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Ahmad Faris Omar, Nadzirah Zainordin, Sui Lai Khoo, et al.

Challengers Adopting BIM among QS Profession in Malaysia

Ahmad Faris Omar[1 a)], Nadzirah Zainordin[2 b)], Sui Lai Khoo[2 c)], Sabrina Rafii[1 d)]

[1]*Center of Building & Resilient Development, Faculty of Engineering and the Built Environment, SEGi University, Kota Damansara, Selangor, Malaysia.*
[2]*Faculty of Engineering, Technology and Built Environment, School of Architecture and Built Environment, UCSI University, Cheras, Selangor, Malaysia.*

[a)] Corresponding author: farisomar@segi.edu.my
[b)] 40633@ucsiuniversity.edu.my
[c)] 21028@ucsiuniversity.edu.my
[d)] sabrinaxhp@gmail.com

Abstract. Building Information Modelling (BIM) technology has become increasingly popular among consultant firms globally. It is considered to have led to the progress of ventures because of more productive and successful business processes. This includes the commitment to the preparation of construction cost estimates, the most effective tool for surveying is the sums when calculating project costs. BIM is believed to be an advantage in improving the estimation process, which is still prone to errors and inaccuracies. By automating the recording of information, BIM technology provides greater data security. The objective of this study to investigate the challenging factor in adopting BIM among Quantity Surveyors in Malaysia. The aim of this study to enhance understanding of the BIM implementation in the construction industry. The questionnaire was further distributed and responded to by 96 respondents consists of QS Consultant, Professional QS and Provisional QS. The methodology used to analyse the data via quantitative research method by having SPSS to analyses the data. The finding has shown that there are management problems that occur in transmitting the BIM implementation.

INTRODUCTION

The use of Building Information Modelling (BIM) has been studied in the construction industry and has been shown to provide more benefits to improve productivity in the industry [2]. Sadly, there are many reasons to prevent the implementation of BIM as the standardized form generally to be used in the construction industry in Malaysia. Based on the BIM survey conducted by the Royal Institution of Chartered Surveyors, numerous quantity surveyors are still ignorant of what BIM is and only small amounts (10%) have been found to gain from BIM [9]. Quantity surveyors must also be more accessible to this new technology, which will allow them to keep up with other market leaders and retain their competitiveness within the 3 sectors. Quantity surveyor consulting firms will expose their staff to new technologies and invite them into the field of quantity survey.

Building business practices currently employ BIM extensively and its adoption is increasing year after year. Canada, Denmark, Hong Kong, Netherlands, Norway, Singapore, Sweden, The United Kingdom, and The United States; are among the nations moving for big BIM acquisitions. Malaysia, where the expansion of BIM has been largely driven by the corporate sector since 2009, has seen incremental steps in the adoption of BIM programs, with implementation levels dropping on a BIM scale of 0 and 1 indicating the need for a response to these issues. Therefore, given the mandate given by the professional body to supervise BIM rollout in Malaysia, CIDB has urged BIM adoption among construction players to deliver more successful construction projects in their practice.

Notwithstanding attempts to promote the use of BIM among Malaysian Construction Industry administrative and organizational teams, CIDB claimed that the slow transition to BIM could be attributed to the lack of standardized BIM processes and the lack of standards for its implementation [1]. According to [1], the CIDB has stressed the

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recommendations of the BIM for better communication and work cooperatively for customers in the construction industry. In addition to the CIDB stressing the availability of BIM standards for consumers in the field, specifically recommended that the Royal Institute of Surveyors Malaysia (RISM), the Division of Quantity Survey (QS) adopt effective measures in assessing BIM's impact [9][1]. This section addresses Quantity Surveyors' general usage of BIM.

