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Trend and Challenges of BIM Training Acceptance in the Construction Industry in Selangor

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Abstract: Building Information Modelling (BIM) is extensively known as one of the innovations of Information Technology (IT), globally used as a platform to promote collaborative and integrated working environments in the construction project management. Previous study shows that challenges to BIM implementation include lack of skilled personnel who is competent and has capability in using BIM effectively and lack of proper training by the local authorities and have a little knowledge of BIM. The main objectives of this study are to determine the current BIM training trend of contractors in the Malaysia construction industry and to identify challenges of BIM training acceptance in the construction industry in Malaysia. Out of 90 questionnaires distributed to G5 to G7 contractors, 60 responded fully to the questionnaire, giving 67.00 % of response rates. The data were analysed using statistical package of social science (SPSS) version 26 and Microsoft Excel to obtain frequency, percentage and mean value. This findings from the current trend of BIM training shows that very little company actually implementing BIM. Majority of the company do not have any clear strategies BIM training. However, there are several challenges of BIM training acceptance in construction industry such as high cost of software and updates, high cost of implementing the process and technology and lack of support and incentive from government and professional bodies. This research justifies the need for more strategic provision by the government to ensure greater acceptance of the construction industry towards BIM training.

Keywords: Trend, Challenges, BIM Training, Acceptance, Construction Industry, Selangor

1. Introduction

Construction companies of all sizes are implementing Building Information Modelling (BIM) to improve their bottom line in all major areas of design and construction phases. BIM was introduced by Public Works Department (PWD) into Malaysia in 2007 and is still slowly increasing in the construction industry to increase the productivity of construction sector [1]. Based on Construction Industry

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Transformation Programme (CITP) 2016-2020, the issues are low quality of workmanship and building, limited safety awareness and negative public perception of construction industry. BIM have no doubt in increasing productivity of project delivery; therefore, Construction Industry Development Board (CIDB) play a role to promote BIM in Malaysian construction industry. BIM is adopted in local construction sector to achieve a high productivity of workforce and high quality of sustainable building. To make sure the quality and efficiency of a superior work, the BIM user should be professional and have high quality training before contact with BIM projects [2].

Construction Industry Transformation Plan (CITP) 2016 - 2020 is a Malaysian agenda to transform construction industry and has highlighted several challenges of BIM implementation in Malaysia. The challenges include a) lack of skilled personnel who is competent and has capability in using BIM effectively and, b) lack of proper training by the local authorities and have a little knowledge of BIM [3]. The government took a step forward by forming a committee that is responsible to select the best BIM platform to be used in both private and public project implementations [3].

Furthermore, studies have identified that it is not the difficulties inherent in the BIM technology but rather it was due to the lack of training and availability of qualified staff, the existing challenges in educating staff to be competent with the technology [4]. This clearly indicates that insufficient training of BIM or lack of it is an issue affecting BIM adoption in the construction industry globally. [5] added, one of the factors the organisations fail to realise about the benefit of implementing new technology is the lack of training provided by the organisation for their staff, and the level and type of training should be based on the needs of the organisation or individuals within an organisation.

Also identified by the studies that the intense promotion of BIM training is one of the major factors that is needed to enhance the speedup of the implementation of BIM in Malaysia's construction industry with the believes that it will boost production of manpower for the potential BIM market in a very near future [6]. Therefore, this study aims to investigate BIM training acceptance in the construction industry in Selangor.

The objectives of this research are to determine the current BIM training trend of contractors in the Malaysia construction industry and to identify challenges of BIM training acceptance in the construction industry in Malaysia. This research is also to be conducted in the state of Selangor where major cities play important roles as BIM training providers. The research concentrates on contractors from Grade 5 to 7, and this can provide a clear understanding and rough overview of BIM towards training.

2. Literature Review

2.1 BIM Training in the Malaysian Construction Industry

In order to understand the different company needs at the individual and group levels, a company in the process of implementing BIM solutions must perform an assessment of current and future technical and human resources requirements [7]. In fact, the assessment of available resources, more than any other contributing factor, guarantees a successful project implementation.

Careful consideration must be given to the assessment of training requirements, as receiving proper training presents one of the greatest challenges to BIM adoption. This especially applies to companies that have very limited staff with previous experience in BIM [8]. BIM training is a significant expense and a somewhat unexplored topic, which has not been extensively documented in part due to the relatively new concept of BIM.

