iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VIII **Month of publication:** August 2021

DOI: https://doi.org/10.22214/ijraset.2021.37878

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VIII Aug 2021- Available at www.ijraset.com

Application of 4D BIM in Construction Industry: Challenges and Suggestions

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Abstract: ***Construction industry is believed to be one of the most criticized industries worldwide. During the last two decades, this criticism has denoted a lot of problems. Without disregarding any of the industry problems, it seems that the most criticized problems are low delivery performance, lack of innovation, lack of collaboration and fragmented nature of the industry. To overcome these problems, a collaborative work environment is needed. During the last few years, the use of advanced information technologies in construction has increased to support the industry requirement of collaboration environment.***

Keywords: Building Information Modeling BIM, BIM implementation, BIM Barriers

I. INTRODUCTION

Construction industry has watched an ideal shift that will achieve the highest performance on the level of efficiency, quality, productivity, sustainability, reducing cost, reducing time, raising the financial value of the project. It is all relevant with written about CI stands to implement techniques which will reduce project cost, project time and increase in quality and productivity of project Building Information Modeling (BIM) is one of these techniques, which is a combination of technological and procedural shift in CI. Basically, it's evolution of information technology as well as computer science. Due to them, most industries have caused a positive change in the process. Building Information Modeling has many applications which can be used for scheduling, cost estimation, analysis, support constructability, sequencing.

Building Information modeling of operation as a new example has a great potential for integration into the life cycle of construction projects. BIM improves maintenance management, reduces in the duration and cost of the project and increases the value of the building.

A. Objectives of Work

1) Critically review of current practices for planning and project control.
2) Critically review application of BIM in project controls.
3) Critically review global current practices in terms of application of BIM with respect to project controls.
4) Analyze the current status of BIM and 4D implementation within Indian construction industry.
5) Analyze the current status of barriers affecting BIM, 4D implementation

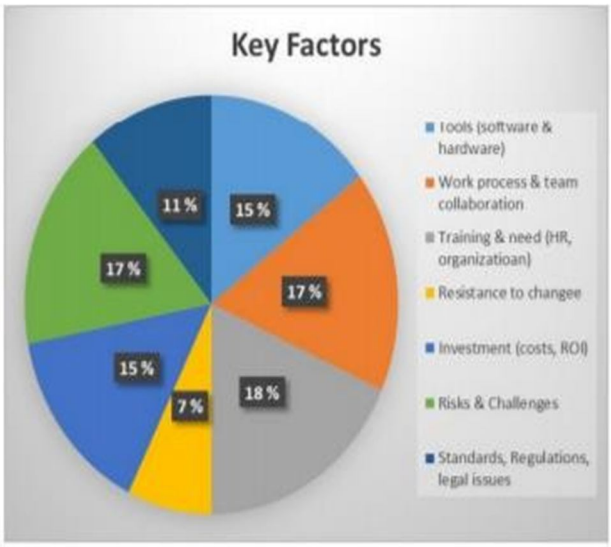
B. BIM and its Implementation in CI

BIM implementation is defined as it "refers to the set of activities undertaken by an organizational unit to prepare for, deploy or improve its BIM deliverables (products) and their related workflows (processes)" (Succar and Kassemet al 2015)(Azhar et al 2011) concluded in his research that BIM consists of software and process.

It is a process of data integration from single sequential form to modern multiple parallel form. To manage several multidimensional tasks and activity of building lifecycle, BIM is used in terms of data sharing with employ. (Arman M. Koucha , Kimmo Illikainena and Seppo Perala et al.,2018).

Reduction in cost and effective use of time has been observed by some companies by coordinating capability of Building Information modeling software like Revit, AutoCAD, Autodesk and use of IPD.

