Green Impact

R3: There is a need to monitor processes from time to time on wastes created from the product or services towards achieving the “Zero Carbon” aim. More assessment or study is needed on the main factors (economy, environmental and social) which impacts sustainability.

Business Potential/Profitability

R3: Proper feasibility study to forecast the business potential is needed before a company (facilities management services provider) acquires any facilities management project. These include a more systematic process of marketing in choosing market segmentation. The company must also implement marketing strategies such as SWOT Analysis, PESTLE, PORTER's 5 Forces, 4P and so on.

The Satisfaction of End User

R3: It is necessary to answer the client's inquiry via an effective communication approach and to provide feedback in the shortest time possible with logical solutions. Proper communication is always the key to ensure the client's satisfaction.

R4: Since the components are manufactured off-site, it is important to get the client's representative to clarify that the products match their description/expectations. Getting them to visit the factory is a good approach.

Cost Saving

R3: Reduction of cost must be done as early as possible. The quantity of material and its cost, as well as the number of workers involved, must be finalized as early as possible to avoid price surge. On top of that, perming price comparison via quotations is also important to get the best value for money.

Suggestion for Future

R3: More research and development (R&D) focusing on IBS implementation is needed. Contractors need more exposure to the new system to help them with site management.

R4: IBS can indeed increase productivity and quality of works at the site, but more training is needed for the contractor to become competent.

R5: IBS is beneficial on to certain parties such as the contractor, but not so much for the service providers. Therefore, they need to evolve in order to compete for business.

Conclusion

In overall, IBS is basically an improved and upgraded system on material handling and product quality. It requires less time and resources on the monitoring process, much less

quality control at the site because of the proven quality of IBS product. Inventory management is also simplified, and the maintenance works can be done a lot quicker. It is indeed cheaper to build a high-rise building using IBS as the government offers more subsidies and tax relieves to a contractor who chose this method. It is an initiative taken by the government towards green and sustainable building.

Based on the interviews, the respondents have experiences in both IBS and conventional project. However, due to the differences in their background, they have different points of view regarding the facilities management aspects of projects. Facilities management typically takes place after construction and occupation.

For IBS project, facilities management and maintenance work require higher quality and life-span of services under efficient management compared to the conventional ones due to the higher technicality that is involved in constructing them thus; it is a preferred method in bigger scaled projects that involve lots of repetitive works. However, in smaller scaled projects, the conventional methods offers more opportunity to save cost despite being very labor-intensive thus they are generally preferred by some clients especially if there are also needs for future renovation, which is not permitted for IBS structures. In overall, five aspects were identified as strategies for improving future facilities management in IBS projects were operation and maintenance, sustainable and green impact, business potential/profitability, the satisfaction of end user and cost saving.

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