

Chapter 4

Blockchain Use Cases in Healthcare

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ABSTRACT

The amount of health data created in the world is increasing exponentially every day. Existing technologies such as data storage, fast processing of stored data, and data security are still sufficient, but it is predicted that some problems will most likely occur. The positive effects of blockchain technology have attracted attention on issues such as ensuring that people avoid direct contact in the pandemic, saving time, facilitating international cooperation, and reducing paperwork. Blockchain technology allows for the elimination of an authority or a central server. This feature makes data processing processes incredibly fast. It allows patient health data to be stored regularly, transferred quickly, and easily anonymized when necessary. In this way, the needs of patients who continue their treatment at home or in the hospital can be determined in advance. The drugs to be used, the necessary medical devices, and the treatment to be applied can be determined quickly, and, if necessary, the product supply can be automatically procured in advance and made ready.

INTRODUCTION

Blockchain technology in the health sector, starting as a digital revolution, has almost determined the future of the health economics potential revolution as the subject of different research studies. Blockchain technology has created key technologies for the decentralization and digitization of healthcare institutions, providing patients

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and service providers with a modern and digital healthcare ecosystem. Blockchain applications with real-time updates on a decentralized blockchain ledger are encrypted to understand, track and control medical information. Thus, it also helps health institutions to restrict unauthorized access to sensitive information (Khatoon, 2020).

Blockchain is a distributed decentralized ledger technology managed by peers in a network. Blockchain technology is operated without a permanent and permanent central administrator or centralized data storage method. Decentralized data is distributed across different nodes, and quality and security, and replication are protected by strong encryption methods. The concept of blockchain was first introduced in an article written by Nakamoto on October 31, 2008. Blockchain technologies provide both wide solutions and security in different areas of life as well as financial areas. The low cost, transparency, and high efficiency of blockchain technology continue to help solve problems in many different sectors. Basically, in 2013, blockchain technology applications caused important initiatives and started to be implemented. While blockchain was the subject of financial issues in the first period, it continued to increase its application areas day by day. Blockchain technologies find application areas by producing many valuable solutions especially for the health field, which is one of the most important elements of our lives. Unfortunately, the healthcare field has met with blockchain technology later than other life fields. Blockchain technology solutions in the field of health have started to accelerate and be implemented significantly since 2016 (Voshmgir, 2020).

The term blockchain refers to the interconnected blockchain structure that stores vast amounts of information about the past, present, and future of each chain block. As soon as each block enters the system to become an attached part of the chain, it takes an important role in the system by connecting with the previous block and the block after it. The main role of each block is to record, verify and transmit activities to other blocks and beyond. Thus, it prevents every block in the chain from being mined or means that every subsequent block cannot be exchanged for irreversible change. As a result, the blockchain network is a decentralized dynamic information system API that contains information about all transactions and works with a predetermined protocol that defines the direction and consent of transactions, as well as the work of all networks and members. In addition, this working network is also often referred to as a distributed registry, since data is held by each node in the working network (Kolb et al., 2020).

A transaction in blockchain technology networks is combined into blocks of transactions linked to the blockchain using the hash of the previous block record. Therefore, major security measures are implemented in blockchain networks as an important feature of immutability. The older the blockchain, the more protected the data in the node content from changes. If an intruder tries to change the contents of one of the keys, the local record in the block will not be valid as the hash values in the

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