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Preliminary Study on the Current Situation of Building Information Modeling Adoption in the Interior Design Industry

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Article Information

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Abstract

The development of technology enquires interior design (ID) industry to be more consistent efficient and have made this industry involved in BIM. Implementation of BIM in the interior industry is important to enhance knowledge and designing process in ID. BIM is a process that uses innovative technology in the building design, construction, and management. This study evaluates the implementation of BIM in terms of readiness, awareness and barriers in interior designing within Malaysia context. A pilot study was conducted on sixteen samples which are the ID firms involved to identify factor affecting the implementation of BIM in ID industry. Findings of the study show that a poor knowledge and implementation BIM in ID firm in Malaysia context. This research were started with pilot survey method which is sixteen firms were chosen randomly to get the overview in the current situation implementation of BIM in ID industry. The significance from this study is to enhance the knowledge and usage in BIM among the ID industry.

INTRODUCTION

Interior design is an actively developing industry especially in the design and construction sector. Most of the process in the interior design involves the use of latest technology in term of management and working method. The implementation of BIM makes the work related design easier and faster than before. Several factors will be identified privileges implementing BIM in the interior design industry. According to Azhar (2011), BIM is a latest mechanism and innovation to approach in building design, construction, and management where it can change the process of professional in the industry abroad to enhance and improve planning process, design and construction of projects (Cho et al, 2011).

Currently, many countries have implemented BIM in their industry especially in the construction industry such as United Kingdom (UK), Australia, Hong Kong, Denmark, Norway, Finland and Singapore (NIBS, 2007, Furneaux & Kivit, 2008). Recently, Architecture, Engineer and Construction (AEC) industry had implemented BIM in their scope of work especially in a construction project in the 2000s (Ahmad-Latiffi et al, 2013 ; Azhar et al, 2008).

In Malaysia, the Government has taken several initiatives to promote BIM among construction players. This includes Construction Industry Development Board (CIDB) and Public Works Department has promoted to implement BIM (Ahmad Latiffi, et al, 2014). However, the implementation of BIM in Malaysia is not well received by the industry players (Zakaria et al, 2013). It was challenging to the Government to identify problems and causes of why BIM is difficult to be accepted by the industry players.

TABLE I
UNDERSTANDING THE ANATOMY OF BIM

No.	Technology	No.	Process
1.	Project simulation consist using 3D models integrated with project planning, design, construction and operation *(*Kymmell, W., *2008)*	1.	Refining and adjusting according to project specifications and design changes to ensure the model are accurate (Jorge, C. & Kathleen, I., *2007).*
2.	Introduced the object-oriented parametric modeling *(*Azhar, S *et al., 2008).*		
3.	The process which is the element modified and adjacent or assembly automatically *(*Daniel J.S *2011).*	2.	To produce a design with optimized for quality, aesthetics, constructability, affordability, timeliness and seamless flow into lifecycle management *(McGraw-Hill Construction, 2008).*
4.	Define BIM is supplier, operation and maintanence producers, flow rates and clearence *(*Azhar, S., & Richter, S., *2009; CRC Construction Innovation, 2007).*		

BIM for Interior Design

As the interior design professional it is to be have to service separated from architecture which is included a programming, space planning, construction, detailing, working drawing, material and finish selection as well as interior designer. BIM is a new phrase for design and construction industries while all the industry players looking to improve and develop their planning and design profession. BIM can help designers to create efficient and easy for construction documents. According to San (2007), there are several advantages of implementing BIM in interior designing such as:-

- The momentum and ease of creating an interior design model.
- The ability to detain and manage the design.
- The richness and reliability of the data with the model.

Technology always changing and consistently improvise the design process for the design practice and education field which is the designer has recognized a range of digital and non-digital instruments (Mueller, 2006). In the planning coordination, one of the advantages of BIM is interior designer gets to document the drawing. The drawing is modeled according to the consultants' requirement, making easier for the designer to evaluate and manage the drawing. BIM is not just as tool but it is also defined as a process and a system to manage, document, evaluate, and integrate into the technology device. Therefore, it is important to study on the readiness and implementation BIM for interior design industry.

METHODOLOGY

In this study, the data were collected in two stages. A thorough literature review and preliminary study were conducted to obtain the information and capabilities of various related with BIM and interior design. The next stage, a questionnaire with existing BIM users will be analyzed to validate the technical requirements for a BIM user needs. Finding from the questionnaire are used to emphasize the technical requirements such as benefits, barriers, awareness, readiness, knowledge and other factors reflected the adoption of BIM in the interior design industry.

According to Nwogu (1991), survey design is one in which group people or items considered being representative of the entire group are studied by collecting and analyzing data for them asserts that describes survey research accordingly the situation as it is. Similarly, with Naoum (2007), is describing that the survey approach is concerned with a generalized result when data is abstracted from a particular sample or population.

