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CHALLENGES IN THE IMPLEMENTATION OF BIM: QUANTITY SURVEYORS PERSPECTIVE

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Abstract

Building Information Modelling (BIM) is not a new thing in the Architecture, Engineering and Construction (AEC) industry. It has been long introduced and being applied. Slowly but surely it is replacing the old traditional way of work in the construction industry. However, even though BIM had already been introduced in Malaysia construction industry for some time, the implementation is quite slow. The same goes among Quantity Surveyors. Somehow Quantity Surveyors still using traditional method throughout their works. This is a loss as there are already many studies exploring the advantages of BIM for Quantity Surveyors when compared to traditional method that Quantity Surveyors has been using all along. This study has been conducted among Quantity Surveyors in Perak. The aim of the research is to identify the best solution to the challenges in implementing BIM for Quantity Surveyors. The objectives of this research are i) To identify the challenges in the implementation of BIM for quantity surveyors ii) To investigate the method to overcome these challenges. The findings show that the biggest challenge for Quantity Surveyor to implement BIM is the high cost needed. The cost includes the installation of hardware and software and even the price of personnel training. The challenge in implementing BIM as syllabus for Quantity Surveying course is due to the lack of skilled personnel. The best solution extracted from the study is by providing funds for universities for them to implement BIM as a syllabus. This could help in implementing BIM as a syllabus while at the same time increasing the number of skilled personnel in BIM after the students graduated.

Keywords: BIM, Problems, Implement, Quantity Surveyors, Obstacle

1.0 INTRODUCTION

Construction industry is deemed to be one of the most important industry in a country. This is because the nature of the industry itself which linked to various other industries (Khan, Liew, & Ghazali, 2014). Not to mention, this industry also built upon thousands of workers which consists of contractors, architects, surveyors, engineers and labors (Mustafa Kamal, Hany Haron, Md Ulang, & Baharum, 2012). As we know, quantity surveyors are one of the key players in construction industry. They hold many important tasks throughout a construction project and one of the tasks is taking measurements or what some call as quantity take-off (Panojan, Perera, & Abeydeera, 2017). Back in the days, quantity take-off is done manually. This is done by using 2D documents prepared by hands or CAD (Monteiro & Martins, 2013). But now, we have new ways of taking-off which by using Building Information Modelling (BIM) (Zainon, Mohd-Rahim, Aziz, Kamaruzzaman, & Puidin, 2018). However, Zainon *et al.*, (2018) also stated that Malaysia is still left behind in implementing BIM. This means that most of Quantity Surveyors still depend on the use of traditional quantity take-off method.

1.1 Problem Statement

In construction, Quantity Take-off is one of the main process that need to be done before any other works can follow through (Monteiro & Martins, 2013). It has its own use for each stages in construction process (Monteiro & Martins, 2013). As until now many Quantity Surveyors still use the Traditional Quantity Take-off method. Olsen and Taylor (2017) stated that this is probably due to how hard it is for the industry itself to adapt to new things. However, this method proves to have many problems of its own. Monteiro and Martins (2013) stated that the traditional Quantity Take-off method is prone to error due to human interpretations. They also stated that because the 2D documents were made manually, there usually will be wrong interpretations because of the complex situations. Olsen and Taylor (2017) stated that this method requires the quantity surveyors to go through sheets of drawings and documents to take-off the quantity while thinking the probability of double measure. This will cost a lot of time. All the above problems could occur on the same time which making the problems stack onto each other (Monteiro & Martins, 2013). After the introduction of BIM, it becomes well known among the contractors. Despite being famous in such a short time, BIM does not really being implemented in the industry thoroughly (Olsen & Taylor, 2017). Kim, Chin and Kwon (2019) cited (Ghoilzadeh et al. 2018; Boktor et al. 2014) where they stated that even though there are already many researchers conducted regarding the benefits and uses of BIM, the usage of BIM for quantity take-off still low.

1.2 Aim
To identify the best solution to the challenges in implementing BIM for Quantity Surveyors

1.3 Research Objectives
  i.   To identify the challenges in the implementation of BIM for quantity surveyors.
  ii.   To investigate the method to overcome these challenges.

1.4 Research Question
  i.   What are the challenges in the implementation of BIM for quantity surveyors?
  ii.   What is the solution to these challenges?

1.5.1 Scope of Research
This research is made to seek the barriers regarding the implementation of BIM for Quantity Surveyors. This research will be focused on challenges which is obstructing BIM implementation mainly by Quantity Surveyor. The main insights will be from Quantity Surveyors. Questionnaire will be used and distributed among Quantity Surveyors in Perak through email or other mediums to collect the required data for the research.

2.0 LITERATURE REVIEW

2.1 BIM
BIM has exist for quite some time and the usage of it and its functionality still growing (Stanley & Thurnell, 2014; Zainon et al., 2018). The meaning for the BIM abbreviation is Building Information Modelling. Generally, BIM turns to be a process of sharing, extracting and exchanging data by the utilization of various tools and technologies. These data usually but not always in computer files format. These data is used in making decisions ("Building information modeling - Wikipedia," n.d.). To add, BIM is mainly used by parties which involves in the construction industries which is the AEC.

Basically BIM can be considered as a process where the parties in construction such as the Architects, Engineers and Quantity Surveyors can get together in planning, designing and even calculating a construction project based on the same one building 3D model (Lorek, 2018). Stanley and Thurnell (2014) cited NBIMS (2010) where they stated that BIM is a representative of a geometric or non-geometric data of a building which is used and shared between parties to facilitate a construction throughout its lifecycle. Shayan *et al.* (2019) stated that the construction industry is aiming to implement BIM to increase productivity and profits.