Based on the previous researcher, the BIM capabilities were synthesized into three specific categories based on their cost estimation significance, including data visualization, robust database, and data coordination. Consequently, the results were assumed to affect the efficiency of cost estimates in quantity survey research, contributing to the establishment of a standardized framework for this paper. This paper also contributes to a holistic view of the effects of improved knowledge resulting from the introduction of BIM by providing greater understanding and sensitivity in producing more reliable cost estimates. This paper provides extensive knowledge on the challenges to adopting BIM in the Malaysian construction industry, particularly from a Quantity Surveyor perspective. This further could provide the basis for recommendations as to how BIM technology can be efficiently used by Malaysian Quantity Surveyors. BIM is the advancement and practice of exhibiting computer software to replicate a facility's construction and manoeuvre. The subsequent prototype, a Building Information Model, is a data-rich, object-adapted, intellectual, and parametric illustration of the facility from which interpretations and data applicable to the essential elements of numerous users can be obtained and evaluated to produce data that can be used to make resolutions and to develop the facility production process (Latiffi, A. A. et al. (2015).

QUANTITY SURVEYOR AND BUILDING INFORMATION MODELING (BIM)

For the past few decades, new developments have changed the building industry and the way it operates. Research and development by the ever-challenging market at the beginning of the new millennium have led to the creation of an even more advanced technology called Building Information Modelling (BIM). BIM is a collaborative tool used by the architecture, engineering, and construction industries (AEC) based on several software solutions. The management of construction projects is a technology and a process. BIM is a collection of innovations and processes in technology that have changed the way infrastructure is planned, evaluated, developed, and controlled. BIM will strengthen and enhance project planning, design, and construction processes [10].

BIM software can be used in any building process, from preparation to the project itself. Unfortunately, the use of BIM software is extremely limited due to the internal and external issues that can occur when using BIM software. The individual himself faces internal difficulties, mostly because of a lack of exposure and training for the BIM software. External difficulties are related to the BIM software applications' inaccuracy or deficiency [1]. Overall, this project will evaluate the advantages of using BIM software in QS work. Identify the difficulties of implementing BIM software and identify the type of acceptable BIM software to be used by the QS company.

DEFINITION OF QUANTITY SURVEYOR

By referring to Table 1, Some authors have noted that quantity surveyors are highly trained professionals engaged in building field costing. They act as consultants for construction costs and financial management, due to their expertise in costing a building project in all its phases [11][12]. The quantity surveyors act as cost consultants and monitor project finances during the entire construction process by making full use of building industry tools [9]. As retrieved from the Royal Institution of Surveyors Malaysia website, quantity surveyors are building practitioners who are well educated and experienced in advising on all aspects of the economy, construction, and contract management. They are finance specialists, and project management specialists.

These are also known as Construction Economist or Construction Cost Manager, as these focus on estimating and managing construction costs during a building project's execution. Which can include taxation, arbitration, and mediation as well. Quantity surveyors are excellent at managing planning, construction c, costs, and construction cooperation [14]. Based on the authors' definitions, we may conclude that the quantity surveying services in the building project are related to costs, financial management, and contracts. Quantity surveyors are well-trained professionals with experience in advising construction costs which also make them recognized as Construction Economist or Cost Manager in the construction industry.

TABLE 1. Definition of Quantity Surveyor

Definition of QS	Author
Quantity Surveyors are construction experts, who are qualified and trained enough to advise on all aspects of building costs, financial and contract administration. They have experience in the expense and management of building projects, whether it be design, civil or heavy engineering.	[13]
The quantity surveyor is a professional who is involved with construction project costs and contracts.	[12]
Quantity surveyors have expertise in costing a building at all its stages, while chartered quantity surveyors act as consultants for construction costs as well-trained professionals are involved.	[11]
The Quantity Surveyor (QS) in the construction industry is also known as Construction Economist or Cost Manager. They evaluate and track construction costs as consultants, from the feasibility stage to construction cycle completion. They may be interested in tax depreciation programs, sharing cost estimates for health, arbitration, and mediation purposes.	[14]
Quantity Surveyors are highly qualified and have experience in handling building costs, construction management, and contact with the construction industry.	[2]
The quantity survey relates to the expense and financial management of construction projects.	[6]
Quantity surveyors ensure that the building industry's resources are completely used through the financial management of projects and serve as cost consultants during the entire construction process.	[9]