With the view of BIM adoption in the Malaysian construction industry, it seems that effective training programmes are essential to enhance the construction professionals' BIM proficiency. BIM training is significant due to its role to expand BIM knowledge and to increase BIM usage via hands-

on training environment. If BIM trainings is seen to be significant in the BIM adoption – that is not just as a knowledge delivery and learning mechanism, then attention need to be paid to design a more effective teaching/learning methods so that attitudes towards BIM can be improved, in both content and learning experiences [3]. The training contents and teaching/learning methods delivered by experienced trainers could create a more conducive and beneficial training environment [3]. This factor may help to influence the participants to use BIM immediately after they attended BIM trainings.

There are many organisations that provide BIM training to the Malaysian construction players. These organisations consist of government agencies, professional bodies and private organisations. Nonetheless, the focus of this study is more on BIM training provided by the government agencies, namely the MyBIM Centre, PWD, Multimedia Super Corridor (MSC) and Construction Research Institute of Malaysia (CREAM). This is because all agencies play significant roles in formulating and organising BIM trainings, and are actively delivering BIM trainings in Malaysia. The types of BIM training programmes organised by CIDB and PWD are introductory trainings, and intensive trainings for the use of BIM software (technical training).

BIM training can be organized as either an in-house training or external training [9]. Organisations with more BIM experience are inclined to organize in-house BIM training due to the organizations capability to provide BIM trainer or BIM manager who will conduct the training sessions. The studies have advocated that the organisations which have their own trainer and organise in-house training could give benefit to the organisation through assisting training customization and reducing cost of training [10].

2.3 Challenges for BIM Training in the Malaysian Construction Industry

Especially in Malaysia, BIM is considered a new technology and it is very certain that the people are reluctant to accept this technology. There are several challenges for BIM training, which is reviewed as follows:

a) Cost

For BIM to be adopted in construction industry, cost is one of the most direct concerns to most of the construction players. Cost involved in the initial stage of the investment covers several areas such as updating the new software, hardware and the training of staff [11]. Hiring new staffs that have the skills and knowledge of BIM requires allocation of cost for the construction industry. Training of staffs to educate them about BIM also needs time and this will lower their productivity in the short term which incurs to additional cost [12].

b) Shortage of BIM experts

The studies have indicated that there is a small group of educators dedicated to spreading BIM knowledge across the industry because BIM is relatively new and its implementation in the sector is still progressing [13]. Therefore, it was not a surprise to see the same scenario in the construction industry. First, it was hard to identify people related to BIM training in the country. Apart from training the existing staffs, an organisation can also hire new professionals in BIM field to establish and manage the BIM implementation [14]. However, there is a lack of adequately trained BIM professionals even though the organisations are willing to hire BIM professionals.

c) Lack of training

The lack of training also hinders the implementation of BIM achieves the satisfactory level. In the study, it was stated in the paper that training is vital for the success in implementing new technology such as BIM [15]. Without proper training BIM cannot be fully utilised to its extent even if that particular organisation did have the technology. Suitable training programs needs to be developed to minimise the cost and human resources to suit the organisation’s needs [11].

d) Lack of guidelines

Malaysia's lack in the standard of BIM implementation guidelines adds to the trouble. Having low level of knowledge regarding BIM has put a question mark on the construction players whether how, when or what to start in implementing BIM [15]. With the absence of a national BIM implementation guideline, users develop their own guidelines without consulting BIM expert. Every organization comes up with their guidelines resulting in a very diverse situation. As a result, all of these versions will lead to the confusion among construction players.

3. Research Methods

This study is conducted through an exploratory survey by using questionnaire method to determine the current BIM training trend of contractors and to identify the challenges BIM training acceptance in Malaysia construction industry. To achieve the objectives, the questionnaire was distributed among contractor class G5 to G7 who are registered with Construction Industrial Development Board (CIDB) in Selangor area, and this can provide a clear understanding and rough overview of BIM towards training. The questionnaire consists of three major parts. section A is emphasizing on the respondent's demography, section B is determining the current BIM training trend of staffs in the construction industry, and section C is identifying challenges of BIM training acceptance in the construction industry.

In order to identify the current BIM training trend of staffs in the construction industry, there was a total of 8 variables used while to identify the challenges of BIM training acceptance in the construction industry, there was a total of 24 variables used. All these variables were selected from the literature.