Besides that, this research considers views by the expertise on the issues related to barriers, advantages, readiness and level of awareness of BIM implementation within Malaysia context. A well-structured questionnaire was designed and administrated to interior design firms. The survey only focuses on the interior design firms that are registered with Lembaga Arkitek Malaysia (LAM). This survey was neither being determine the readiness for interior design using BIM nor effective to the industry.

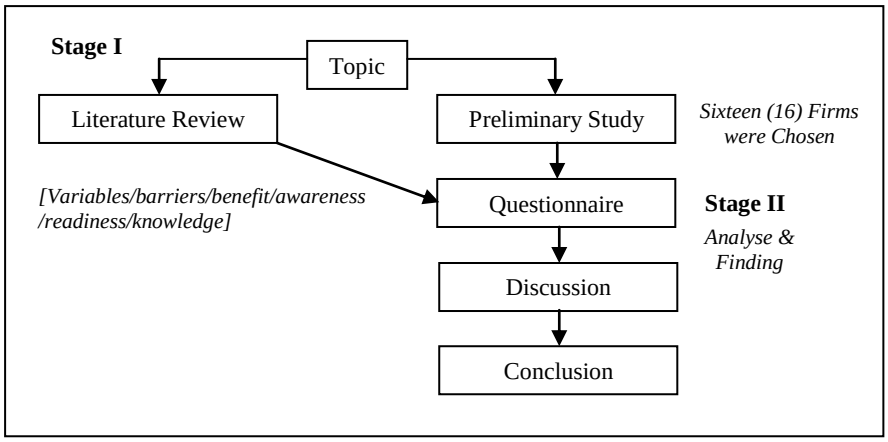
The data was analyzed using score method and ranking, an explanatory statistical tool. There are some questions in the questionnaire used in assessing the content and subject matter of the application BIM in 5 point Likert's scale. Several questions also were using Thurstone's scaling in the method paired of comparison to support the data in the questionnaire. Some of the responses were using in frequency and expressed in simple percentage. The opinion method also applied in this survey to get more accuracy data and result.

TABLE II
LIST OF REGISTERED INTERIOR DESIGN FIRMS IN MALAYSIA

Zone	No.	State	Total of Interior Design Firms
	1	Perlis	0
North	2	Kedah	5
	3	Penang	7
	4	Perak	4
		Total	**16**
	5	Kelantan	1
East	6	Terengganu	2
	7	Pahang	2
		Total	**5**
	8	Selangor	60
Central	9	Kuala Lumpur	47
	10	Negeri Sembilan	0
		Total	**107**
South	11	Melaka	3
	12	Johor	5
		Total	**8**
East Malaysia	13	Sabah	2
	14	Sarawak	7
		Total	**9**
		Overall Total	**145**

After the initial review, preliminary research data were collected through the randomly selected interior design firms in Klang Valley to identify industry needs, expectation and perception while implement BIM in the interior design industry.

Fig. 1: Research Methodology Flow Chart



A total number of sixteen (16) interior design firms were chosen randomly distributed out sixteen (16) firms highlight to the knowledge, use, application, barriers and benefit of BIM in Malaysian interior design industry was conducted. A well-structured questionnaire was designed and a total number of sixteen (16) copies questionnaires are set and distributed to the interior design firms in Malaysia. Table I shows the numbers of Interior Design (ID) firms registered with Lembaga Arkitek Malaysia (LAM) with total 145 firms. According to that numbers, most of the ID firm firms were in the Central Zone with 107 numbers compared other zones with the small numbers of ID firms. Some of the states, they do not have any registered ID firms.

TABLE III
YEAR OF FIRM ESTABLISHED

Year	Frequency	Percentage
1990-1995	1	6%
1996-2000	1	6%
2001-2005	3	19%
2006-2010	6	38%
2011-2015	5	31%
Total	**16**	**100%**

Table III shows the year of the firms was established for interior design. The table shows that 6 firms were established between year 2006-2010 representing 38% of the total respondents followed 5 firms established between year 2011 - 2015 representing 31%. It is following with three (3) respondents representing 19% established in the year 2001 to 2005. However, in the year 1990 to1995 and year 1996 to 2000 each representing one (1) respondent (6%) only.

DATA ANALYSIS AND RESULT

Based on the analysis, this research will occur thus the result to clarify the adoption BIM in the interior design industry in Malaysia. From the analysis, this study will identify the awareness, readiness, knowledge, problems and barriers are it BIM appropriate implement in the interior design firms. The professional from industry was identifying randomly to get the data accordingly their expertise basis.

Knowledge and Experience Using BIM

Knowledge is very important in experts' memory but cannot remain longer as a possible. It is can store and recorded which other way of various media, such as documents, database, and intranets. In the construction industry, knowledge was focusing in acquisition and management control the processing such as, storage, reuse, evaluation and problem solving context (Jan, S.H, Ho, S.P & Tserng, H.P, 2013).

