

**Title: Relationship between digital twin and building information modeling: a systematic review and future directions**

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**Abstract: Purpose** Digital twin (DT) and building information modeling (BIM) are interconnected in some ways. However, there has been some misconception about how DT differs from BIM. As a result, industry professionals reject DT even in BIM-based construction projects due to reluctance to innovate. Furthermore, researchers have repeatedly developed tools and techniques with the same goals using DT and BIM to assist practitioners in construction projects. Therefore, this study aims to assist industry professionals and researchers in understanding the relationship between DT and BIM and synthesize existing works on DT and BIM.

**Design/methodology/approach** A systematic review was conducted on published articles related to DT and BIM. A total record of 54 journal articles were identified and analyzed.

**Findings** The analysis of the selected journal articles revealed four types of relationships between DT and BIM: BIM is a subset of DT, DT is a subset of BIM, BIM is DT, and no relationship between BIM and DT. The existing research on DT and BIM in construction projects targets improvements in five areas: planning, design, construction, operations and maintenance, and decommissioning. In addition, several areas have emerged, such as developing geo-referencing approaches for infrastructure projects, applying the proposed methodology to other construction geometries and creating 3D visualization using color schemes.

**Originality/value** This study contributed to the existing body of knowledge by overviewing existing research related to DT and BIM in construction projects. Also, it reveals research gaps in the body of knowledge to point out directions for future research.

**Keywords:**Digital twin, BIM, Facilities management, Built environment, Literature review, Construction innovation

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