Based on the literature review the questionnaire will design using mainly closed-ended (or multiple choice) questions to collect the required data. This surveys documents will be distributed to the contractors in the Selangor area. There also have are five Likert scales that will be used for the questionnaire. A five Likert scales ranging from 1 which represented the strongly disagree to 5 which represented the strongly agree was being used to capture the challenges of BIM training acceptance in the construction industry.

The respondents involved in this research were selected from a random of contractors with grade G5, G6, and G7 in Selangor. Based on their financial strength of more than 5 million tendering capacities, contractors with these grades were chosen. Hence, the totals of questionnaires that were distributed are 90 sets. The proportion of distribution is (30:30:30) for a group of contractors in the state of Selangor with grades G5, G6, and G7. For the purpose of this questionnaire distribution, which is by mail delivery, there was only one main method used. Out of 90 questionnaires distributed, 60 responded fully to the questionnaire, giving 67.00 % of response rates.

Furthermore, pilot test is important because it can give advice about the possible failure of this study and enable to determine practical problems of the methodology. 5 people will give questionnaire before the questionnaire will be distributed to the actual target respondents. 5 people including lecturers, academician, industry expert that related to construction field and contractor company in Malaysia. For the purpose Cronbach's alpha test was conducted to the current BIM training trend of contractors and challenges BIM training acceptance in Malaysia construction industry. Based on the reliability analysis that has been done, all values of Cronbach's alpha were greater than 0.70, so it can be concluded that the overall reliability of the questionnaire used is acceptable in the research.

The questionnaire about the BIM training acceptance in Malaysia's construction industry can generate data to analyse by using statistical package social science (SPSS) version of 26 and Microsoft Excel Spreadsheet. SPSS is a Windows based program that can be used to perform data entry and analysis and to create tables and graphs. Microsoft Excel was used in the forming of graphs, tables and charts. The types of analysis are consisting of frequency analysis and descriptive statistical analysis. Hence, the flow chart of the method adopted in this study will be shown in Figure 1.

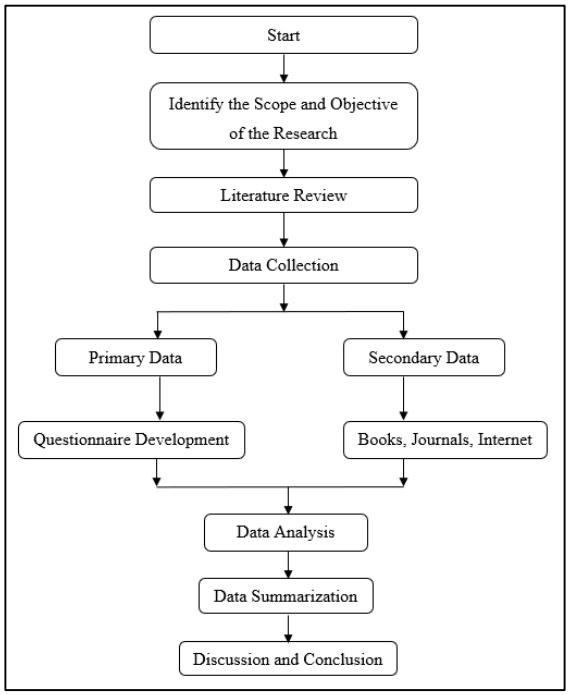

Figure 1: Methodology Flowchart

4. Results and Discussion

The results of the questionnaire are presented and discussed in this chapter. The questionnaire illustrates the characteristics of the studied demographic analysis, determine the current BIM training trend of contractors and identify the challenges BIM training acceptance in Malaysia construction industry. The distribution of questionnaire is limited to the respondents in Selangor.

4.1 The demographic of the respondents

The demographic of the respondents is given in Table 1. The demographic of respondents is described the following actions such as gender, grade of contractors, working position, and working experience in construction field. All the items will be analysed by using SPSS version 26.0 and Microsoft Excel.

