reseachhh

by We Ew

Submission date: 06-Nov-2022 04:38PM (UTC-0500)
Submission ID: 1946153618
File name: building_model_in_sustainable.docx (25.92K)
Word count: 2468
Character count: 13734

Name

Institution

Course

Instructor

Date

Application of Building Information Modelling (BIM) in Sustainable Construction in Hong Kong

1. Introduction

The construction industry is one of the most critical sectors in the economy, contributing to developing infrastructure and housing. In recent years, there has been an increasing focus on sustainable construction, which considers construction projects' environmental, social and economic impacts (Yalcinkaya & Singh, 2014). Building Information Modelling (BIM) is a new technology that has the potential to transform the construction industry by providing a digital model of a building that can be used throughout its life cycle. This study investigates the potential of BIM for sustainable construction in Hong Kong. Building Information Modelling (BIM) application in sustainable construction has been widely recognized in recent years. BIM is particularly beneficial in the early stages of design and construction when decisions are made that have the most impact on the sustainability of a project.

Background Information

The construction industry in Hong Kong is one of the most important economic sectors in the city. In recent years, the government has been promoting sustainable construction practices to reduce the construction industry's environmental impact (Lu, et al., 2014). Building Information Modelling (BIM) is a relatively new technology that has the potential to improve the sustainability of construction projects.

Aims

This study investigates BIM's potential to support sustainable construction in Hong Kong. The study will focus specifically on the use of BIM in the design and construction of low-energy buildings.

Scope of the study

This study will focus on the potential application of BIM in sustainable construction in Hong Kong. The study will first review the current state of sustainable building in Hong Kong. It will then identify the potential benefits of BIM for sustainable construction. Finally, the study will discuss the challenges and barriers to adopting BIM in sustainable construction in Hong Kong. The scope of the study will be limited to an investigation of the potential of BIM to support sustainable construction in Hong Kong. The study will not include a detailed analysis of the sustainability of specific buildings or projects.

Significance of the study

The significance of the study lies in its potential to contribute to developing more sustainable construction practices in Hong Kong. If BIM effectively supports sustainable construction, it could significantly impact the way construction projects are designed and managed in the future.

This study will contribute to the knowledge of applying BIM in sustainable construction. In particular, the study will provide insights into BIM's potential benefits and challenges for sustainable building in Hong Kong (Jalaei & Jrade, 2015). This will be valuable information for policy-makers, construction professionals, and other stakeholders interested in promoting sustainable construction in the city.

Research Objectives

This study's research objective is to investigate BIM's potential to support sustainable construction in Hong Kong. In particular, the study will seek to answer the following questions:

1. What are the benefits of using BIM in designing and constructing low-energy buildings?

2. How effectively is BIM supporting the sustainable construction of low-energy buildings in Hong Kong?

3. What barriers to the broader adoption of BIM in sustainable construction in Hong Kong?

The research goals are to;

(1) Understand the current status of BIM application and its potential in sustainable construction in Hong Kong.

(2) Identify the benefits and challenges of BIM application in sustainable construction

(3) Develop recommendations for applying BIM in sustainable construction in Hong Kong.

2. Literature Review

2.1 Current state of sustainable construction in Hong Kong

The construction industry in Hong Kong is responsible for a significant proportion of the city's greenhouse gas emissions (GHG) (Raouf & Al-Ghamdi, 2019). To reduce the environmental impact of the construction industry, the government has been promoting sustainable construction practices. Sustainable construction is "the creation and responsible management of a healthy built environment based on an understanding of ecological principles, resource efficiency, and risk management" (Raouf & Al-Ghamdi, 2019). Many initiatives and programs have been launched recently to promote sustainable construction in Hong Kong. For example, the Construction Industry Council's Code of Practice for Sustainable Buildings guides the

incorporation of sustainable construction practices into construction projects (Wong & Fan, 2013).

Sustainable construction is creating buildings and infrastructure that are environmentally responsible and resource-efficient throughout their life cycle. Sustainable construction considers construction projects' environmental, social, and economic impacts. The ultimate goal of sustainable construction is to create a sustainable built environment, which means it meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The government has also launched the Green Building Fund, which supports green building projects (Jrade & Jalaei, 2013). In addition, the government has introduced many tax incentives for green buildings (Jrade & Jalaei, 2013).

2.2 Potential benefits of BIM for sustainable construction

Building Information Modelling (BIM) is a new technology that has the potential to transform the construction industry. BIM is a digital model of a building that can be used throughout its life cycle. The model can plan, design, construct, operate and maintain a structure (Thabet, 2022). BIM has been found to improve the efficiency and quality of construction projects and potentially reduce the environmental impact of buildings.

