Chapter 24
A Scientometric Analysis of Studies in Turkey:
Driving BIM Into Facilities Management

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ABSTRACT

Recently, architecture engineering and construction (AEC) industry benefits from building information modeling (BIM) as a technology-based development, to enhance collaboration and increase the efficiency of construction projects. After implementing BIM in design and construction phases, developed countries now head towards utilization of BIM in facilities management (FM) processes. As ranking among the leading AEC industries, Turkey not only follows latest developments but also promises valuable potentials for both theoretical and practical improvement of BIM. Based on the studies published in BIM field, this study applies bibliometric review approach to analyze the state-of-the-art situation of the field in Turkey, and determine potential research areas, especially in BIM and FM intersection. Following the systematic literature search that aims to introduce current efforts of Turkish researchers in BIM field, the qualitative analysis categorizes these efforts according to life cycle phases of a construction project and provides a vision on existing knowledge as well as research gaps. Findings of this study point out the important contributions of Turkey to BIM field especially in design and/or construction phases. A prominent conclusion of this study also signals a need for more FM oriented approach in BIM researches.

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INTRODUCTION

Building Information Modeling (BIM) is an IT-enabled approach that involves applying and maintaining an integral digital representation of all building information for different phases of the project life cycle in the form of a data repository (Gu & London 2010). Dated from the first introduction of the concept of BIM in the early 2000s (Penttila et al., 2007), evidence empirically proofing reduction in cost and time, enhancement in coordination and improvement in safety and quality speed up its diffusion into the architecture, engineering and construction (AEC) business, especially for design and construction phases.

Facilities management (FM), on the other hand, refers to "an integrated approach to operating, maintaining, improving and adapting the buildings and infrastructure of an organization in order to create an environment that strongly supports the primary objectives of that organizations" (Barrett & Baldry 2003) and covers the longest duration in a building's life cycle. As stated by Chotipanich (2004), buildings are designed or selected to meet the specific needs of organizations, but during occupancy process they need specific FM practices. Because FM processes generate and require excessive information, effective utilization of BIM in operational phase becomes crucial for professionals to achieve higher quality-built environment. However, compared with the number of studies focusing on BIM applications in design and construction processes, BIM applications in FM still fall behind (Pishdad-Bozorgi et al., 2018). For this reason, this study aims to explore the future opportunities to minimize the knowledge gap in implementing BIM for FM of buildings.

Brief Overview to Facilities Management and Potentials in Turkey

International Facility Management Association (IFMA) defines facility management as a profession that encompasses multiple disciplines to ensure functionality, comfort, safety, and efficiency of the built environment by integrating people, place, process and technology (IFMA 2019). Despite functions of FM evolved and broadened throughout the decades, conducting daily operations and maintenance of the buildings remain as its primary functions. Consequently, FM spreads over the longest time (Pishdad-Bozorgi et al., 2018), requires higher investment compared to building's initial investment (Becerik-Gerber et al., 2012; Korpela et al., 2015), needs and generates an extreme amount of information (Becerik-Gerber et al., 2012) and thus, offers significant opportunities in terms of efficiency gain. Another issue is the increasing complexity of construction projects due to the growing scale of buildings, with the increasing amount of technological investments and the growing number of stakeholders involved during the project life cycle. Listed characteristics of FM and construction projects necessitate IT-based approach for successful operations of buildings.

In this context, BIM is accepted as a promising tool for creating, storing and managing all kinds of information across the project life cycle and owners are indicated as the main beneficiaries of BIM (Eadie et al., 2013). BIM contributes to FM through displaying the exact location of building components for commissioning, repair or replacement in as-built model, facilitating real-time data of building systems for maintenance or inspection, monitoring the building performance, visualizing the space both for renovation and emergency case training and keeping all the information digitally updated (Becerik-Gerber et al., 2012; Parn et al., 2017). Along with the studies agreeing on promising benefits of BIM in FM practices, a brief review of literature reveals various barriers to implementing BIM in FM. Some of these barriers are; lack of standards defining the information requirements for FM tasks, fragmented data and interoperability problems between BIM and FM systems, incomplete and unmaintained models, lack of