Table 1: Demographic of Respondents

Demographic of respondent	Frequency	Percentage (%)
Gender		
Female	25	41.7
Male	35	58.3
Grade of Contractors		
G5	18	30.0
G6	13	21.7
G7	29	48.3

Working Position		
Project manager	12	20.0
Project engineer	9	15.0
Site supervisor	9	15.0
Technician	2	3.3
BIM manager	4	6.7
BIM assistant manager	1	1.7
BIM coordinator	0	0.0
BIM modeler	2	3.3
Others	21	35.0
Working Experience		
Less than 2 years	8	13.3
3 – 5 years	17	28.3
6 – 10 years	11	18.3
11 – 15 years	7	11.7
16 years and above	17	28.3

4.2 Trend of BIM training of contractors in the construction industry

4.2.1 Level of BIM awareness and use of BIM

Table 2: Level of BIM awareness and use of BIM

Level of BIM awareness and use of BIM	Frequency	Percentage (%)
Aware and currently using BIM	13	21.7
Aware and have used BIM	17	28.3
Aware of BIM but have not used it	24	40.0
Not aware of BIM	6	10.0
Total	60	100

The level of BIM awareness and its use are the main aims of this study. From the survey, the results indicated that the level of BIM awareness is very high where 90.00 % of the respondents are aware of BIM and only 10.00 % of respondents are not aware of BIM. On the contrary, the usage of BIM is very low where only 21.70 % of the sample are currently using BIM and 28.30 % of the sample have used BIM. These results are illustrated in Table 2. These findings offer clear evidence that BIM is already a well-known technology in the Malaysian construction industry. However, the low usage of BIM indicates that BIM is still a 'young' technology in Malaysia despite its introduction long time ago, and it has not been fully developed and improved to maximise its potential.

4.2.2 Participation of BIM training organized by government agencies

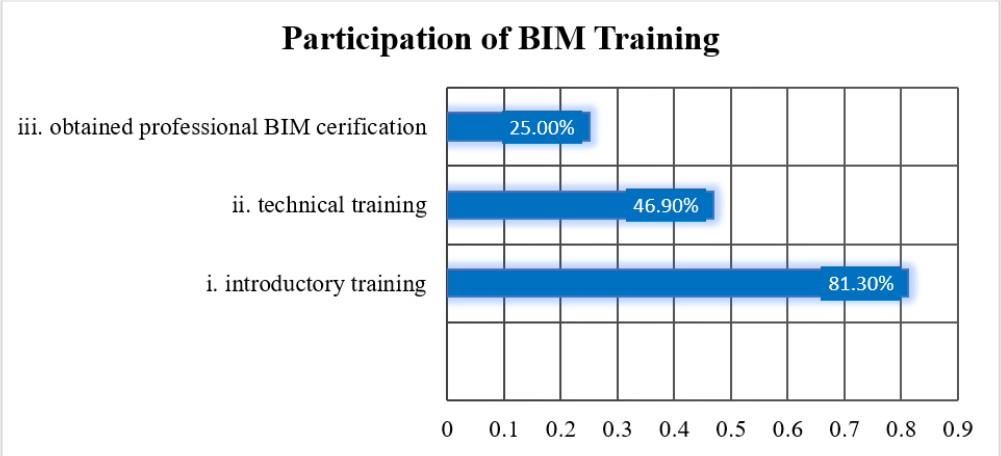

Figure 2: Participation of BIM training organised by government agencies

The result in Figure 2 shows respondents from the contractor background who have attended BIM training and also who have not participated any BIM training. The result showed that 46.70 % (n=28) have not participate any BIM training and 53.30 % (n=32) have participate BIM training organised by government agencies. In the questionnaire, the respondent had been given opportunity to choose more than one training that they have attended either introductory training, technical training or obtained professional BIM certification. From 32 respondents who have participated BIM training, 81.30 % has participated introductory training, 46.90 % has participated technical training and 25.00n% has obtained professional BIM certification organised by government agencies.

4.2.3 Best method for BIM training

Table 3: Best method for BIM training

Best method for BIM training	Frequency	Percentage (%)
Self-learning	3	5.0
Seminar or workshop	39	65.0
In-house training	10	16.7
Online training	3	5.0
Others	5	8.3
Total	60	100

Respondents were categorized based on the best method for BIM training as shown in Table 3. Most of the respondents that respond for best method for BIM training is seminar or workshop with 39 respondents (65.00 %). For the lowest is In-house training with 10 respondents (16.70 %), others with 5 respondents (8.30 %) and self-training and online training with 3 respondents (5.00 %). 65.00 % which is the highest number of respondents mention that seminar or workshop was the best method for BIM training.

