Study on Building Information Modeling and Efficiency Monitoring

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Abstract
Building Information Modelling (BIM) is an intelligent 3D model-based process. This helps planning, designing, construction, and documentation of project more easier and efficient. BIM is an emerging technology. It has become an increasingly important tool for architects, engineers etc. It is very important among professionals. This research is helps to study or measure the acceptance of BIM, and also study about the parameters like awareness, efficiency etc. Here the study is conducted in Kerala construction industry. Questionnaires were sent electronically to approximately 30 professionals (engineers, architects &designers). Only 22 responses were obtained with 73.33% response rate. Survey is designed to ask respondents questions about BIM experience, benefits etc. Collected data is analyzed using Microsoft excel.
Keywords: *Building information modeling, efficiency analysis.*

I. INTRODUCTION

Building information modelling (BIM) is a process of development and using of a simulation model of planning, design, construction and operation of building. It is a set of rich data and information of all part of building during its life cycle and intelligent communication all members with each other. It is an intelligent 3D model-based process. This helps planning, designing, construction, and documentation of project more easier and efficient. BIM is an emerging technology. It has become an increasingly important tool for architects, engineers etc.it is very important among professionals. This research is helps to study or measure the acceptance of BIM, and also study about the parameters like awareness, efficiency etc. Here the study is conducted in Kerala construction industry. Questionnaires were sent electronically to approximately 30 professionals (engineers, architects &designers). Only 22 responses were obtained with 73.33% response rate. Survey is designed to ask respondents questions about BIM experience, benefits etc. Collected data is analyzed using Microsoft excel.

1.1.1 Methodology

To achieve the objectives, a survey questionnaire was sent to engineers, architects and designers working in construction industry in Kerala. Invitations were sent electronically to approximately 30 engineers, architects &designers. Only 22 responses were obtained with 73.33% response rate. The classification of respondents is: 4 designers, 4 architectures, and 14 civil engineers. To collect data related to the research objectives, a survey is designed to ask respondents questions about BIM experience& awareness. The structure of the survey is shown in below. Here part requests the surveyed person to rate his knowledge and years of experience with BIM. Finally evaluate the outcome from survey with the help of Microsoft excel. Flow chart of methodology shown in fig.1
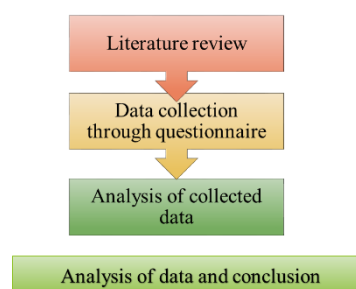

Figure 1: Methodology

1.1.2 Questionnaire Model

Name :

Designation :

Company name :

1. Have you ever used BIM as a tool for your projects? .
   Yes/No

2. When producing drawing ,which of the following tools do you mainly use?
   Autodesk revit /Bently micro station/Archi cad /Others

3. What are the barriers to BIM adoption in your organization?
   BIM not always relevant to the project we work on/Cost of BIM system/Lack of company BIM Experience.

4. Adopting BIM has given the organisation the following advantage
   BIM improves visualization/BIM improves co ordination of construction documents
   Improves productivity/Adopting BIM brings cost efficiency and profitability

5. What is the most common use of BIM in your projects?
   Architectural Design/MEP Modelling/Visualization/Scheduling Marketing

6. The approximate costs expended for implementation of BIM in your projects is ...percent
   Less than 2/2-5/Greater than 5

7. How do you rate your knowledge and skills in BIM
   Little /Better/don't know

8. For how many years are your experience with BIM
   NA/Less than 3/Greater than 3

9. Is BIM effective for risk and safety assessment
   Disagree/Neutral/Agree

10. Is BIM improves speed ,accuracy& reliability
    Disagree/Neutral/Agree

1.2 FINDINGS

Awareness about BIM knowledge and understanding is shown in figure 2.As shown in figure 2, 15% of respondents are known about BIM, and 85%, do not know anything about BIM. According to Figure 3, 5% of respondents have BIM experience greater than 3 years,15% of respondents have BIM experience ranges from 0 to 3 years and 80% of respondents have no BIM experience .According to Figure 4, 60% of respondents have no knowledge about BIM,15% have little knowledge&25% have better knowledge about BIM.
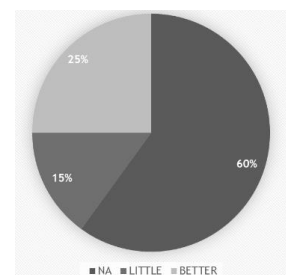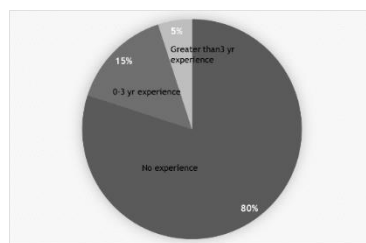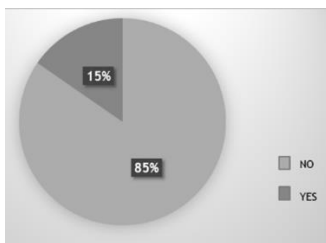

Figure 2: Awareness about BIM   **Figure 3: BIM experience rating**   **Figure 4: BIM knowledge**

