



BENEFITS BIM INFRASTRUCTURE FOR CONSTRUCTOR

Nur-ul Balqes Md Zaid*

Civil and Structural Engineering Programmed
National University of Malaysia
Malaysia

Noraini Hamzah

Faculty Engineering & Built Environment
National University of Malaysia
Malaysia

Muhamad Azry Khoiry

Faculty Engineering & Built Environment
National University of Malaysia
Malaysia

***Corrospoding author's Email:** P90589@siswa.ukm.edu.my

Peer-review under responsibility of 3rd Asia International Multidisciplanry Conference 2019 editorial board

(<http://www.utm.my/asia/our-team/>)

© 2019 Published by Readers Insight Publisher,

lat 306 Savoy Residencia, Block 3 F11/1,44000 Islamabad. Pakistan,

info@readersinsight.net

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).





RESEARCH HIGHLIGHTS

Building Information Modelling (BIM) is a major transformation in the construction industry. The construction is among the best solutions to overcome too many problems faced in the construction industry. Conventional construction is associated with two-dimensional (2D) drawing technology while BIM used three-dimensional (3D) model and each component in the construction process contains detail information. Therefore this study is to collect the previous studies on the benefits of BIM in infrastructure from the perspective of the constructor to view the use of this method. The basic development of BIM for infrastructure is emphasized in this observation. Benefits for the constructor for BIM for infrastructure will be analysed from past research. Through this observation, we have found many benefits for construction on BIM for infrastructure. However, the listed benefits are the most stated in past research. These benefits show that this technology of BIM is the most effective method that been applied in the infrastructure construction industry.

Keywords: *Building Information Modelling (BIM), Infrastructure, Benefits for Constructor*

RESEARCH OBJECTIVES

Buildings are often associated in the construction industry. Nevertheless, infrastructure is also a categorization in the construction industry. The development of this infrastructure has resulted in investment and development outcomes and solutions to the problems of connectivity in basic transportation and facilities. BIM is the solution for a new era in the conventional construction industry.

BIM's transition into project infrastructure has been increasing among the construction industry, it has become a major focus on improving the Architecture, Engineering and Construction (AEC) industry. On survey conduct by McGraw Hill Construction revealed that BIM for infrastructure using it at a low level or either not using current AEC users pass two years ago by 73%. The trend is reversed in 2013 with 78% expecting to use it more than 25% of their project (1).

Academia and industry are increasingly putting effort into adopting BIM for building, but the focusing for the infrastructure study is still lacking. BIM for infrastructure: A vehicle for business transformation (2), innovation for infrastructure project (3) and BIM for infrastructure: an overall review and constructor perspective (4). These provide an elaborate overview of their respected focus. Therefore, the purpose of this paper is to provide a comprehensive of the BIM for infrastructure by benefits for the constructor.

MATERIALS AND METHODS

Two academic databases selected science direct and google scholar for literature research. To produce a review of BIM for infrastructure by benefits for a constructor it takes by an article consisting of 1 thesis, 2 reports, 16 conference paper and 35 journal article.

To capture article relating to BIM in construction and/or infrastructure the following search criterion was devised: ((BIM OR Building information Modelling) AND (Infrastructure OR Construction OR Civil Information Modelling)) within ((Title OR Keyword)). The use of 'OR' because sometimes the article with a special noun like BIM was written as Building Information Modelling and it can be found in title or keywords. A total of 347 articles in the area of BIM for infrastructure and construction. However, to get only relevant article BIM for infrastructure and construction for construction phase leaving a final literature volume of 54





papers. Results of the initial search (raw findings before removal of duplicates and unrelated article) and breakdown into the specific subject domains are depicted in Table 1.

Table 1. Initial volume for literature search

	Science Direct	Google Scholar	Totals
BIM Infrastructure	64	127	191
BIM Construction	51	105	156
Totals	115	232	347

RESULTS

To reduce cost, time and enhance quality and environmental sustainability are being rapidly embraced by the construction industry by using BIM applications. That it common benefits to all participants in the whole project when using these BIM methods. This review paper only reveals BIM for infrastructure by benefits for constructor;

Cost Control

Two bridges in Denver that using BIM for construction could approximately save 5-9% of construction cost (5). Models are created for a single-disciplinary analysis such as cost estimation (6).

Constructibility Review

In the construction phase of highway bridges, 3D visualization of the BIM model can help to increase collaboration and communication (7). During construction, by BIM monitoring, it can help in the prevention of contract disputes (Brilakis, 2016).

Construction Inspection

We can find all the information required for design and construction workmanship inspection and specification in BIM model (8,9). These information extraction from BIM models are useful for pre-construction operations and facility management.

Information Sharing

With the BIM model via URL and/or internal or external servers, a huge amount of data, information and files could be linked for facility managers that are very useful for information sharing among contractor (10).

FINDINGS

The results of this review indicate that BIM is one of the effective methods for the construction industry. Most of the companies using BIM reported in strong favour of this technology. Based on the previous study stated that BIM for infrastructure is not only for cost control, information and useful for visualization but also contribute to design and management operations. By applying the BIM concept it can demonstrate the advantages for infrastructure and construction research. All benefits listed in this review will provide better collaboration between stakeholders, advanced analytics, automation of repetitive tasks, linking of information sets and optimisation of construction information.

REFERENCES

1. McGraw Hill Construction. SmartMarket report: The business value of BIM for owners. 2014.
2. Infrastructure BIMFOR, Autodesk. BIM FOR INFRASTRUCTURE BIM for Infrastructure: A vehicle for business transformation. Autodesk. 2012;1-18.
3. Duffield C, Maghsoudi S. Innovation for Infrastructure Projects. 2013;(June):1-62.
4. Bradley A, Li H, Lark R, Dunn S. BIM for infrastructure: An overall review and constructor perspective. Autom Constr [Internet]. 2016 Nov 1 [cited 2018 Jul 3];71:139-52.





5. Fanning B, Clevenger CM, Ozbek ME, Mahmoud H. Implementing BIM on Infrastructure: Comparison of Two Bridge Construction Projects. *Pract Period Struct Des Constr.* 2015;
6. Cheng JCP, Lu Q, Deng Y. Analytical review and evaluation of civil information modeling. *Autom Constr [Internet].* 2016;67:31–47.
7. Zak J, Macadam H. Utilization of building information modeling in infrastructure's design and construction. *IOP Conf Ser Mater Sci Eng.* 2017;236(1).
8. Bryde D, Broquetas M, Volm JM. The project benefits of building information modelling (BIM). *Int J Proj Manag [Internet].* 2013;31(7):971–80. Available from:
9. Winberg A, Dahlqvist E. BIM - the Next Step in the Construction of Civil Structures. *Archit Built Environ.* 2010;Master's T(ISSN 1103-4297):215.
10. Liu W, Guo H, Li H, Li Y. Using BIM to improve the design and construction of bridge projects: A case study of a long-span steel-box arch bridge project. *Int J Adv Robot Syst.* 2014;