4.2.4 Company has been using BIM

Table 4: Company has been using BIM

Company has been using BIM	Frequency	Percentage (%)
Less than a year	28	46.7
1-3 years	21	35.0
4-6 years	9	15.0
7-9 years	1	1.7

10 years or more	1	1.7
Total	60	100

Referring to the Table 4 shows the data collection for survey about usage of BIM in the company projects. Most of respondents choose less than 1 year with 28 respondents (46.70 %) have been using of BIM in their projects and 21 respondents (35.00 %) used of BIM for 1-3years. While 9 respondents (15.00 %) for 4-6 years, for 7-9 years and 10 years or more are only 1 respondent (1.70 %) data survey. It can be concluded that most of the company still new with the adoption of BIM in their company project.

4.2.5 Employees work in the BIM department/project

Table 5: Employees work in the BIM department/project

Employees work in the BIM department/project	Frequency	Percentage (%)
5 or less	16	26.7
6-25	15	25.0
26-50	2	3.3
51 or more	1	1.7
None so far	26	43.3
Total	60	100

The Table 5 below shows the percentage of respondents answering the questionnaire regarding the number of organisation employees in the BIM department/project. The data shows the most percentage is 43.30 % which is company that employed none so far, 26.70 % which is company that employed 5 or less employees and 25.00 % which is company that employed 6-25 employees. The lowest percentage which is 2.00 % that are company that employed 26-50 employees and 1.70 % that are company that employed 51 or more employees.

4.2.6 Company has a standard BIM training plan

Table 6: Company has a standard BIM training plan

Company has a standard BIM training plan	Frequency	Percentage (%)
Yes	14	23.3
No	46	**76.7**
Total	60	100

The survey taking the data about company has a standard BIM training plan. From the results in Table 6, the majority of respondents vote No with 46 respondents (76.7%) and others 14 respondents (23.3%) vote Yes for company does not have a standard BIM training plan. It can be concluded that majority of respondents vote No for the survey of company has a standard BIM training plan. It shows that there is the very on obvious that there is no established BIM training plan in the big contractors in Malaysia.

4.2.7 Company allocate training budget for BIM

Table 7: Company allocate training budget for BIM

Company allocated training budget for BIM	Frequency	Percentage (%)
Yes	23	38.3
No	37	61.7
Total	60	100

Besides the standard BIM training plan respondents, the survey taking the data about company allocate training budget for BIM. From the results in Table 7, the majority of respondents vote No with 37 respondents (61.70 %) and others 23 respondents (38.30 %) vote Yes for company does not allocate training budget for BIM. It can be concluded that majority of respondents vote No for the survey of company allocate training budget for BIM. It shows that there don't have clear intention BIM strategies in respective companies.

4.2.8 Company provide any training or education on using BIM

Table 8: Company provide any training or education on using BIM

Company provided any training or education on using BIM	Frequency	Percentage (%)
Yes	26	43.3
No	34	56.7
Total	60	100

The survey also taking the data about company provided any training or education on using BIM. From the results in Table 8, the majority of respondents vote No with 34 respondents (56.70 %) and others 26 respondents (43.30 %) vote Yes for company does not provided any training or education on using BIM. It can be concluded that majority of respondents vote No for the survey of company provided any training or education on using BIM. Since BIM is still not so readily establish in the construction industry in Malaysia.

4.2.9 Attend seminars/conferences/workshops on BIM

Table 9: Attend seminars/conferences/workshops on BIM

Attend seminars/conferences/workshops on BIM	Frequency	Percentage (%)
One time per year	12	20.0
Two times per year	12	20.0
More than two times per year	8	13.3
None so far	28	46.7
Total	60	100

Referring to the Table 9 shows the data collection for survey about attended seminars/conferences/workshops on BIM. Most of respondents choose none so far to attend the seminars/conferences/workshops on BIM with 28 respondents (46.70 %) and one time per year and two times per year are same as 12 respondents (20.00 %). The lowest of respondents choose more than two times per year to attend the seminars/conferences/workshops on BIM with 8 respondents (13.30 %).