Figure 5 shows respondents agreement with BIM advantages. From these advantages. 57.1% respondent say that, BIM improves coordination and flexibility of design& documentation. As shown in Figure 5, 14.3%, 28.6%, of respondents say that ,adopting BIM brings cost efficiency and profitability, BIM improves speed of delivery,respectively.There are several software used in BIM, like Autodesk Revit, Archicad, Bently Microstation etc. Figure 6 shows common software used in BIM. According to respondent,85.7% say that Autodesk Revit is the most common software over bently microstation ,archicad & Autodesk Revit. 14.3% of respondents, they are use other than software mentioned in the questionnaire.
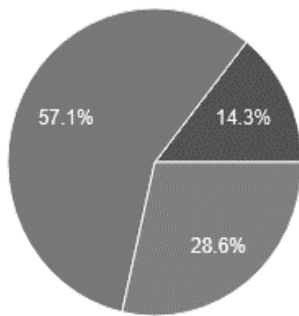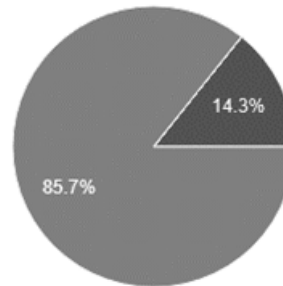
Figure 5: BIM advantages

Figure 6: Software used in BIM

Figure 7 shows cost of BIM .According to respondent,28.6% say that ,more than 5% of total project cost need for BIM. The major part,ie,42.9% say that cost of BIM is 2-5% of total project cost, and the rest 28.6% say that, need less than 2%.Figure 8 shows the barriers to BIM adoption. According to survey, 62.5% of respondent say that lack of experience is barriers to BIM adoption.12.5% are cost of BIM system,25% not relevant to the project.
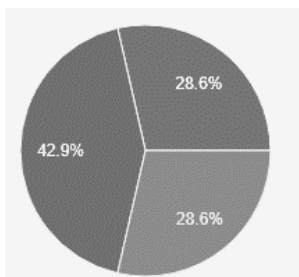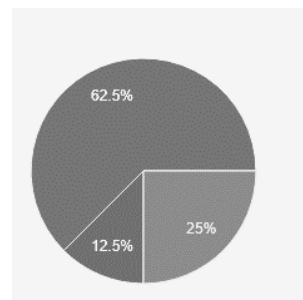

Figure 7: Cost of BIM

Figure 8: Barriers to BIM

Risk assessment is a term used to describe the overall process or method where you, Identify hazards and risk factors that have the potential to cause harm (hazard identification).Figure 9 shows , BIM effectiveness for risk and safety assessment.66.7% agree with the statement and the rest 33.3% of respondent is neutral to the statement.
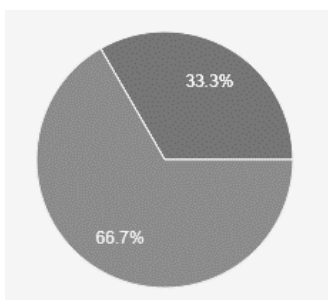

Figure 9: BIM effectiveness for risk and safety assessment
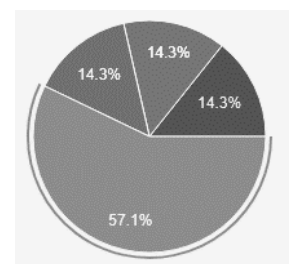

Figure 10: Use of BIM

The concept of BIM used for several purpose i.e., architectural design& visualization, MEP modelling, project management and marketing etc. Figure 10 shows most common use of BIM. 57.1% of respondent Say that, architectural design& visualization is most common use,14.3% each of MEP modelling, project management and marketing was selected by the remaining respondents.

II. SUMMARY AND DISCUSSION OF FINDINGS

The survey results obtained are as discussed below.

- According to the survey questionnaire may be explained that the majority (85%) of current construction practitioners not aware about BIM.

- 5% of respondents have BIM experience greater than 3 years,15% of respondents have BIM experience ranges from 0 to 3 years and 80% of respondents have no BIM experience .
- 60% of respondents have no knowledge about BIM,15% have little knowledge&25% have better knowledge about BIM.
- BIM have several advantages. Majority of respondent, ie.57.1% say that, BIM improves coordination and flexibility of design& documentation.
- 85.7% of surveyed practitioners considered that Autodesk Revit is the most common software.
- The major part, i.e., 42.9% of surveyed practitioners considered that cost of BIM is 2-5% of total project cost.
- According to survey 62.5% of respondent say that lack of experience is the most common barriers to BIM adoption.
- 66.7% agree with the statement, BIM effective for risk and safety assessment.
- 57.1% of respondent Say that, architectural design& visualization is most common use.

III. CONCLUSION

BIM is an emerging technology. It has become an increasingly important tool for architects, engineers etc.it is very important among professionals. It improves coordination and flexibility of design& documentation. According to the survey, professionals not much aware about BIM. Only few respondent have experience in BIM. The research also concluded that major barriers to BIM application lack of company experience. Practitioners agree with the statement, BIM effective for risk and safety assessment. The major part, of surveyed practitioners considered that cost of BIM is 2-5% of total project cost. Majority of surveyed practitioners considered that Autodesk Revit is the most common software.

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