



Risks and Opportunities for Reforming Construction with Blockchain: Bibliometric Study

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Abstract

Emerging technologies are always treated with caution, and Blockchain is no exception to this rule. The AECO (Architecture, Engineering, Construction, and Operations) sector is considered conservative when it comes to technology adoption, which is often positive in an industry that deals with a vital commodity that could harm humans or result in catastrophe. However, excessive caution also stifles innovation, as shown in the industry's low R&D expenditure when compared to other industrial activities. In recent years, the AECO sector has benefited from the adoption of new information management tools and systems that allow professionals to develop, share and store construction data more effectively. These tools have successfully tackled many of the traditional interoperability issues that have affected the industry, but several challenges remain unsolved. Indeed, effective real-world communication depends, not only on the compatibility between data formats and systems, but also on issues such as privacy, transparency, and trust. Blockchain has been adopted in different activities as a tool to address these issues, but its impact in the construction industry remains scarce. This paper presents a bibliometric study for the available literature on Blockchain implementation in the AECO sector. In addition to the bibliometric review, content analysis for the literature retrieved is presented to provide a clear vision of the current directions regarding Blockchain technology adoption. The purpose of this article is to evaluate the maturity of Blockchain in Construction literature using statistics based on the available bibliometrics in addition to content analysis. The main results show that although the number of articles about the use of Blockchain in Construction has increased, no studies that present ready to use solutions were found. Instead, the covered studies discuss the technical capabilities of the technology and suggest possible fields of implementation, such as smart contracts and automated payments. Study limitations include the limited amount of literature that can be found on major indexing services, which cover a relatively short reference period.

Keywords: Blockchain; Construction; Bibliometric Review; BIM; Construction Management; Infrastructure.

1. Introduction

Blockchain, as a concept, is not new. However, it gained its current popularity after it was used to create the first cryptocurrency in January 2009, Bitcoin. Crosby et al. (2016) [1] defines Blockchain as a distributed database of records, or public ledger of all transactions or digital events that have been executed and shared among participating parties. Blockchain is essentially a protected distributed file system where communication between nodes is not coordinated by a single node. In Blockchain, data integrity can be assured through different consensus mechanisms such as proof of authority, proof of space, proof of stake, or proof of work. Blockchain brings value and transparency to the data exchange network and makes collaboration efficient [2].

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