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READINESS OF FACILITIES MANAGEMENT COMPANY TO IMPLEMENT BUILDING INFORMATION MODELLING AS MAINTENANCE STRATEGY IN HIGHER EDUCATION

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ABSTRACT

BIM, also known as n-D Modelling or Virtual Prototyping Technology, is an innovation that is leading information technology in the Architecture-Engineering-Construction (AEC) business. BIM is a technology as well as a method. BIM technology assists project stakeholders in visualizing what is to be created in a simulated environment to detect any possible design, construction, or operational difficulties. The problems statement for this research are Building Information Technology are not familiar among the maintenance team in Malaysia and most companies do not use Building Information Technology (BIM) in their maintenance work. Next, the objective why this thesis needs to be done are to assess the readiness of FM company in using BIM as the maintenance strategy at higher education institutions, to elicit the function of BIM in maintenance work and to determine the benefit of BIM in strategizing the maintenance work. Research uses questionnaire and focus group methods to assess Malaysian higher education facilities management's use of Building Information Modelling in building maintenance.

Keywords: *building information modelling, technology, higher education*

INTRODUCTION

For this research work, the topic has already been chosen. The topic is Building Information Modelling (BIM) as the proposal for this research. Building Information Modelling (BIM) is one of the important aspects that we need to consider, especially during inspection or doing maintenance work. The reason this topic was chosen is because Building Information Modelling (BIM) is one of the scopes of work under the Building Surveyor job. So, this topic needs to be understood deeply.

LITERATURE REVIEW

Definition of BIM (Building Information Modelling)

Building information modelling (BIM) involves using digital building models throughout a facility's entire lifecycle, from conceptual design to construction and operation. This method improves information flow among stakeholders, reducing errors and errors. BIM systems provide a comprehensive understanding of a building's structure, layout, and materials, enabling better understanding of various aspects (André Borrmann, Markus König, Christian Koch & Jakob Beetz, 2018). BIM is a method for producing and managing information about construction projects, generating a coordinated computerized description of every feature using relevant technologies. This digital description may include information-rich 3D models and structured data like item, execution, and handover data (Hamil, 2021).

BIM as a Technology

According to (Kymmell, 2008), Building Information Model (BIM) is a project simulation that includes 3D representations of project components and essential information related to planning, design, construction, or operation. BIM differs from traditional 3D CAD in that it describes a building through separate 3D views, which can be error-prone and cause poor documentation. BIM models use intelligent situational semantics, referring objects to architectural elements and systems like spaces, walls, beams, and columns, rather than graphical entities like lines, arcs, and circles.

BIM as a Process

BIM enables efficient and precise collaboration among various teams, including owners, architects, engineers, contractors, subcontractors, and suppliers. This virtual process encompasses all aspects, disciplines, and systems of a facility within a single model. To ensure precision, team members continuously modify and adjust parts based on project specifications and design changes (Carmona and Irwin, 2007).

BIM and Project Planning

BIM aids project planning by analysing space, understanding space standards, and land laws, reducing time and enabling more valuation work, reducing time, and ensuring better project outcomes (CICRP, 2009).

Some of the benefits of 'GIS-BIM' based site analysis (CICRP, 2009) are as described in the following:

1.	Assist in identifying whether potential sites fulfil the required criteria based on project needs, technical and financial factors, and more.

2.	Reduce utility consumption and demolition costs.

3.	Reduce the risks of dangerous waste.

BIM in the Pre-construction Phase

The following are a few examples of BIM applications in the preconstruction phase:

1.	Predicting: Contractors can perform a fairly accurate quantity survey and prepare detailed estimates with building information models. The Stanford University Center for Integrated Facilities Engineering (CIFE) claimed that the accuracy of BIM-based predictions was within 3% with up to 80%-time efficiency in generating these estimates based on data from 32 major projects (cited by CRC Construction Innovation, 2007).

2.	Project coordination: Using 3D or 4D site coordination modeling, contractors may plan for site logistics, develop traffic layouts, and identify possible dangers in the workplace, assisting in the development of a more realistic site safety policy.

3.	Construction process evaluation: The project team may perform detailed constructability analysis using BIM models to plan the sequence of operations on the site.

BIM in the Construction Phase

During the construction phase, BIM is utilized for various tasks, including construction progress monitoring, trade coordination meetings, and incorporating documents, change orders, and checklist information. The project team must regularly update the BIM model to ensure it displays the most up-to-date information for facility managers. With advancements in smartphone and tablet technologies, contractors and subcontractors increasingly use BIM models for information retrieval and cooperation. Popular BIM programmers include BIMX®, Bentley Navigator®, Buzzsaw®, and Autodesk 360, a cloud-based service that allows users to exchange BIM models and perform various field tasks, such as walk-throughs, conflict detection, and digital document generation (Rubenstone, 2012).