In generally, most of the construction industry in Malaysia recently is new in BIM application otherwise only architecture and engineer using BIM during the construction phase. In this research, the data was justifying the knowledge and experience level for interior design using BIM in Malaysia. This data will analyze the readiness and awareness to implement BIM in the interior design industry.

TABLE IV
LEVEL OF KNOWLEDGE

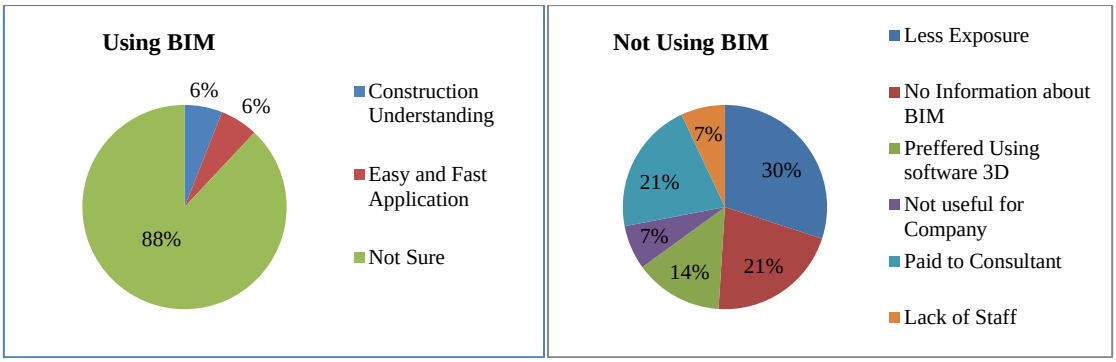
Response	Frequency	Percentage
Yes	4	25%
No	12	75%
Total	**16**	**100%**

Table IV shows the level of knowledge of BIM among the surveyed firms. From the table IV, four (4) respondents (25%) of the total respondents know about BIM while twelve (12) respondents (75%) of the total respondents do not know or have never heard of BIM. Highly percentage for a level of knowledge shows it is a very crucial knowledge among the interior design as professional players in the construction field.

Reasoning of BIM usage

Figure shows the implementation of BIM among respondents. Only two (2) respondents using BIM where is one (1) respondent representing 6% for each respondent and only fourteen (14) respondents representing 88% not sure to apply the BIM. It is compared to not using BIM with 30% is representing less exposure about BIM and 21% are no information about BIM and paid to the consultant. Otherwise, 21% respondents mentioned that they prefer using 3D software while 7% respondents considered BIM is useless for their firm and lack of staffs respectively. Based on the findings, the main reasons of not using BIM are less exposed to BIM, lack of information of BIM and they preferred to pay for BIM expertise.

Fig. 2: Comparison between Using and Not Using BIM



Awareness and Readiness to Implement BIM in Interior Design

Table V shows the responses of level awareness and readiness using BIM in interior design. From the result, seven (7) respondents show poor awareness on BIM and five (5) respondents fair awareness about BIM. However, four (4) respondents are shows very poor about BIM awareness. In terms of readiness level, 10 respondents show fair readiness about implementing BIM in their firms while and two respondents willingly to implement BIM. However, only four respondents show a very poor awareness and not ready to implement BIM in their firms.

TABLE V
LEVEL OF AWARENESS AND READINESS BIM FOR INTERIOR DESIGN

Level	(VP) 1	(P) 2	(F) 3	(G) 4	(VG) 5	Total
Awareness Level	4	7	5	0	0	**16**
Readiness Level	4	0	10	2	0	**16**

Note: VP=Very Poor, P=Poor, F=Fair, G=Good, VG=Very Good

CONCLUSION

The findings from the preliminary survey clarify that the level of readiness and awareness to implement BIM in the interior design industry in generally is still consider not ready and have to justify the causes and implication in the interior design industry. The barriers and reasoning do not use BIM need to make the postmortem and further works. Therefore, BIM still plays a role in enhancing the use of a wider and so far only used by architecture, engineer and construction (AEC). The BIM is a new technology and process thus promising approach for interior design in Malaysia context. This survey explores the BIM potential to adopt in the interior design industry when implement in the industry for better workflow and construction process to be a better integrated and efficiency work progresses. Based on the findings, the implementation of BIM is yet to well receive by most interior design firms in Malaysia except all construction players implemented BIM in their construction and work progress. This is will give a good impact for interior design industry to adopt BIM as part of skill and knowledge in the design process.

The challenging for implementation of BIM by interior design industry in Malaysia has been focused in this study and a several factors has been identifying to emphasize the causes. The main crucial to implement BIM in the interior design field is a less exposure and no knowledge about BIM. Therefore, if interior designer is not aware of the use of BIM has been adopted by other construction fields. The poor level of awareness that will lead to interior design industry will lags behind in the use of BIM technology existing know it is vet beneficial and accelerate the design process in the field of interior design. With the current situation, it is time interior design move forward in the development of BIM for the sake of the industry survival and societal values to upgrade the profession as interior design.

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