4.2.10 Attend training on BIM related software

Table 10: Attend training o BIM related software

Attend training on BIM related software	Frequency	Percentage (%)
One time per year	14	23.3
Two times per year	9	15.0
More than two times per year	8	13.3
None so far	29	48.3
Total	60	100

Referring to the Table 10 shows the data collection for survey about attended training on BIM related software. Most of respondents choose none so far to attend the training on BIM related software

with 29 respondents (48.30 %) and has 14 respondents (23.30 %) with one time per year. are same as 12 respondents (20.00 %). The lowest of respondents choose two times per year to attend training on BIM related software with 9 respondents (15.00 %) and 8 respondents (13.30 %) with more than two times per year.

4.2.11 Types of BIM training that have attended

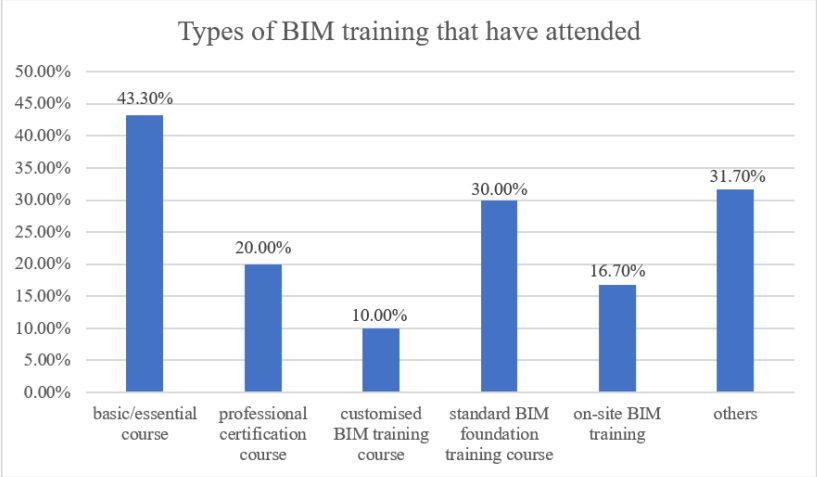

Figure 3: Types of BIM training that have attended

Referring to the Figure 3 shows the data collection for survey about types of BIM training have attended. The highest of respondents choose basic/essential course with 26 respondents (43.30 %). The lowest of respondents choose 6 respondents (10.00 %) with customised BIM training course. 43.30 % which is the highest number of respondents choose basic/essential course for attended the types of BIM training.

