Drivers and Barriers to the Use of Building Information Modelling in India

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ABSTRACT

Building Information Modelling (BIM) is a remarkable development that has recently engulfed the construction sector globally. It has provided a catalytic means for “rethinking” the design, construction, and operation of our built environment. Fundamentally a technology driven concept, BIM when entwined with issues pertaining to people, processes and organizations has the potential to significantly impact the industry. Considering global adoption of BIM, a clear divide between developed economies and emerging economies can be seen. Significantly low adoption of BIM in the developing world has been reported. Paradoxically the need for BIM in the developing world is far more than the developed world. With this backdrop, this paper reports on the adoption of BIM in India. Finding the adoption rate in India low, this research aimed at finding out the drivers and barriers to the use of BIM. The research has been divided into two phases. The first phase involved interaction with industry professionals by conducting semi structured interviews so as to gather deeper and actual understanding of the subject under study. In the second phase, on the basis of this interaction and the literature review, a questionnaire was prepared and an online survey was conducted. As per the analysis of the collected data, it surfaced that the use of BIM is still in its nascent stage in India, although its adoption has seen an upward trend in the past three to four years. BIM adoption has still not reached a stage where the users can comment on the savings in cost due to BIM implementation as the majority of the respondents have not seen full cycle of successful implementation. Stakeholders remain sceptical about BIM adoption and its perceived benefits. However a majority of the users are intuitively convinced that there is savings in time and significant improvement in final quality. Moving forward a meaningful impact can be made on the state of education, research and practice pertaining to BIM in India via a meaningful collaboration between industry, government, and academia. Findings of this study can be compared and collated across other emerging economies to develop implementation strategies.

Keywords: Building Information Modelling (BIM), Drivers and Barriers, Indian Construction Sector, Questionnaire Survey, Semi-Structured Interviews, Virtual Design and Construction

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1. INDIAN CONSTRUCTION SECTOR AND USE OF TECHNOLOGY

The importance of the Indian construction sector to the Indian economy and the socio-economic development of the country is very high (Planning Commission 2011, Gupta et al., 2009). As an economic activity, construction is the second largest activity after agriculture in India (Doloi et al., 2011, Planning Commission 2011). Statistics available in the public domain highlight the current contribution of the sector and the projected growth of the sector (Sawhney et al., 2011a). Regardless of the economic importance and employment generation of the sector, issues such as low productivity, limited mechanization and lack of professionally qualified employees plague the industry (Doloi et al., 2011, Sawhney et al., 2011a). Lack of standards and low use of technology across the construction supply chain is one of the weak points of the industry (Planning Commission 2011). There is strong evidence of less than optimum performance of Indian construction projects and this trend is growing. Projects are reportedly failing across the key performance measures including cost, time and quality performances (Doloi et al., 2011; Sawhney et al., 2011a). By earlier estimate, over 40% of Indian projects suffer from poor performance (Satyanarayana & Iyer 1996; Iyer and Jha, 2005). In a study comparing the performance of international development projects in India, China, Bangladesh, and Thailand, Ahsan and Gunawan (2010) reported that construction projects in India showed the worst schedule performance. A status report published by the Ministry of Statistics and Programme Implementation highlighted that out of the 951 projects being monitored 309 projects have cost overruns and 474 projects are behind schedule. Reasons for these problems range from land acquisition, improper planning and budgeting, to poor coordination and monitoring of the projects (Singh, 2010).

The Indian Planning Commission recently highlighting the importance of the sector recommended the use of “modern management techniques and efficient technologies” for the growth of the sector so as to fulfill the demands being placed on it by the economic development of the country (Planning Commission 2011). One such technology that can benefit the Indian construction sector is Building Information Modelling (BIM). Using the linkages between technology, process and people that BIM platform provides, this study is aimed at determining and understanding the drivers and barriers to its implementation in India. Teasing out these issues ultimately yields insights as to how the Indian construction sector can benefit from BIM in years to come.

2. LITERATURE REVIEW

Over the past few three decades, realizing that project delivery is an information intensive process, there has been rapid development of concepts and representations relating to how information is created and managed on projects. Tracing back in time, Mokhtar et al. (1998) developed an information model intended to replace drawings as the main repository of design information and main communication media. Essentially the idea of a central database containing all the project information to produce technical documents suitable for project delivery was proposed. Zaneldin et al. (2001) went further in their research and proposed that the approach would be more successful if used in a collaborative setting. The key shift that happened around fifteen years ago was that researchers felt technology alone would not be sufficient for attaining success and that the inter-relationships between people, organizations and processes must also be evolved with technology in order to produce a successful model. In recent years, this amalgamation of technology, people and processes that is allowed by BIM, has taken root in both research and practice (Sacks and Barrack 2010). While the idea of BIM as a technology has been around for over two decades, it is only recently that through the discussion of the people and process issues BIM has become popular in the industry and
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