DEFINITION OF BUILDING INFORMATION MODELLING

Building Information Modelling (BIM) is a method that produces and manages the building data during its life cycle. In the meantime, not only does BIM qualify as a technical tool or simply as a commodity that can be bought and used [10]. It is just a model that blends technology with business, people, and processing problems. This creates a tectonic change in the way we produce the built environment [7].

A seminar entitled Issues and Challenges in the Implementation of Building Information Modelling for Small and Medium Enterprises (SMEs) organized by CIDB in 2014 described BIM as one of the new technologies to be implemented in the design, construction and management of facilities. Building Information Modelling describes the production of digital models used in the planning, design, construction, and operation of a facility during the life phases [4]. BIM is a set of digital resources that can help monitor the effectiveness of a construction project [3]. BIM is a combination of advanced processes and technology that provides a platform for collaboration among diverse parties in construction projects by leveraging the use of information technology [5].

BIM is the use of a network infrastructure to encapsulate designed facilities with specific stakeholder viewpoints in the simplest of terms [5]. It is an interactive system that integrates into a comprehensive way digital representations of building structures and their relationship with others so that stakeholders can inquire, simulate, and estimate activities and their effect on the construction process as a life-cycle entity. BIM can also help create a more sustainable community by making the required value decisions that will please its owners and residents. BIM has several meanings and can be defined in several ways.

Building Information Modelling (BIM) as a modern way of technical communication in construction refers to the depiction of a structure as an object using computers to simulate buildings, based on the various definitions of BIM. BIM is a software model that can be used in the planning, design, monitoring, and monitoring of projects amongst stakeholders in the community of construction projects to ensure a successful project. While the BIM model was proposed during the 1970s due to technological constraints, its implementation has remained isolated since the mid-1990s. However, technical limitations are being removed right now and promoting the use of BIM worldwide.

TABLE 2. Definition of Building Information Modelling

Definition of BIM	Authors
The method of creating and handling the construction data during the life cycle of the building	[7]
BIM is not simply a technological tool or a technology that can be obtained and applied.	[1]
BIM is one of the latest emerging technologies to be applied in design, construction, and facilities management, providing a digital image of the building to promote digital knowledge sharing and interoperability.	[10]
Building Information Modelling (BIM) represents the development of digital models for use during the planning, design, construction, and operation phases of the life of a facility.	[4]
A set of digital tools which can manage the efficiency of the construction project	[3]
BIM is a combination of advanced process and technology that provides a medium for cooperation between the various parties in the construction project by leveraging information technology (IT) uses.	[5]
Usage of a network system to encapsulate designed facilities with unique stakeholder viewpoints.	[2]

THE CHALLENGES OF ADOPTING BUILDING INFORMATION MODELLING (BIM) IN QUANTITY SURVEYOR WORKS

By referring to Table 3, list of challengers quoted by five different authors and researchers on the adopting of BIL in QS works.

TABLE 3. The challengers of adopting Building Information Modelling (BIM) in Quantity Surveyor works

Challengers	Authors
• BIM data possession • Data entry monitoring and unreliable data accountability. • Question of liability amongst separate systems for the correct technical • Interface. • Management challenges in developing and using BIM. • Lack of strong agreement on BIM applying or using the methodology. Involve clear BIM procedures and applying instructions.	[1]
The risks involved with BIM can be classified into two different categories: (1) Risks related to technology and (2) risks related processing. The first risk related to technology • Lack of BIM standards for multidisciplinary team model integration and management. • There are significant risks associated with interoperability issues. Issues of licensing if team members are different from architect/engineer and owner. Legal, contractual, and organizational risk includes process-related risk.	[9]

