AFIDEP
African Institute for Development Policy

AUDA-NEPAD
AFRICAN UNION DEVELOPMENT AGENCY

Harnessing Blockchain Technology for Efficient Healthcare Service Delivery


© Freepik

Policy Brief

November 2024

Key Messages

- Blockchain is one of the emerging technologies with the potential to address various challenges within the African healthcare system.
- Blockchain's decentralised and encrypted nature can help ensure data security, transparency, efficiency, and information sharing.
- In Africa, blockchain is being leveraged to enhance medical records management, streamline healthcare supply chain distribution, and facilitate secure communication among healthcare providers.
- Laws and regulatory frameworks to ensure appropriate data governance and privacy, as well as investments in research and digital infrastructure can help Africa countries realise the potential of blockchain technology.

Context

African countries experience challenges in managing patients' confidential data, maintaining data integrity, and with secure Internet connectivity. The healthcare systems are often fragmented and lack interoperability, making it difficult for facilities to exchange patient data. The recent uptake of emerging technologies in healthcare promises benefits for African countries and has led to generation of massive electronic patients records to guide more efficient and effective care. However, such growth poses unprecedented demands for healthcare data protection while in use and in exchange with others. Blockchain technology provides many opportunities in addressing these challenges as well as benefits that lead to improvements in healthcare in Africa. Blockchain can facilitate secure and seamless sharing of patient information, leading to better coordination of care. The benefits also include cost reduction, improved security due to the elimination of single point of failure, and greater transparency.

HealthTech
Promoting dialogue and action on health technologies in Africa

Methodology

This policy brief is based on secondary data collected through a review of published literature. The authors conducted a review of relevant journal articles, conference papers, books, reports, newspapers, and other sources, to gain insights into the opportunities and challenges of blockchain technology in the health sector and service delivery in Africa. The brief also benefited from information gathered during meetings with experts on emerging technologies convened by the African Institute for Development Policy (AFIDEP) and the African Union Development Agency (AUDA-NEPAD) and August, September and October 2024. The meetings included the emerging health technologies expert meeting, biannual statutory meeting for the African Union High Level Panel on Emerging Technologies (APET) and a Regional Dialogue on Leveraging Emerging Technologies to Improve Healthcare Delivery Systems in Africa.

Findings

Blockchain technology is commonly associated with cryptocurrencies, yet its use could revolutionise processes in various areas, from finance and trade to government public services, humanitarian work and healthcare. In the healthcare system in Africa, blockchain technology is being explored and piloted in several ways to address challenges. Blockchain possess multiple features that make them general-purpose tools in enabling transparency, coordination, and information sharing. With traditional healthcare systems in Africa often facing issues related to data security and privacy, blockchain's decentralised and encrypted nature can help ensure that sensitive healthcare data is stored securely and accessed only by authorised individuals.

Some potential and actual applications of blockchain include: improving the management of patient health records by ensuring secure and interoperable data sharing across healthcare providers; tracking the entire supply chain of drugs from manufacturer to patient; ensuring transparency and reducing the risk of counterfeit medicines entering the sector; supporting telemedicine platforms by securely storing patient data; facilitating payment transactions in a transparent and traceable manner; streamlining health insurance processes by automating claims processing, reducing administrative costs, and minimising fraud.

Blockchain is currently being employed to securely store and manage patient records across healthcare facilities. AID:Tech, a financial technology developer, has implemented blockchain technology in Uganda in refugee camps to improve access to healthcare services and ensure transparent distribution of medical aid. Blockchain is used to digitise and verify entitlements for healthcare services, such as medical consultations and treatments, for refugees. A South African company, MediLedger, is utilising blockchain to enhance the management of medical records and improve healthcare service delivery.

Medici Land Governance in Zambia has developed blockchain solutions to securely store and manage patient data. This project has improved the quality of healthcare

What is blockchain?

Blockchain technology is an advanced database mechanism that allows transparent information sharing within a network. A blockchain database stores data in blocks that are linked together in a chain. The technology can ensure secure transfer of patient records between hospitals, bolstering healthcare data security, and managing the pharmaceutical supply chain. Blockchain can also play a critical role in preventing the circulation of counterfeit drugs and addressing unlawful tax evasion schemes within the healthcare system.

by enabling healthcare providers to access accurate and up-to-date patient histories. IBM has piloted blockchain projects in Nigeria to track the supply chain of medicines and vaccines. In enhancing transparency and traceability, this system reduces the risk of counterfeit drugs entering the supply chain, ensuring that patients receive genuine medicines.

VeChain in South Africa provides blockchain solutions to verify the authenticity of pharmaceutical products. This application helps combat counterfeit medicines by providing a transparent and immutable record of the drug production and distribution process. It ensures that only genuine medicines are available in the market, improving patient safety.

These applications of blockchain technology in health generate benefits. These benefits include data security, increased transparency, interoperability, enhanced data availability, and improved healthcare services with telemedicine, mobile health applications, and diagnostic tools that are enhancing access and quality.