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C. Benefits of BIM Applications in Project Control

Building information modeling is a process of data managing and creating of a project during its life cycle.In modern construction companies: BIM is a important part of management. The possibility of using new technologies in construction project management for controlling project activities like cost management, cost reducing, design of buildings, drawing and planning of construction projects generally) is steadily increasing by developing of new software solutions

D. BIM Implementation Barriers/Challenges

1) Lack of awareness of BIM: the practitioners are not aware of BIM advantages and hence they do not willingly adopt BIM, this is one of the major barrier in BIM implementation
2) Lack of training and innovation: the organization don't have updated training program through which the BIM technology can be trained to his staff. Due to this fact thepercentage of BIM implementation is reduced.
3) The practitioners who already used BIM and still there are some barriers can be listed as below.
4) They are very reluctant to change the existing practices on work. This is due to the old experienced practitioners which were not used toadvanced technology.
5) BIM is usually overlooked as an advancement ofCAD.
6) The BIM processes are not clearly understood by the stakeholder.

E. BIM Adoption in India

BIM is also known as Virtual Design and Construction (VDC) in India. India is a developing country and it has high population and economic growth. So construction market also has expanding. However, in survey of 2014 only 22% was responded for usage of BIM.

In Indian build environment sector, BIM is continuouslygaining popularity amongst professionals.

1) In experienced professionals, BIM gains maximumdemand. Also since value proposition of BIM have betterappreciation.
2) BIM mostly maximum useful for large and complex projects. Also it is popular in large originations with maximum strength of technical staff.
3) Eastern region of India is comparatively weak in use ofBIM.
4) In India, BIM is maximal under experimentation phaseas compared to developed countries.

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II. LITERATURE REVIEW

Building Information Modeling is a functional characteristic of a facility and a digital representation of physical. During a decision of life-cycle, BIM represents as information sharing resource; defined as existing from earliest conception demolitions(about thenational BIM standard-united states,2010)

Building Information Modeling is firstly defined by Park and Lee, process of establishing manageable and sharable representation ofphysical and functional data that defines building through their lifecycle in digital format (park and lee 2010)

(ISO 16757-1:2015) defined BIM as Construction of a model thatcontains the information about a building from all phases of the building life-cycle.

"National Building Specification (NBS)" defined BIM as a rich information model, consisting of potentially multiple data sources,elements of which can be shared across all stakeholders and be maintained across the life of a building from inception to recycling.(about the national BIM standard-United states"' 2010)

"Autodesk" defined BIM as a process that involves creating and using an intelligent 3D model to inform and communicate project decisions. Design, visualization, simulation and collaboration enabled by Autodesk BIM solutions provide greater clarity for all stakeholders across the project lifecycle. BIM makes it easier to achieve project and business goals (Autodesk 2008)

"Hollywood" BIM is referred to as a concept in which the contractholder uses the model only to communicate the BIM concept in 3D and doesn't use further information in the Building Information Modeling. Without sizing and shaping the BIM, the contract holder can use the Hollywood BIM to win jobs (Vardaro, et al 2009).

"Lonely" BIM is referred to as where, the Building Data Modeling is practiced within only a single organization, and notused within the rest of the organization. For example, an architectural firm may use BIM for visualization and energy.

Architects firm may even have internal collaboration. However, the architects may restrict the BIM and provide the drawings in 2dimensions. This would hinder the involvement of the construction manager (CM), unless he creates a new model.

III. CONCLUSION

The chapter have explored BIM from several aspects i.e. theories, definitions and processes, modeling concept, BIM Impact in the CI, its applications in project quality management and use of BIM in Construction Management as well as BIM standardization and BIM Benefits and Challenges.

From this chapter, main conclusion is taken that the BIM has many benefits which will be consider as solution for a problem,inefficient delivery performance, and lack of innovation in the CI. For better and easy communication, teamwork and forcollaboration, BIM will be the best option.