TABLE 3. The challengers of adopting Building Information Modelling (BIM) in Quantity Surveyor works (Cont'd)

Challengers	Authors
• The curve earning and lack of qualified staff • High implementing costs • Other stakeholders' reticence (e.g., architect, engineer, contractor) • Failure to implement collaborative work and modeling standards • Interoperability Lack of contract/legal contracts	[4]
• Technical & Managerial	[8]
• the need for well-defined models for transactional construction to remove data interoperability problems. • Requirements for the computability of digital design data • The necessity of well-developed practical strategies to achieve this • Cluster management problems relating to the application and use of BIM. • Lack of clear agreement on how BIM should be deployed or utilized. • No single document or BIM process which provides guidelines for its application or use is available. • Multiple software companies cannot handle the process. • The BIM process and the guidelines for its implementation must be standardized. • An issue concerning the development and operation of AEC industry stakeholders of BIM models (i.e., owners, designers, and constructors). Unclear cost distribution methodology and BIM technology operations	[5]

METHODOLOGY

This study begins with an extensive literature review, due to a shortage of research reviews on the related issue, the literature search is extended to quantitative research by choosing a group of people to be responding to related research to get the study done. This study will target the Quantity Surveyors who register with the Board of Quantity Surveyor Malaysia (BQSM). There are 51 Consultant Quantity Surveyors, 22 Professional Quantity Surveyors, 14 Provisional Quantity Surveyors, and 9 QS Technologists who responded to this study. A structured questionnaire has been sent to the respondents which make 96 in total who responded. The question it's based on a 5pointst Likert scale with 29 facts to test to the respondents.

RESULT AND FINDINGS

A total of 96 questionnaires were analysed. Table 4 shows the number of respondents who respond to the questionnaire based on a class of membership with the Board of Quantity Surveyor Malaysia (BQSM).

TABLE 4 Respondents responded to questionnaire

Class of Professional Membership	Number	Percentage %
Consultant Quantity Surveyor, CQS	51	53
Professional Quantity Surveyor, PQS	22	23
Provisional Quantity Surveyor, QS	14	15
Quantity Surveyor Technologist, QS Tech	9	9
Total	96	100

Figure 1 show the respondents responded on Challenging factor in adopting BIM among QS in Malaysia. Based on the data, the most challenging factors list as follows: cluster management problem relating to the application and use of BIM, interoperability, the contractual issues include the data monitoring authority and responsibility for inaccuracies, lack of BIM standards and multidisciplinary team model and integration and management, and question of liability amongst separate system for correct technical.