There are, however, several challenges to the realisation of the full potential of blockchain technology, including issues associated with scalability, privacy concerns, uncertain regulatory standards and difficulties posed by the integration of blockchain technology into existing applications. Nevertheless, Africa's potential for technology transfer is vast, and addressing challenges such as funding, infrastructure, and intellectual property protection will maximise the impact of these innovations and drive sustainable development.

Policy Recommendations

African decision and policymakers can consider the following recommendations to leverage blockchain technology in addressing the various challenges within the African healthcare system:

1. Develop a Pan-African blockchain strategy in accordance with the African Union's Digital Strategy.
2. Establish clear and supportive regulatory frameworks that provide legal certainty and guidelines for the use of blockchain in healthcare.
3. Equip public authorities with the necessary powers and resources to monitor and enforce data protection laws.
4. Support research and education about blockchain technology and blockchain governance to foster skills, develop talent and stimulate innovation.
5. Push for interoperability and harmonised standards, specifically to enable interconnectivity between different blockchains.
6. Allocate resources and investments to improve digital infrastructure, including Internet connectivity, cloud computing capabilities, and cybersecurity measures.
7. Facilitate collaboration and partnerships between government agencies, healthcare providers, technology developers, academic institutions, and private sector stakeholders.
8. Foster regional collaboration and knowledge sharing among African countries to leverage economies of scale, share best practices, and address challenges in adopting blockchain technology in healthcare.

Conclusion

The imperative role of a robust healthcare system in driving a country's economic prosperity underscores the importance of innovative solutions like blockchain technology to address prevailing healthcare challenges. Blockchain technology has the potential to address some of the key challenges in healthcare in Africa by improving data security, interoperability, supply chain management, patient identity management, and fraud detection. African countries need to strengthen innovation systems to guide the adoption of blockchain technology within the health sector towards inclusive and sustainable applications, and strategically position themselves to benefit from this new wave of technological change. African governments and the private sector can collaborate to support national efforts to capture opportunities through the sharing of knowledge and experience, the development of common standards and regulations and capacity building in engaging with blockchain in health service delivery.

Bibliography

African Union High Level Panel on Emerging Technologies (APET). (2018). *Powering the African Vision: BlockchainTechnology for Africa's Transformative Governance.*

Alhassan, I., & Ofori, D. (2022). Exploring the Role of Blockchain Technology in Improving Health Care Delivery in Africa. *International Journal of Healthcare Management, 15*(3), 595–602.

Choi, Y. J., & Kamal, N. A. (2020). Using Blockchain to Improve Health Systems in Sub-Saharan Africa: A Review of Applications and Barriers. *Blockchain in Health Journal.*

Fabi, M. S., & Anis, V. (2023). Decentralized Health Records: The Promise of Blockchain in Africa's Healthcare Delivery. *Journal of Health Management, 25*(1), 45–57.

Gachanja, D., & Mukhwana, M. (2022). Blockchain Technology: A Revolutionary Approach to Enhancing Healthcare in Africa. *Journal of Medical Internet Research, 24*(5).

Igbinovia, A., & Igboin, B. (2023). Integrating Blockchain Technology into Africa's Healthcare System: A Systematic Review. *Journal of Health Informatics in Africa, 10(1).*

Oduor, J., & Ogutu, J. (2022). Enhancing Trust in Healthcare Delivery Through Blockchain Technology in Sub-Saharan Africa. *Journal of Global Health Reports, 6.*

Osei-Tutu, E., & Nkrumah, E. (2023). How Blockchain Can Reshape Healthcare in Africa: Innovations and Challenges. *Health Policy and Technology, 12*(1).

Salih, S. M., & Kofi, M. (2022). Blockchain-Based Healthcare Solutions in Africa: A Focused Review. *International Journal of Telemedicine and Applications.*

Seriki, S. M., & Adegoke, A. A. (2024). Blockchain Technology for Health Data Security in African Countries: Challenges and Perspectives. *Journal of Global Health Reports, 8.*

Tschider, C. A., & Rachael, D. (2023). Blockchain Technology and Its Impact on Health Security in Africa: A Critical Analysis. *International Journal of Healthcare Technology and Management, 15*(2), 109–123.

For More Information, Contact:

Africa Institute for Development Policy (AFIDEP)
Malawi Office: 3rd Floor, Public Service Pension Fund Building, P.O. Box 31024, Lilongwe 3
Kenya Office: 6th Floor (Block A), Westcom Point Building, Mahiga Mairu Avenue, Off Waiyaki Way, Westlands
P.O. Box 14688-00800, Nairobi, Kenya | info@afidep.org
www.afidep.org

African Union Development Agency (AUDA-NEPAD)
230 15th Road, Midrand,
Johannesburg, South Africa
info@nepad.org
www.nepad.org