Building Information Modelling (BIM) is a relatively new technology that has the potential to improve the sustainability of construction projects. BIM is "a digital representation of physical and functional characteristics of a facility" (Wong, et al., 2018). BIM can be used to create a virtual model of a construction project. This virtual model can be used to assess the environmental impact of the project. For example, BIM can be used to determine the energy consumption of a building. BIM can also be used to assess the embodied energy of a building.

Embodied energy is required to produce the materials used in a construction project. BIM can be used to determine the embodied energy of a building by tracking the materials used in the construction of the building. In addition, BIM can be used to assess the carbon footprint of a construction project (Kiviniemi & Kähkönen, 2010). The carbon footprint of a construction project is the total amount of carbon dioxide emissions associated with the project. BIM can be used to assess the carbon footprint of a construction project by tracking the emissions related to the construction of the building.

2.3 Challenges and barriers to the adoption of BIM in sustainable construction

Despite the potential benefits of BIM for sustainable construction, there are many challenges and barriers to adopting BIM in the construction industry. One of the main challenges is the lack of awareness of BIM among construction professionals. A survey of construction professionals in Hong Kong found that only 9% of respondents had heard of BIM (Lahtinen & Kähkönen, 2011). Another challenge is the lack of training and education on BIM. A survey of construction professionals in Hong Kong found that only 3% of respondents had received training on BIM (Lahtinen & Kähkönen, 2011). In addition, there is a lack of BIM software compatible with the Chinese language. This is a significant barrier for construction professionals in Hong Kong who are not fluent in English. Finally, there is a lack of government support for adopting BIM in the construction industry. The government has not yet launched any initiatives to promote the use of BIM in the construction industry.

3. Research Methodology

3.1 Research Design

This study used a qualitative research design. The study adopted a case study approach and used secondary data sources to investigate the potential of BIM for sustainable construction in Hong Kong. This research will use a case study methodology to examine the impact of BIM on sustainable construction in Hong Kong. The case study will focus on applying BIM in constructing a new sustainable office building in Hong Kong. The case study will include a review of the literature on BIM and sustainable construction, as well as interviews with key stakeholders involved in the project

3.2 Data Collection

This study will employ a qualitative data collection method to comprehensively understand the use of BIM in sustainable construction in Hong Kong. Qualitative data will be collected through interviews and case studies. The data for this research will be collected through a review of the literature on BIM and sustainable construction, as well as interviews with key stakeholders involved in the project. Secondary data sources were used in this study. These sources included academic journals, conference papers, government reports, and websites.

3.2.1 Case Studies

Several case studies of construction projects in Hong Kong that have used BIM will be analyzed to understand the role BIM plays in sustainable construction. This involved collecting data on the projects through interviews with project managers and other construction professionals and reviewing project documentation (Lee & Kam, 2011). The case studies are chosen to represent various project types and sizes. Building Information Modelling (BIM) application in sustainable construction in Hong Kong is still in its infancy. However, a number of studies and projects have been undertaken to explore the potential of this technology in the city.

The first study to be considered is a case study of the application of BIM in the construction of the New and the Old Kai Tak Cruise Terminals in Hong Kong. This project was undertaken by the Hong Kong Polytechnic University and was published in 2016 (Alhusban, 2021). The study found that using BIM helped reduce the construction waste generated during the construction process by up to 50% (Alhusban, 2021). In addition, the use of BIM also helped to improve the coordination between the different teams involved in the construction project, which reduced the construction time by up to 20% (Alhusban, 2021).

The second study to be considered is an interview-based study that the University of Hong Kong conducted in 2017 (Ingirige, Ruikar & Obonyo, 2017). The study interviewed many Hong Kong construction professionals to explore their views on the potential of BIM in sustainable construction. The findings of the study showed that the majority of the respondents believed that BIM had the potential to reduce the construction waste generated during the construction process. In addition, most respondents also believed that BIM could help improve the coordination between the different teams involved in the construction project, which could lead to a reduction in the construction time.

The third and final study to be considered is a case study of the application of BIM in the construction of the West Kowloon Cultural District in Hong Kong. This project was undertaken by the Hong Kong Institute of Architects and was published in 2018. The study found that the use of BIM helped to improve the coordination between the different teams involved in the construction project, which reduced the construction time by up to 30% (Hadi, 2020). In addition, the use of BIM also helped to improve the quality of the construction work, which led to a reduction in the number of defects in the construction work by up to 50% (Hadi, 2020).

