Chapter 4

# Prospects and Challenges of Blockchain Technology in Managing Healthcare Data:
## Evidence From Africa

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## ABSTRACT

*In terms of data transparency, traceability, immutability, audit, data provenance, flexible access, trust, privacy, and security, healthcare data management systems face significant hurdles. Additionally, a significant portion of the existing healthcare data management systems are centralized, which could be dangerous in the event of a single point of failure. The handling of data in the healthcare sector has the potential to undergo a big transformation. Blockchain is an emerging, disruptive, decentralized technology. In this chapter, the authors explore how utilizing blockchain for healthcare data management systems might spur innovation and result in significant advancements.*

## 1. INTRODUCTION

In an era where data integrity, security, and accessibility have become paramount, healthcare systems worldwide are seeking innovative solutions to manage patient information and optimise service delivery. Africa, with its diverse and rapidly evolving healthcare landscape, is no exception. Despite the continent's healthcare advancements, there remains a pressing need to address challenges related to data

fragmentation, security breaches, and inefficiencies in patient data management. Enter blockchain technology—a decentralised, immutable ledger system originally designed for digital currency transactions. Its potential applications in healthcare are vast, promising enhanced data security, traceability, and interoperability. However, like any burgeoning technology, blockchain comes with its own set of challenges, especially in the unique socio-economic and infrastructural context of Africa. Healthcare has undergone a shift thanks to the "internet of things" (IoT) paradigm's quick advancements. IoT-based medical devices can assist with the collection of priceless patient data, workflow automation, insight into disease symptoms and patterns, remote care, and increased patient control over their lives and treatments (Aazam et al., 2020; Ali et al., 2020; Tao et al., 2018). Hospital stays or readmission costs may be decreased with the aid of connected home health monitoring devices (Deloitte, 2023). Through warnings and trigger notifications, IoT-enabled medical devices can help with diagnosis before it gets serious. Additionally, they can reduce the frequency of hospital visits for standard health examinations (Awais et al., 2019; Zhu et al., 2019; Jiang et al., 2019; Ali et al., 2021). Changes in blood pressure, respiration, and other vital signs can be detected by sensors attached to various sections of a patient's medical equipment (Yaqoob et al., 2021). Due to the data being disseminated across numerous medical facilities, processing EHR and EMR in a safe manner has become quite difficult (Shahnaz et al., 2019). The majority of currently in-use healthcare systems are centralised, making them susceptible to single points of failure and data leakage (Global Blockchain in Healthcare report, 2022). A patient's private and sensitive information breach could have catastrophic repercussions (Sengupta et al., 2020). Some of the main problems in handling "electronic medical records" (EMR), like fraud and fake goods, could be resolved by blockchain technology (Deloitte, 2023). By 2025, it is predicted to result in savings of up to $200–250 billion annually in expenditures associated with data breaches and fraud, counterfeit goods, and fraud (Global Blockchain in Healthcare report, 2022). Blockchain is an emerging technology that has the potential to help improve the efficiency of operations for managing healthcare data by delivering exceptional data efficiency and enforcing trust (Islam et al., 2019; Chukwu & Garg, 2020; Syed et al., 2019; Esposito et al., 2018; Al Omar et al., 2019). Decentralised storage, transparency, immutability, authentication, flexible data access, interconnection, and security are just a few of the many characteristics it offers. Figure 1 shows blockchain-enabled healthcare systems.

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