BIM in the Post Construction Phase

Building information models offer detailed data on a facility's planning, design, and construction, enabling efficient operations and maintenance. However, 85% of a facility's lifecycle costs come after construction, and $10 billion is wasted annually in the US due to inadequate information access and interoperability concerns (Newton, 2004). A BIM model's main benefit is that it provides information on a building's spaces, services, and elements. The overall aim is to integrate this data into facility organizational processes. Just by clicking on an object in a BIM model, information regarding building infrastructure and systems can be accessed.

Definition of Maintenance

Maintenance is the combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function. maintenance is a set of organized activities that are conducted to keep an item in its best operational condition with minimum cost acquired. In other words, maintenance is an action that a team does to maintain and make sure that the building is functioning well based on the building purpose (British Standard Glossary of terms (3811:1993).

Maintenance Budget and Quality

The amount of the budget allocated has a significant effect on the quality of maintenance activities. A typical problem in distributing maintenance budget with the argument throughout the process of designing maintenance funding is identified (Lee and Scott, 2008).

Types of Maintenance Work

Maintenance is classified into two types: planned/preventive maintenance and corrective/unplanned maintenance.

Planned / Preventive Maintenance

Planned/preventive maintenance tries to avoid major failures and maintain a facility operating at top efficiency through frequent inspection and repair (Madureira et al., 2017). Preventive maintenance is required for healthcare, safety, and components of the environment, regardless of whether their condition can or cannot be monitored (Horner, ElHaram and Munns, 1997).

Corrective / Unplanned Maintenance

Corrective/unplanned maintenance includes repair and replacement components because of preventative maintenance failure or natural wear and tear (Ruparathna et al., 2018; Queensland Government 2, 2017; EU Standard, 2009; Muyingo, 2009).

METHODOLOGY

Research Methodology

A research methodology is a well-structured document that specifies the topic of your study and describes how you want to pursue a specific enquiry. It usually includes an in-depth investigation of the ideas that support your hypothesis, which is a proposed response to this question. It can also demonstrate the approaches you want to utilize, as well as the practical processes for carrying out your research. Because a research proposal frequently introduces people to your issue, this document may also outline the main aims of your study and how it will bring new knowledge to an academic subject.

Data Collection

Data collection is the systematic method of collecting and analysing information on variables of interest to answer specified research questions, test hypotheses, and assess outcomes. Data gathering is a component of research that is shared by all subjects of study, including physical and social sciences, literature, management, and so on. While methods change depending on the field, the focus on ensuring accurate and honest collecting remains unchanged.

Data Collection Method

For my research, I have used the questionnaire and focus group method to gain information about Building Information Modelling. This is because we need to see if the higher education (university) facility management in Malaysia use this technology in their building maintenance management or not.

According to (Business, 2021), non-statistical information that is usually organized or unstructured is used to create qualitative data. Qualitative data is not measured using tangible statistics used to create graphs and charts. They are classified based on their qualities, features, identities, and other characteristics. Qualitative data is likewise exploratory in nature, and it is typically kept open until further research is performed. All theories, judgements, hypotheses, and assumptions are based on qualitative research data.

This is the list of the method of data collecting part: -

1.   Interview.

2.   Focus group.

3.   Observation research.
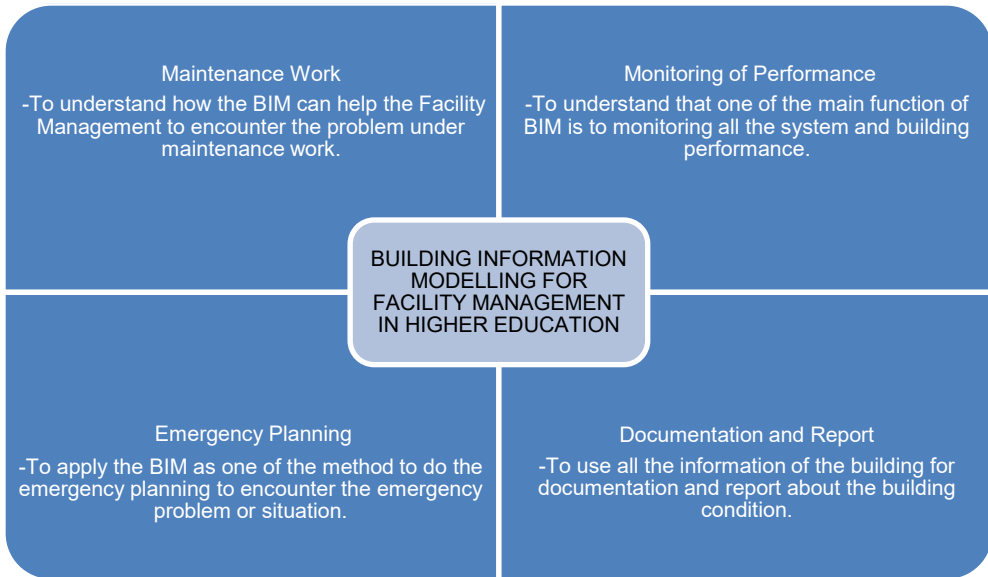
4.   Records and documents.

FRAMEWORK

Figure 1: Building Information Modelling for Facility Management in Higher Education Framework

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Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

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setuju.

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Saya yang menjalankan amanah,

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