

# A REVIEW ON CHALLENGES INVOLVED IN IMPLEMENTING BUILDING INFORMATION MODELING IN CONSTRUCTION INDUSTRY

S.MEGANATHAN <sup>1</sup>, N.NANDHINI <sup>2</sup>

<sup>1</sup> PG Scholar, Department of Civil Engineering, Kongu Engineering College, Perundurai, India.

<sup>2</sup> Assistant Professor, Department of Civil Engineering, Kongu Engineering College, Perundurai, India.

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**Abstract** - The Indian Construction industry is still at the very infancy stage with the adoption of Building Information Modeling (BIM) to improve the design, construction, and facility management of construction projects. Therefore, several issues about data acquisition and management arise during the design creation and development of a construction project due to the complexity, ambiguity, and fragmented nature of the Indian construction industry. The main objectives of this paper to find the challenges while implementing BIM in construction projects. The challenges are management process change difficulties, inadequate top management commitment, Rise in short term course, Lack of BIM standards, Unclear the legal liabilities these are the main challenges were faced by construction industries while implementing BIM in construction projects. This paper suggests a strategy for India's Construction firms to successfully implement BIM in their current working processes. The research method involves studying the present state of BIM information in the Indian manufacture industry along with the appraisal used for data collection regarding the troubles faced by the Indian manufacture firms concerning BIM. The data allowed drawing conclusive inferences on how fragmented organizational structures inhibit the use of BIM and how effective BIM adoption coupled with collaboration can aid in aligning goals of project participants.

**Key words:** Building Information Modeling (BIM), Architecture Engineering and Construction, Facilities Management (FM), Building Performance Modeling (BPM), Construction Industry.

## 1. INTRODUCTION

Building information modeling (BIM) is one of the best part promising modern developments in the construction industry. With BIM expertise, an accurate virtual model of a building is digitally constructed. This representation, known as a building information model, can be used for forecast, drawing, production, and process of the facility. Building Information Modeling (BIM) is not just a tool but it is a process and software, but also implementing a new way of thinking. BIM has been adopted or is being adopted by more and more companies; its usefulness has expanded beyond the original design phase activities. The efficiency of BIM in comparison to Computer-Aided Design (CAD) improved 53%, 50%, 20%, and 91% as saving in schematic, design development, construction documents, and checking and coordination respectively. Building Information Modeling (BIM) has been adopted by many Architecture, Engineering

and Construction (AEC) firms in many other countries, India's firms seem to be behind in this current trend of appropriately adopting the BIM technology. In order to propose a strategy for India's AEC firms to successfully implement BIM in their current working processes, this paper studied the current state of BIM knowledge along with the online review used for information collection on the subject of the troubles faced by the Indian AEC firms. The data was analyzed to determine essential changes for individuals and for the discipline, solutions to overcome barriers, and effective ways to introduce BIM capacities.

## 2. BACKGROUND OF BIM

A multi-dimensional tool, Building Information Modeling (BIM) is process that supports virtual design and construction methodologies putting all team members together throughout the entire design and construction process and beyond to the operations in maintenance of the building, during its working life. Typically, BIM is one holistic process using real time, intellectual modeling software effectively working in 3D, 4D (3D + time), and 5D (4D + cost) to improve productivity, to save money and time in the design and construction phases, and to reduce operating costs after construction. In distinguish; the Indian construction industry is not beating the proper prospective of BIM tools. A majority of the architectural and engineering firms in India still rely on two-dimensional Computer Aided Design (CAD) drawings. This usage of traditional methods neither implies that the Indian designers are ignorant of BIM and its ability, nor does it exhibit a paucity of skilled BIM users in the Indian Construction industry. In fact, there is lot of outsourcing for a full range of BIM services by development centers in India, delivering built environments for projects designed in the USA, the UK, and European countries. Currently, there is no clear consistency about the process of implementing or using BIM for Construction firms in India. Even the Associated General Contractors (AGC) of America realizes that there is an absence of a single document that instructs BIM application for firms. This fact creates the need to standardize and create guidelines for the implementation of a BIM process in the construction industry.

## 3. LITERATURE REVIEW

**Yang Zou et al (2017)** This paper presents a summary of traditional risk management, and a comprehensive and extensive review of published literature concerning the latest efforts of managing risk using technologies, such as

BIM, automatic rule checking, knowledge based systems, reactive and proactive IT (information technology)-based safety systems. The findings show that BIM could not only be utilized to support the project development process as a systematic risk management tool, but it could also serve as a core data generator and platform to allow other BIM-based tools to perform further risk analysis

**Abuzar Aftab et al (2016)** this study involves finding the awareness and adoption of BIM in the world among the construction professionals like Builders, Contractors, Site Engineers, and Design Engineers and among the professors and students of different Civil Engineering Colleges

**Ziga Turk et al (2016)** the most important contribution of BIM is not that it is a tool of automation or integration but a tool of further specialization. Specialization is a key to the division of labor, which results in using more knowledge, in higher productivity and in greater creativity.

