Chapter 20
Application of Blockchain in Libraries and Information Centers

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ABSTRACT

This chapter explored the concept and application of blockchain technology in libraries and information centers. Blockchain is one of the emerging technologies thriving in the fourth industrial revolution. It is the application of cryptography for creating a time-stamped, immutable, and dynamic database, distributed across nodes in a network. Although its emergence began with cryptocurrencies, advancement in this technology has given birth to a fourth generation of blockchain with industrial disruptive capabilities, cutting across various fields including library and information science. Accordingly, the application of blockchain in libraries and information centers was thoroughly examined. Specifically, the chapter underscored the application of blockchain in circulation services, collection development, storage and archiving of records, research data management, cataloging and classification, indexing and abstracting, digital first right (DFR), etc. Lastly, the merits and demerits of blockchain in libraries and information centers were furnished accordingly.

INTRODUCTION

Libraries have evolved through various technological and industrial revolutions. In the past, libraries have acquired, stored and preserved information in various media: stone, clay tablet, parchment, papyrus, paper, microform, and now the digital or electronic media. Thus far, libraries have relentlessly fought against agents of deterioration, to preserve and conserve the information contents in these various media.

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Consequently, various strategies and policies were adopted to secure and preserve library information resources for posterity. Nowadays, the increasing demand and use of digital information resources have necessitated libraries and information centres to acquire the same, in order to satisfy the information needs of their clientele. Unfortunately, advancement in the development and use of the digital media also came with lots of challenges. These include but not limited to: privacy issues regarding information, unauthorized access and theft of information, computer viruses and other malware that corrupt information contents, cost incurred in procuring and maintaining servers, etc. Hitherto, files and databases were used to store, organise, secure, preserve and also retrieve information from a centralised Web or File Transfer Protocol (FTP) Server. Nonetheless, issues regarding privacy and tampering of data still remain threat to confidentiality, integrity and availability of information. As library and information services increasingly move online, one of the challenges online users face is divulging or entrusting their personal and research/academic data to other parties (Hoy, 2017). Interestingly, the emergence of blockchain technology have alleviated some of these problems. It is a technology that makes information decentralised and distributed, making it difficult for unauthorised party to hack, tamper or fake. Blockchain as a veritable solution to the issues of cost, security, privacy and transparency of digital information, hence, the need for the adoption and utilisation of this technology in libraries and information centres.

According to (Conway, 2020) blockchain is a type of database in which data or information are structured and filed in groups, also known as blocks, that holds sets of information; which are then chained unto previously filed blocks, forming a chain of data/information known as blockchain. (Chingath & Babu, 2020a) view blockchain as a growing list of records, called blocks that are linked using cryptography, with each block containing a cryptographic hash of the previous block, a timestamp, and transaction data generally represented as a Merkle tree. Blockchain is one of the emerging technologies that have ushered the 4th Industrial Revolution (4th IR). It is a fast growing technological inventions in the last decade that attracts attention for its widespread cyber security capabilities, and the promises it holds to provide security, transparency, immutability and privacy of data, from supply chain management to crypto-currency and shipping, e-voting etc (Atienza-Mendez & Bayyou, 2019). In addition, (Rosic, 2020) posited that blockchain is an immutable time-stamped series or chain of records of data that is distributed and managed by cluster of computers. It is a highly secured, and ingenious way of storing and transferring or sharing digital information among parties or organisations. When one party creates and dispatches a set or block of information, it is verified by thousands, and even millions of computers distributed around the net. The verified block of information is added to a chain, which is stored across the net, creating not just a unique record, but a unique record with a unique history. Falsifying a single record would mean falsifying the entire chain in millions of instances. That is somewhat impossible! (Rosic, 2020). Initially, blockchain was used for Bitcoin and other cryptocurrencies, but has found application in several industries including finance, health, supply chain management etc. Libraries and information centres need to adopt this technology and take advantage of its benefits for enhanced services delivery and user experience in tandem with the 4th IR.

Although blockchain technology is mostly used for transactional data and is preferably apt for immutable recordkeeping, it can fit into library's environment owing to its policies on personal privacy, open access, transparency and accountability. Hence, the library will earn the trust of its users, in securing and protecting their personal and research data, thus, supporting open scientific publishing. In this 4th IR, libraries and information centres are intertwined with technologies. Blockchain is one of these technologies that have gain usefulness in the library's ecosystem. Apart from the crypto-currency market, the transition from Blockchain 1.0 to Blockchain 3.0 and Blockchain 4.0 have widened the application