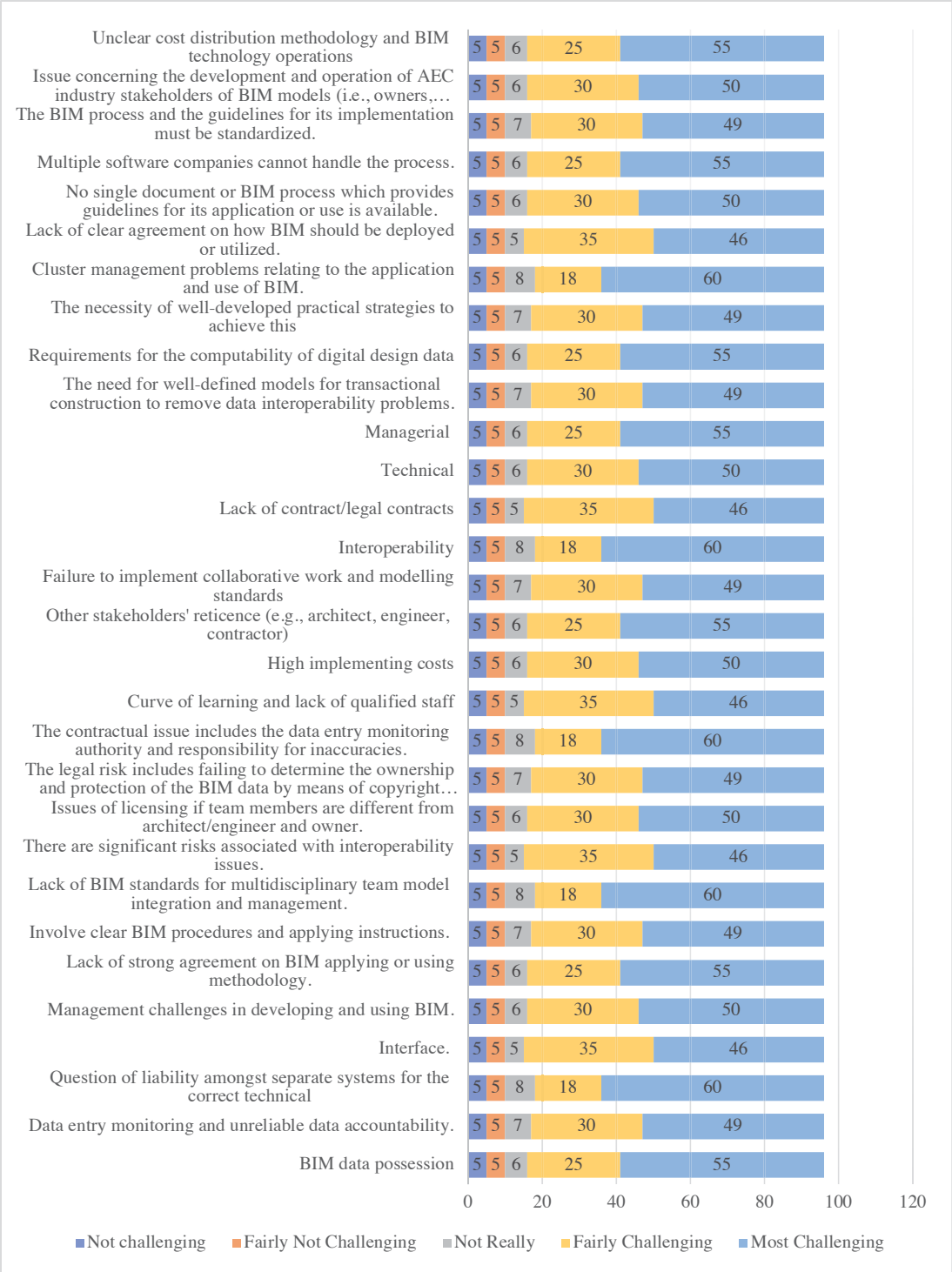

FIGURE 1. Challenging factor in adopting BIM among QS in Malaysia

CONCLUSION

According to the highest percentage, due to lack of skill in the BIM field, the company does not implement the BIM concept in construction works. Does not does have experience within his field. Thus, it's leading to a lack of practice. Because of a lack of specific guidelines or instructions to operate the provided private model that could assist construction players to implement BIM. Companies are discouraged to use this software. The challenges are mainly faced by those who are unfamiliar with BIM technology.

The focus of this research is on increasing the understanding and implementation of current technologies in the building industry through construction employees. There are guidelines on how to update the key stakeholders in construction on the latest technology that will boost the efficiency not only of quantity inspectors but of the whole building industry. Thus, it would recommend that training and education should be given to everyone who will be involved in a construction project. In the training, quantity surveyors and all other construction key players must be exposed to the latest technology or ways to complete the project efficiently. The construction key players must be aware of the latest technology, so they would not be missing out on others. No matter how many years of experience they have, they must be humble and keep on communicating with one another to achieve their goals. Lastly, Proper communication among the parties involved in the construction. If any of the construction key players have learned of something that would be beneficial to the construction industry, they should share it with others to ensure the project runs smoothly and efficiently.

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