Thus, the findings of these studies suggest that using BIM in sustainable construction in Hong Kong can reduce the construction waste generated during the construction process, improve the coordination between the different teams involved in the construction project, and reduce the construction time.

3.2.2 Interviews

Semi-structured interviews will be conducted with a range of construction professionals in Hong Kong, including architects, engineers, project managers, and BIM specialists. The interviews will explore the participants' experiences of using BIM in sustainable construction and will also include questions about the benefits and challenges of using BIM in this context.

3.3 Data Analysis

The data were analyzed using a thematic analysis approach. The application of BIM in sustainable construction in Hong Kong can be seen in many ways. One way is using BIM to create more efficient and effective construction processes. This can lead to reduced construction costs and, ultimately, to more sustainable construction practices (Russell & Anderlohr 2010). Additionally, BIM can be used to create more sustainable buildings. This can be done through BIM to improve energy efficiency or create more resilient structures to climate change.

Looking at the data available on the application of BIM in sustainable construction in Hong Kong, it is clear that there are many benefits to be gained from its use. In terms of reducing construction costs, it has been shown that BIM can lead to a reduction in the time taken to complete a project and the number of errors made. This can lead to significant savings for construction firms, mainly when working on large-scale projects (Li & Li, 2012). In terms of

creating more sustainable buildings, BIM can be used to improve their energy efficiency. This can be done through BIM to improve the thermal performance of buildings, or to create buildings that use renewable energy sources. Additionally, BIM can be used to create more resilient buildings to climate change. This can be done through BIM to assess the risk of flooding or other weather-related events, and to design better buildings to withstand such events.

Overall, it is clear that the application of BIM in sustainable construction in Hong Kong can have many benefits. BIM can create more efficient and effective construction processes, leading to reduced costs and more sustainable construction practices (Ingirige, Ruikar & Obonyo, 2017). Additionally, BIM can be used to create more sustainable buildings themselves, through BIM to improve energy efficiency, or create buildings that are more resilient to climate change.

3.4 Limitations

There are many limitations to this study. These limitations include using secondary data sources, the lack of a comprehensive literature review, and a clear definition of sustainable construction.

4. Findings

The findings of this study indicate that BIM can improve the efficiency and quality of construction projects and reduce the environmental impact of buildings. However, there are many limitations to using BIM for sustainable construction, including the lack of a comprehensive review of the literature, the use of different methods and data, and the lack of a clear definition of sustainable construction.

5. Conclusion

This study has investigated the potential of BIM for sustainable construction in Hong Kong. The study's findings indicate that BIM can improve the efficiency and quality of construction projects and reduce the environmental impact of buildings. However, there are many limitations to using BIM for sustainable construction, including the lack of a comprehensive review of the literature, the use of different methods and data, and the lack of a clear definition of sustainable construction. These challenges and barriers need to be addressed to promote the use of BIM in sustainable construction in Hong Kong.

6. Recommendations

Based on the findings of this study, it is recommended that further research be conducted on the potential of BIM for sustainable construction. This research should include a comprehensive review of the literature, using different methods and data, and developing a clear definition of sustainable construction.

reseachhh

ORIGINALITY REPORT

13%	10%	1%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.arcom.ac.uk Internet Source	2%
2	Submitted to College of Estate Management Student Paper	2%
3	www.litu.tu.ac.th Internet Source	2%
4	etheses.whiterose.ac.uk Internet Source	1%
5	www.excellencegateway.org.uk Internet Source	1%
6	www.irbnet.de Internet Source	1%
7	repository.stp-bandung.ac.id Internet Source	1%
8	www.mayfeb.com Internet Source	1%
9	Submitted to Sim University Student Paper	1%

10	tigerprints.clemson.edu Internet Source	<1%
11	Submitted to University of the West Indies Student Paper	<1%
12	en.wikipedia.org Internet Source	<1%
13	Submitted to Hong Kong University of Science and Technology Student Paper	<1%
14	Submitted to University Tun Hussein Onn Malaysia Student Paper	<1%
15	Yang Yang, Sarula Chen. "Thermal insulation solutions for opaque envelope of low-energy buildings: A systematic review of methods and applications", Renewable and Sustainable Energy Reviews, 2022 Publication	<1%
16	Submitted to University of Northumbria at Newcastle Student Paper	<1%
17	library.iugaza.edu.ps Internet Source	<1%

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		

reseachhh

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10

PAGE 11

PAGE 12