4.2.12 Summary of BIM training trend according to top ranked percentage

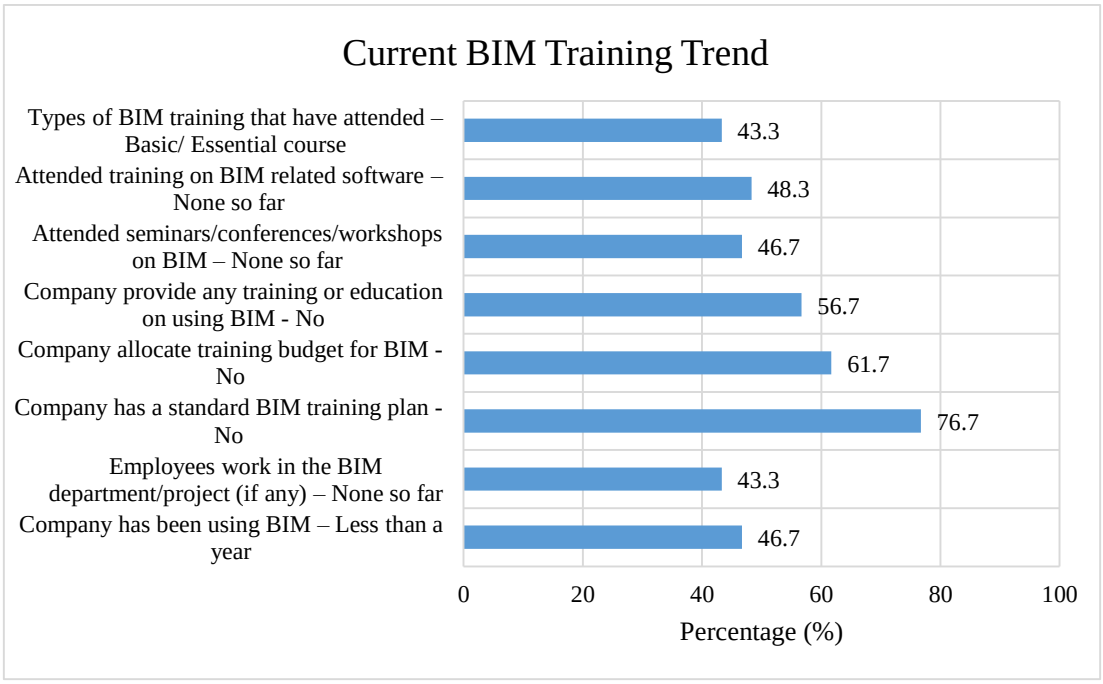

Figure 4: Summary of BIM Training Trend

From Figure 4 shows that the summary all the highest percentage of current BIM training trend. The survey shows that 46.70 % of company has been using BIM for less than a year. This confirms the statement that BIM is a young technology, therefore it has not developed its full potential and many improvements are yet to be made. The data shows that 43.30 % of employees work in the BIM department/project for none so far. The survey shows that most of respondents (76.70 %) do not have standard BIM training plan. The majority of respondents (61.70 %) do not have allocate training budget for BIM. There is no literature about what approach is more beneficial for training process, but it is the opinion of the author that having a budget assigned will help improve the structure of the training program. Majority of respondents (56.70 %) do not provide any training or education on using BIM. Most of the respondents (46.70 %) do not attend seminar /conferences/workshops on BIM. Other than that, most of respondents (48.30 %) also do not attend training on BIM related software. Most of the respondents are attended for basic/essential course for the types of BIM training which is 43.30 %.

4.13 Challenges of BIM training acceptance in the construction industry

This section shows that the findings of the challenges of BIM training acceptance which is categorized under People, Technology, Process and Policy.

Table 11: Challenges of BIM training acceptance (People)

No	Challenges	Mean	Standard deviation (SD)	Ranking
A	People			
1	Lack of knowledge on BIM	3.72	0.993	6
2	Lack of awareness of BIM benefits	3.73	0.918	4
3	Lack of competency among team members in using BIM	3.72	0.940	5
4	People's mindset that is reluctant to accept better changes and prefer the traditional means	3.80	0.777	1
5	Lack of skill on BIM, eg. AutoCAD, Revit, Naviswork and others	3.78	0.922	2
6	Insufficient of BIM trainings	3.73	0.880	3

From the Table 11, the highest mean challenges of BIM training acceptance that there is the lack of skill on BIM, eg. AutoCAD, Revit, Naviswork and others within the industry with the mean value at 3.80 (SD 0.777). The lowest mean challenges of BIM training acceptance that there is lack of awareness of BIM benefits with overall mean 3.72 (SD 0.993).

Table 12: Challenges of BIM training acceptance (Technology)

No	Challenges	Mean	Standard deviation (SD)	Ranking
B	Technology			
1	Training cost is too expensive	3.82	0.748	3
2	High cost of software and updates	4.00	0.864	1
3	BIM software is complicated to use	3.28	0.940	6
4	Existing hardware incapable of running basic BIM software	3.63	0.974	5
5	High cost of hardware and networks	3.77	0.890	4
6	High cost of implementing the process and technology	3.95	0.891	2

From the Table 12 the most salient Technology challenges is high cost of software and updates which ranked first overall (M: 4.00, SD: 0.864). The lowest mean challenges of BIM training acceptance that there is the BIM software is complicated to use with the mean value 3.28 (SD 0.940).

Table 13: Challenges of BIM training acceptance (Process)

No	Challenges	Mean	Standard deviation (SD)	Ranking
C	Process			
1	Lack of time for experimentation and implementation in fast-paced projects	3.85	0.954	1
2	Lack of references to assist in implementing BIM	3.67	1.068	5
3	Lack of direction of BIM in the industry	3.75	0.950	2
4	Inadequate familiarity with the use of BIM	3.72	0.976	3
5	No BIM requirement / mandate exists in the industry	3.68	0.911	4
6	Assumption that conventional methods are better that new processes	3.53	1.049	6

Within the Process context, the highest mean challenges of BIM training acceptance that there is a lack of time for experimentation and implementation in fast-paced projects with the mean value at 3.85 (SD 0.954). The lowest mean challenges of BIM training acceptance that there is assumption that conventional methods are better that new processes with the mean value at 3.53 (SD 1.049).