2.3 Barriers in Implementing BIM

i)   Compatibility
Firstly, as mentioned by Stanley and Thurnell (2014), the barrier for BIM to be implemented in our country is the compatibility of software. In their research, most of the participant agreed that the software of BIM lack the inter-operability between each other. Some other perspective is that the compatibility is not regarding the software but knowledge instead. As example, if one knows how to use Revit does not mean he know how to use Cost-X and such as these software have different operability. Kim, Chin and Kwon (2019) stated that quantity surveyors still short on knowledge regarding BIM and the exchanging information between BIM software still limited.

ii)   Cost
Next is regarding the cost. To setup BIM, a huge cost is required. These cost includes the installation of the software and hardware requires itself and training for workers (Stanley & Thurnell, 2014). This is agreed by Olsen and Taylor (2017) as they said that if one wants to implement BIM, they will have to spend time and money for employees training, hardware upgrading and the cost of the software itself. Zainon *et al.* (2018) also said that there is probably the need of hiring new workers that is knowledgeable in BIM to have a proper

usage of BIM. Because of the traditional method has been working until now, they scared of investing too much in using something new that has not fully tested and proven (Olsen & Taylor, 2017).

iii)   Legal issues
Until now, professionals in the industry still in confusion on who is responsible in the data in the BIM is accurate or not (Kim et al., 2019; Zainon et al., 2018).

Below are some of the barriers for BIM implementation based on research done by (Gardezi, Shafiq, Nurudinn, Farhan, & Umar, 2014):

Table 2. 1: Findings by other researchers

Researchers	Findings
Salman Azhar, Michael Hein and Blake Sketo (2011)	•Ownership of BIM data •Responsible party for any inaccuracies •The issue regarding responsibility for proper technological interface among various programs. •Management issues. •Methodology of implementing BIM •Lack of standardization in the implementation of BIM.
Thompson and Miner Ku (2007)	Technology related risk • Lack of standards specifically for BIM. • Problems regarding interoperability • License over the data as it is shared between the parties by BIM. • Responsible party for any inaccuracies.
Ku and Taiebat (2011)	•lack of skilled personnel • Cost of implementation •Reluctance of implementation •Lack of standards for BIM •Interoperability •Lack of law on the contractual agreement
Bernstein and Pittman (2004)	•Lack of strategy •The implementation and use of BIM. • No clear way on how to implement or use BIM. • Limited function of a single software •Lack of BIM standards • Who should pay for the implementation?

3.0 METHODOLOGY
This study is conducted in stages which started with finding the problem statement. After the problem statement been developed then the aim and objectives including the research question was built. Then, the scope of study is built to come up with how big the research is. Next stage is the preparation of Literature review. This stage is conducted by reviewing the researches, articles, books, newspapers and other sources in order to give more insights and understandings in the topic that is being research.

The method that I use to gather data for this research is by using quantitative approach. Questionnaire was used to measure the opinion of a population through statistical method.The population will be quantity surveyors around Perak. From the Board of Quantity Surveyor Malaysia (BQSM) websites, there is at least 900 registered QS consultant in Perak. From this numbers, random sampling technique will be used to pick

the sample for this research. By using sample calculator with confidence level of 90 percent and 10 percent margin of error a total of 60 sample was decided.

4.0 FINDINGS

Table 4. 1: Mean, Mode and Median for Challenges in Implementing BIM for Quantity Surveyor

		Different BIM softwares lack the inter-operability between each other.	High cost for the installation of the software and hardware required and training for workers.	Problem regarding the licensing of the Data since it is shared between many parties.	Lack of skilled personnel.	Reluctant to change.	Lack of standardization in method of implementing.
N	Valid	60	60	60	60	60	60
	Missing	0	0	0	0	0	0
Mean		3.70	4.57	3.88	4.57	3.90	4.32
Median		4.00	5.00	4.00	5.00	4.00	5.00
Mode		4	5	4	5	4	5

Table 4. 2: Mean, Mode and Median for Method to Overcome the Challenges in the Implementation of BIM for Quantity Surveyor

		Add BIM as a syllabus for Quantity Surveying course in universities.	Set a standard or guideline for implementing BIM for Quantity Surveyor by the government or an appropriate body.	Provide BIM and 3D take-off workshops for the existing quantity surveyors.	Promotes BIM for Quantity Surveyors much widely by having seminars and such.	Provide funds for Quantity Surveying company to implement BIM in their company by the Government and appropriate bodies.	Provide funds for Universities and educational institutes to implement BIM in their syllabus by the Government and appropriate bodies.	Create an act focused on BIM
N	Valid	60	60	60	60	60	60	60
	Missing	0	0	0	0	0	0	0
Mean		4.67	4.53	4.65	4.38	4.57	4.65	4.12
Median		5.00	5.00	5.00	4.00	5.00	5.00	4.00
Mode		5	5	5	4	5	5	4

5.0 CONCLUSION

This study concluded that the major challenge for Quantity Surveyors to implement BIM in their company primarily is due to high cost and lack of skilled personnel. Both of this challenges share equal mean. The reason for the high cost if primarily due to the price in installing the software and its licensing. Not to mention the upgrade that is needed to the already existing hardware of the company to cater the need of the software. Besides that, the cost also involves the cost for training needed for the workers to allow them to be better in using BIM.

The findings concluded that the best method in overcoming these challenges in implementing BIM for Quantity Surveyors is by adding BIM as a syllabus for Quantity Surveying course in universities and educational institutes. By having BIM as a syllabus, this could even solve the issue regarding the lack of skilled personnel as the graduates of these universities would already have the knowledge and skills needed regarding BIM. By having skilled personnel created straight from the universities, less amount of money and cost would be needed for personnel training.

The recommendation made for further research is to research on guideline in implementing BIM and research regarding act that revolves around licensing of data that could be implemented on BIM.

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