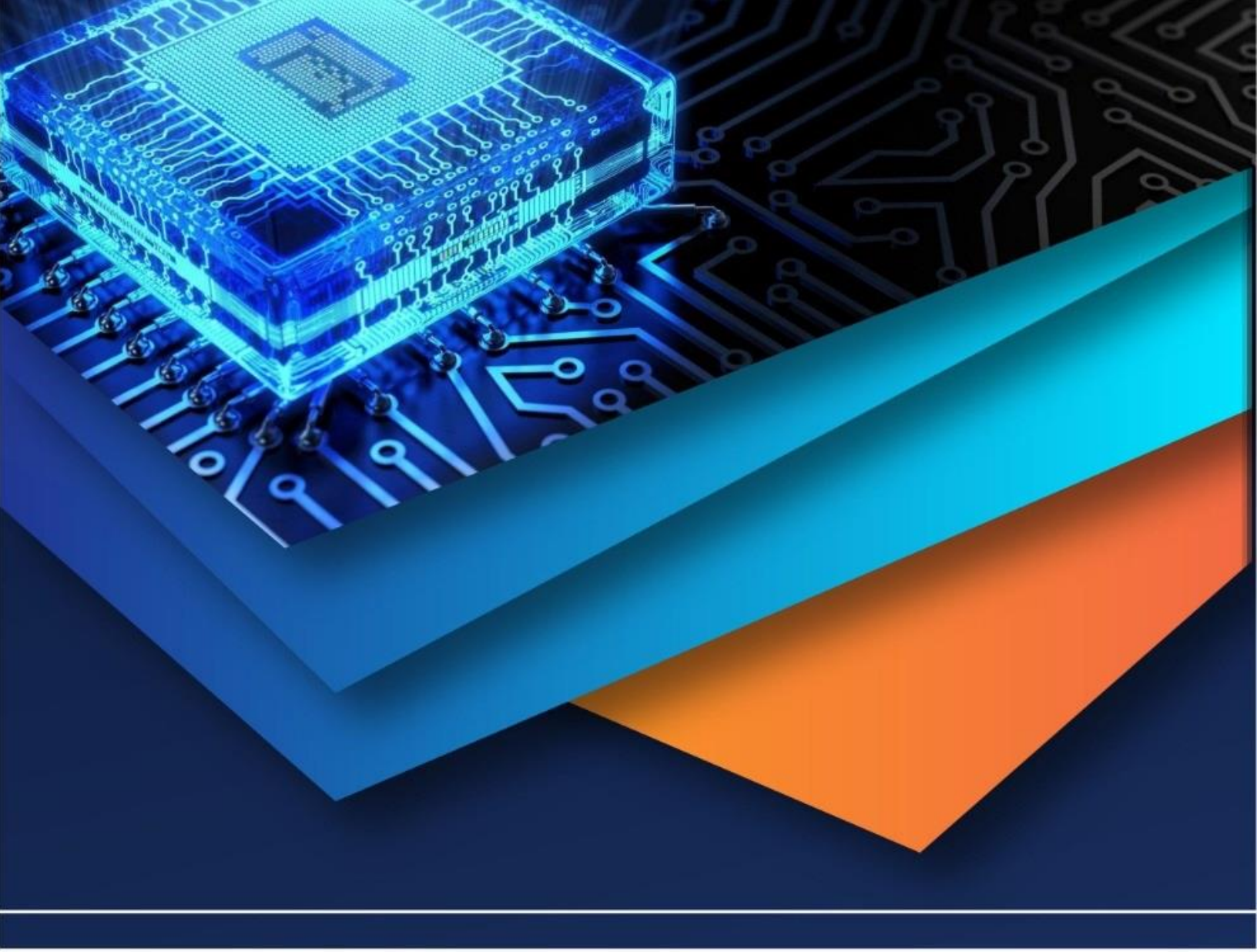
REFERENCES

[1] Abdias, Humid. (2015). Advancing in Building Information Modeling (BIM) contracting: Trends in the AEC/FM Industry.AEI 2015: Birth and Life of the Integrated Building - Proceedings of the AEI Conference 2015. 10.1061/9780784479070.001.
[2] Arayici, Y., Coates, P., and Kagioglou, M. (2011). BIM Adaptation and Implementation for Architectural Practices.Structural Survey, 29 (1), pp. 7- 25. Availableavailablee Chen, L., & Lou, H. (2014). A BIM-based construction qualitymanagement model and its applications. Automation in Construction, 46, 64-73.
[3] https://engineeringmanagementinstitute.org/bim-effective-tool-project-management/(Accessed 12 March 19)
[4] https://www.academia.edu/10728174/Building_Information_M odeling_Based_Time_And_Cost_Planning_In_Construction_Projects(Accessed 12 March 19)
[5] https://www.aproplan.com/blog/quality-management-plan-construction/what-is-bim-what-are-its-benefits-to-the- construction-industry
[6] Building Information Modelling (BIM) Task Grouphttp://www.bimtaskgroup.org
[7] Building Information Modelling (BIM) Working Group Strategy Paper (March 2011)
[8] Abuzar Aftab Shaikh, Ramya Raju, Nida L. Malim and Geetha K.Jayaraj, "Awareness and Adoption of BIM in Construction Industry," International Journal on Recent and InnovationTrends in Computing and Communication, Vol.4, no.4, May 2016, pp.204-208
[9] Ali Ghaffarianhoseini, John Tookey, Amirhosein Ghaffarianhoseini, Nicola Naismith, Salman Azhar, Olia Efimova, Kaamran Raahemifar, "Building Information Modeling (BIM) uptake: Clear benefits, Understanding its Implementation, Risks and Challenges," Science Direct, Vol.83, no.4, June 2016, pp.1-8.
[10] Arto Kiviniemi and Ricardo Codinhoto, "Challenges in the Implementation BIM for FM – Case Manchester Town Hall Complex", ASCE, Vol.35 (2), Jan 2014, pp.665- 672.
[11] B.Thomson and Ryan G. Miner, "Building Information Modeling - BIM: Contractual Risks are changing with Technology", ASCE, Vol.7, no.7, Apr 2011, pp.115-230.