Table 14: Challenges of BIM training acceptance (Policy)

No	Challenges	Mean	Standard deviation (SD)	Ranking
D	Policy			
1	Lack of BIM standard and guidelines	3.63	0.758	5
2	Lack of training and awareness programs by government	3.75	0.914	2
3	Lack of support and incentive from government and professional bodies	3.90	0.877	1
4	No legal or contractual agreement on BIM	3.57	0.851	6
5	Lack of best practice and guidance within industry	3.67	0.877	4
6	Unclear scope and ownership between within project team	3.72	0.804	3

In the area of Policy, the highest mean challenges of BIM training acceptance that there is a lack of support and incentive from government and professional bodies such as CIDB and PWD. The mean value is 3.90 (SD 0.877). The lowest mean challenges of BIM training acceptance that there is no legal or contractual agreement on BIM with the mean value of 3.57 (SD 0.851).

4.14 Top 5 ranked challenges of BIM training acceptance

Table 15: Top 5 ranked challenges of BIM training acceptance

Factors	Challenges	Mean	Standard deviation	Ranking
Technology	High cost of software and updates	4.00	0.864	1
Technology	High cost of implementing the process and technology	3.95	0.891	2
Policy	Lack of support and incentive from government and professional bodies	3.90	0.877	3
Process	Lack of time for experimentation and implementation in fast-paced projects	3.85	0.954	4
Technology	Training cost is too expensive	3.82	0.784	5

From Table 15 shows that the top five most important factors that challenges of BIM training acceptance, high cost of software and updates. From the ranking, it has 4.00 mean, which is higher than all the remaining. The cost to adopt BIM tools, the companies need to be incurring the large cost to buy the new hardware and software in addition to sending all stakeholders involved to attend BIM training on software. The cost to adopt BIM software such as Revit, Tekla, ArchiCAD and Naviswork is high if compared with the traditional design tools [16]. High cost of implementing the process and technology has 3.95 mean, which is the next challenges of BIM training acceptance. Lack of support and incentive from government and professional bodies has mean of 3.90, which is third ranking of challenges of BIM training acceptance. To ensure a widespread adoption of BIM, the government need to take the primary role as in current, private sectors are taking the lead on BIM implementation [17]. Lack of time for experimentation and implementation in fast-paced projects is fourth at ranking, with 3.85 mean in challenges of BIM training acceptance. BIM success factor is highly determined by participation, value of the model is lost due to inability to use it as intended. Training cost is too expensive is fifth at ranking has 3.82 mean in the challenges of BIM training acceptance. High training cost and high technology cost are the top two challenges in Malaysia Building Information Modelling Report 2016. As BIM requires investment of equipment, software, hardware and training, it would greatly impact on cost.

5. Conclusion

With the view of BIM adoption in the Malaysian construction industry, it seems that effective training programmes are essential to enhance the construction professionals' BIM proficiency. This research is concerned about the BIM training acceptance of contractors in the construction industry in Selangor. The purpose of this chapter is to conclude all the findings derived from the research. A questionnaire was designed and distributed among contractors with grade G5, G6 and G7 in the state of Selangor. All objectives set for this research and the findings are to determine the current BIM training trend of contractors in the Malaysian construction industry and to identify challenges of BIM training acceptance in the construction industry in Malaysia. This findings from the current trend of BIM training shows that very little company actually implementing BIM. Majority of the company do not have any clear strategies BIM training. However, there are several challenges of BIM training acceptance in construction industry such as high cost of software and updates, high cost of implementing the process and technology and lack of support and incentive from government and professional bodies.

The first obvious limitation is in term of the respondent. The rate of respond towards this study is low and it also did not cover each of the categorises of the construction players. Different steps and techniques should be utilise to obtain a better response rate. Besides that, limitation of time, late of responding the questionnaire from the parties make the researcher late to analyse the data because the time is too short. Its takes almost one week in working days to get a respond and the data analysed may take in two or three weeks to be calculate. Due to the time constraint, the number of respondents involved in this research may not represent the entire population of the Malaysian construction industry.

The respondents of this study are limited to the Grade 5 to Grade 7 contractors' company. Due to lack of company that can contribute to answer the questionnaire less feedback from the G5 to G7 contractors. By expending the survey, can get more feedback that represent the actual scenario in the construction industry can be obtained. More extensive literature review can be carried out to identify more information and results that can be obtained from different scope of the project natures. Correlating the data of company implementing BIM and their challenges.

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