**Ali Ghaffarianhoseini et al (2016)** this paper aims to discuss the reality of BIM, its widespread benefits and current level of uptake. The risks and challenges associated with the adoption of BIM, as well as recommendations regarding how future BIM adoption could be developed are also highlighted.

**Nor Diana Aziz et al (2016)** In this study, the opportunities acquire by the organization implement BIM in FM for the benefit of QOL in the workplace are reviewed. Although the implementation of BIM is not an easy thing, BIM promising to benefits of efficient Information Management (IM) in Facilities Management (FM).

**Pawel Nowak et al (2016)** this paper presents possibilities of Building Information Modeling (BIM) techniques and relevant software for decision making optimization in construction. Some relevant description of BIM elements needed for optimization in construction investment process.

**Olufolahan Oduyemi et al (2016)** this paper represent some recommendations such as the establishment of proper mechanisms to monitor the performance of BPM related constructions are suggested to allow for its continuous implementation. This research consolidates collective movements towards wider implementation of Building Performance Modeling (BPM) and forms a base for developing a sound BIM strategy and guidance.

**Kuo-Feng Chien et al (2014)** Building information modeling (BIM) technology exhibits strong potential to become the core technology used in the construction industry. This study identified the critical risk factors of BIM projects at various levels and proposes relative risk-response strategies for a case study project.

**Arto Kiviniemi et al (2014)** In this paper we document some of the issues involved in the adoption of BIM in FM and identify some of the enablers and barriers to BIM implementation in FM. Results confirm the lack of awareness

the potential of BIM in the operation phase and need of clear guidelines for the implementation of BIM in FM defining required level of integration, standard BIM protocols and the key deliverables for FM purposes.

**Han Yan et al (2008)** this paper concludes that improvements are still needed in the development of BIM technology. Secondly, the paper concludes that complete adoption of the technology by the AEC industry will take a few more years.

#### 4. OBJECTIVES

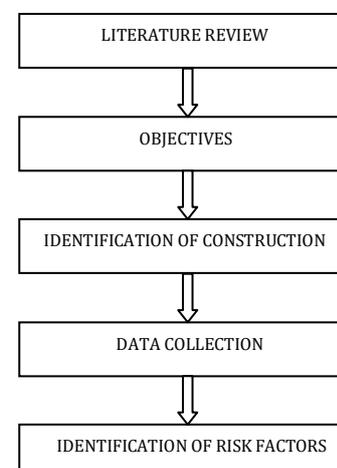
The purpose of this project is to investigate a strategy to achieve successful ways of implementing BIM at Construction firms in India. The objectives are as follows:

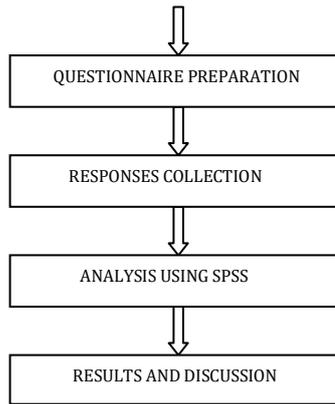
- To identify the challenges involved while implementing BIM in construction projects.
- To study potential advantages/benefits of transitioning the Indian AEC industry from 2D CAD to BIM.
- To assess the impediments and driving factors those prohibit the implementation of BIM in India.
- To propose successful implementation strategy for BIM at AEC firms in India.

#### 5. AWARENESS OF BIM

Building Information Modeling (BIM) is getting increased attention day-by-day due to its many benefits, including clash detection, collaboration between contract parties, visualization future structure, optimized schedule and project control, waste control, design documentation, and harmonized facilities management. As such, many countries have already adopted BIM, and many other countries are exploring the potential of adopting it.

#### 6. METHODOLOGY





## 7. RISK FACTORS

### 7.1 Technical risk

- Inadequate project experience.
- Lack of software compatibility.
- Inefficient data interoperability.

### 7.2 Management Risk

- Management process change difficulties.
- Inadequate top management commitment.

### 7.3 Environmental Risk

- Lack of available skilled personnel.
- Increase in short-term workload.

### 7.4 Legal Risk

- Lack of BIM standards.
- Unclear legal liability.

### 7.5 Financial Risk

- Rise in short-term costs.
- Additional expenditures

## 8. CONCLUSION

This study involving the Indian AEC firms consideration of BIM implementation and suggesting strategies based on those factors. The major reasons for this condition being high cost of software, low demand from the clients, inadequate project experiences, management process change difficulties, inadequate of top management commitment, unclear the legal liabilities, lack of skilled and trained employees. The uncontrolled tradition about BIM usage and the lethargic attitude of professionals towards validating the facts are keeping the firms away from embracing the BIM technology. Promotion of the usage of BIM in the Indian construction industry based on the assumption that the firms are proactively involved with implementing BIM.

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