Building information modeling bim facility management

by Pramod Dibble, Frost & Sullivan Energy & Environment Research Analyst — The convergence of information technology (IT) and facility management (FM) is an inevitable trend. The goal of facility managers has always been to make buildings more energy efficient, more productive and more comfortable for tenants and operators. Smart buildings solve all these problems and at a lower total cost of ownership than conventional systems. One tool in the repertoire of smart buildings is information modeling. Building Information Modeling (BIM) digitally manifests a framework to create a model that can be used to monitor and share information throughout the building lifecycle. The advantages of this approach include a dramatic increase in the efficiency of information sharing between the multiplicity of parties and contractors who collaborate to build facilities. This collaborative approach reduces redundancies and communication errors, thereby reducing early construction as well as ongoing maintenance and energy costs. Through the use of BIM, all planned systems can be integrated, visualized and optimized before construction begins. This holistic vision provides a vehicle for design innovation, build quality and cost accuracy to build and operate estimates. The highly fragmented nature of the construction industry has created the need for a centralized platform for information sharing and control. With the increasing complexity of facilities, particularly in high-tech, luxury or specialized facilities, the large volume of disciplines needed to design and build a quality facility is large and growing. BIM provides a forum for collaboration, rather than the traditional spider web of individual companies that communicate independently. In addition, given the traditional approach of individual contractors each using their own data and modeling tools, incompatibilities are bound to arise, causing significant losses for the industry and subsequently to customer value. The dynamic nature of BIM incorporates changes and modifications made over the years, ensuring that it never becomes obsolete or less useful due to outdated records. With additional pressure on building owners and operators to reduce energy use and environmental impact, BIM enables simulated testing and analysis of construction systems prior to construction to ensure that appropriate measures have been taken to ensure expected performance and change low-performance systems before they are installed. BIM is useful even in existing installations that were not built using an integrated digital model, Through the use of original design plans and retrofit and, in some cases, laser scanning, a BIM model can be generated from an existing installation. This system can then be used to monitor and benchmark systems and suggest retrofit opportunities for operational operations and cost reduction. All the ongoing advantages of a BIM platform will be available to building owners and managers, and while the system is useful and cost-effective in everything except the final stages of the building's life cycle, its benefits increase the sooner it is implemented. The ability to track contracts and performance during the long utility period of the facility is invaluable. It becomes much easier to review contracts and ensure compliance using an integrated model. BIM is typically used in conjunction with cloud architecture. This approach allows contracted participants to access and review building information remotely, further increasing collaborative potential and efficiency gains. While the value proposition during the early stages of design and construction is significant and can be measured directly in exchange for investment, other advantages of this approach also exist and may have even more impact on the overall usefulness of the facility. Smarter facility designs can improve occupant comfort and safety for office or residential facilities. Safety concerns and evacuation planning can be built intuitively and efficiently to promote the health and well-being of occupants. Radio frequency identification interrogators and intelligent checkpoint planning can deny security weaknesses at an installation level with the least negative impact on tenant comfort and ease of access. In the case of factories, improved efficiency can be achieved by modeling and controlling the manufacturing process and designing the most efficient assembly line possible. Product modeling can be performed, and off-site processes can be analyzed and tested digitally prior to implementation, with huge potential savings. In critical and complex environments such as telecommunications and nuclear power plants, inefficient projects have a compound effect on the cost of construction, and entering the budget requires the use of a master monitoring and testing system. BIM is most effectively used in conjunction with smart buildings, which involve the dynamic integration of construction and information systems. These buildings automatically detect and respond to changes in the environment using wireless sensors embedded in their external and interior surfaces. Sensors can detect and respond to daylight levels, external temperatures, system performance and possible deterioration, and automatically correct window coloring, blind positioning and HVAC settings, as well as alert facility personnel to any anomalies. These systems are able to anticipate conditions to respond in a timely manner. When synchronizing construction systems integrated with BIM, the most complete picture of a building's status is possible and accessible in real time. Integrating IT infrastructure and building systems is the next logical logic for building owners and operators. Most of the costs associated with building management and maintenance are not in the construction phase of the project, but rather in the ongoing costs of maintenance and energy use. The use of advanced construction techniques, such as BIM and integration of smart buildings, can provide enormous cost savings throughout the life cycle of the building, in addition to making it a more pleasant and desirable place to live or work. Building planning and construction are such a complex and multidisciplinary industry that the opportunity missed by the lack of integrated information and collaborative communication between contractors and owners/operators is in the billions of dollars each year. Three-dimensional digital modeling stored in the cloud solves all these problems, and we expect to see dramatically increased utilization in the near future. Sources: Ruwini Edirisinghe (School of Property, Construction and Project Management, RMIT University, Melbourne, Australia) Kerry Anne London (Department of Arts and Social Sciences education, University of South Australia, Adelaide, Australia) Pushpitha Kalutara (Faculty of Science and Built Environment Engineering, University of Deakin, Geelong, Australia) Guillermo Aranda-Mena (School of Property, Construction and Project Management, RMIT University, Melbourne, Australia) Building information modeling (BIM) is being increasingly adopted during construction projects. Design and construction practices are adjusting to the new system. BIM is intended to support the entire life cycle of the project: the phases of design and construction and also the management of facilities (FM). However, BIM-enabled FM remains in its infancy and has not yet reached its full potential. The aim of this article is to identify the main aspects of BIM in order to derive a fully BIM-enabled FM process. In total, 207 articles were classified in the main and subordinate research areas for quantitative analysis. These findings were then used to conceptualize an FM structure enabled for BIM, based on the theory of diffusion of innovation for adoption, and to determine the path of future research. Through an extensive literature review, the article summarizes many benefits and challenges. The main aspects of BIM are identified to describe a BIM-enabled FM implementation process, based on the theory of diffusion of innovation. The main research areas of the proposed framework include: planning and guidelines; Achievement value; internal leadership and knowledge; acquisition; FM; specific areas of application; data capture techniques; data integration; knowledge management; and legal and political impact. Each element is is and is supported by literature. Finally, the gaps are highlighted for research in future research. This article systematically classifies and evaluates the existing research, thus contributing to the realization of the final view of FM enabled for BIM. The proposed framework informs facility managers and the BIM-enabled fm implementation process. In addition, holistic research identifies gaps in the body of knowledge, revealing paths to future research. Edirisinghe, R., London, K.A., Kalutara, P. and Aranda-Mena, G. (2017), Modeling of construction information for facilities management: are we still there?, Engineering, Construction and Architectural Management, Vol. 24 No. 6, pp. 1119-1154. Download as . RIS : Emerald Publishing Limited