[12] Abd, A. M., Hameed, A. H., & Nsaif, B. M. (2020).Documentation of construction project using integration of BIM and GIS technique. Asian Journal of Civil Engineering, 21(7), 1249–1257. https://doi.org/10.1007/s42107-020-00273-9.
[13] Ahmed, S. (2018). Barriers to implementation of building information modeling (BIM) to the construction industry: A review. Journal of Civil

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Engineering and Construction, 7(2), 107–113. https://doi.org/10.32732/jcec.2018.7.2.107.
[14] Ahuja, R., Sawhney, A., Jain, M., Arif, M., & Rakshit, S. (2020). Factors influencing BIM adoption in emerging markets—the case of India. International Journal of Construction Management, 20(1), 65–76. https://doi.org/10.1080/15623599.2018.1462445.
[15] Amarnath, CB. (2020). BIM implementation inIndia. India building information modeling association. https://www.ibima.co.in/post/bim-implementation-in-India.
[16] Azhar, S. (2011). Building information modeling (BIM):Trends, benefits, risks, and challenges for the AEC industry. Leadership and Management in Engineering, 11(3), 241–252. https://doi.org/10.1061/9780784413777.015.
[17] Barlish, K., & Sullivan, K. (2012). How to measure the benefits of BIM—a case study approach. Automation in Construction, 24, 149–159. https://doi.org/10.1016/j.autcon.2012.02.008.
[18] Eadie, R., Odeyinka, H., Browne, M., McKeown, C., & Yohanis, M. (2014). Building information modelling adoption: An analysis of the barriers to implementation. Journal of Engineering and Architecture, 2(1), 77–101. https://doi.org/10.1007/s13398-014-0173-7.2.
[19] Ebrahimi, H., & Akhbari, H. (2015). Construction ofmanagement and sustainable construction in the engineering by building information modeling. International journal of Materials Engineering, 5(3), 64–75. https://doi.org/10.5923/j.ijme.20150503. 04. India Ratings and Research (2020). https://www.indiaratings.co.in.

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