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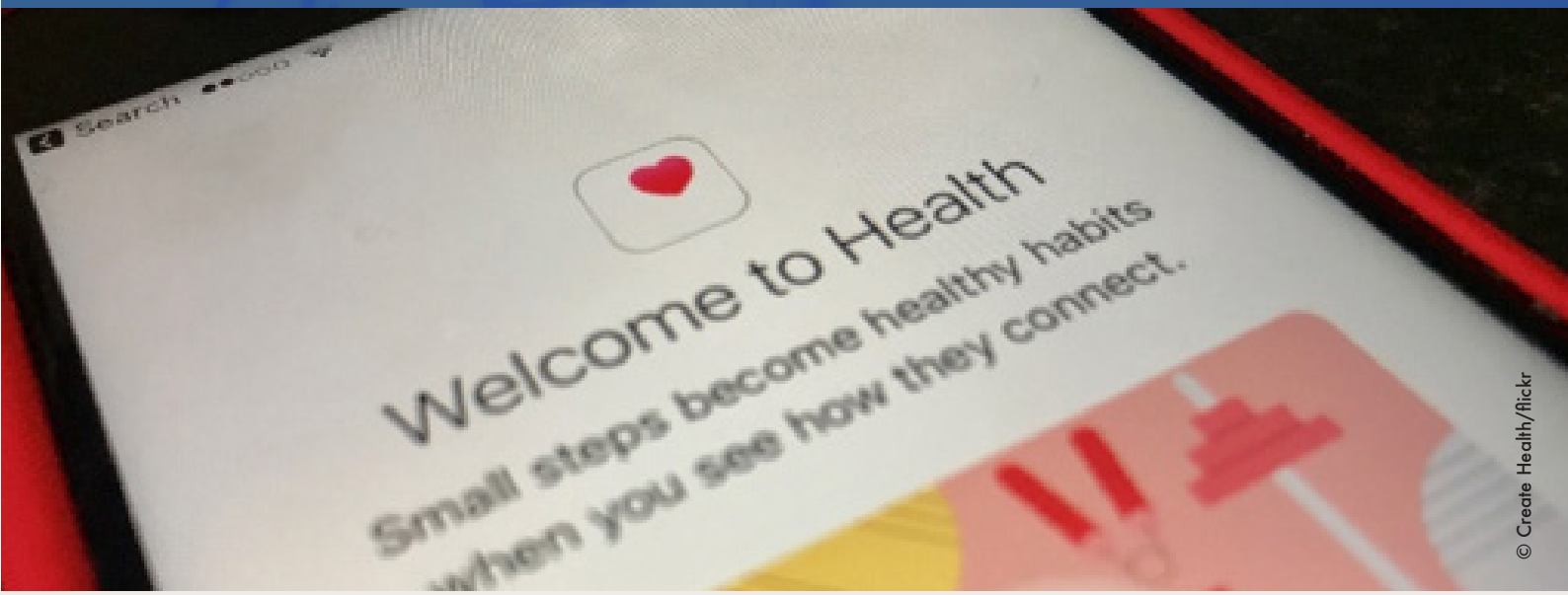
Increasing the Contribution of Internet of Medical Things to Healthcare Delivery in Africa



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Policy Brief

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Key Messages

- Internet of Medical Things (IoMT) encompasses a network of interconnected health care devices and systems that gather, analyse, and transmit health data, enabling remote patient monitoring, diagnosis and treatment.
- IoMT in Africa improves healthcare delivery, efficiency, and patient outcomes by enabling continuous monitoring, timely interventions, and personalised treatment plans based on the data gathered from these devices.
- At present, many African countries are implementing IoMT in their healthcare sector and these applications have made significance contributions to improving health outcomes.
- The effective use of IoMT in healthcare hinges on a strong code of conduct for data management, privacy, confidentiality, and cybersecurity.

Context

The Internet of Medical Things (IoMT) is a network of internet-connected medical devices and applications that gather, analyse, and transmit health data, enabling remote patient monitoring, diagnosis and treatment. The network allows wireless and remote devices to securely communicate over the Internet to allow rapid and flexible analysis of medical data.

In Africa, IoMT technologies can help bridge healthcare gaps, and improve health outcomes while enhancing healthcare delivery. They can contribute to building more efficient and resilient healthcare systems that meet the evolving needs of diverse African populations. IoMT enables medical professionals to monitor patient health more efficiently. It is also expected to lower healthcare costs by improving the accuracy of diagnosis and monitoring of chronic illnesses. This technology can send patient information directly to doctors and track health information for chronic conditions.

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Integrating IoMT technology can open new ways to improve healthcare in remote and hard-to-reach parts of Africa.

Methodology

This policy brief presents the findings of a review of the literature to establish the opportunities and challenges of IoMT in the health sector in Africa. The review covered relevant scholarly papers, conference papers, books, reports, newspapers, and other sources related to IoMT in Africa, identified through a systematic search. 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) in 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

Internet of Medical Things (IoMT) is increasingly being deployed in African countries to enhance healthcare delivery due to four major shifts in the health industry: growing demand of personalised care, rising healthcare costs, inadequate health infrastructure, and limited health workers. One of the main impediments to proper healthcare in Africa is lack of exposure to readily available healthcare information systems. African countries suffer from shortage of well-trained healthcare providers and brain drain of health professionals. In some countries the healthcare workers serving the population are distant away from them.

IoMT devices are contributing to inclusive access to health services by transforming how Africans access health services. IoMT is particularly useful in rural Africa, where integrating the technology in rural healthcare systems offers new ways of improving healthcare in remote parts of Africa. Within rural communities, the primary focus is on reducing healthcare burden, optimising efficiency of resources usage, and expanding access to basic healthcare and reducing the shortage of well-educated healthcare professionals.

There are several examples of IoMT implementation in Africa, which highlight the successful utilisation of the technology within the health sector. For instance, D-tree utilises mHealth applications that integrate with IoMT to support community health workers in diagnosing and managing childhood illnesses. These apps provide decision support, improve treatment adherence, and facilitate data collection for monitoring and evaluation. Mobile health wallets for saving and spending funds on healthcare services improve access to healthcare financing, enabling low-income individuals to afford necessary treatments. Additionally, IoMT-enabled mobile applications like CommCare are used for community health monitoring and data collection. Community health workers use smartphones or tablets to record patient data, track immunisations, and monitor public health indicators, improving data accuracy and timeliness.

Another example is the MamaOpe Smart Jacket, a wearable device designed in Uganda to aid in the early diagnosis of pneumonia in children. Equipped with sensors, the jacket monitors respiratory patterns and sounds, transmitting data via Bluetooth to a mobile app. Healthcare workers receive alerts for potential pneumonia cases, enabling early intervention and reducing mortality rates. Various mHealth solutions are deployed across Africa to improve maternal health outcomes. These solutions often

include mobile apps that integrate with IoMT devices like blood pressure monitors and foetal heart rate monitors. They enable remote monitoring of pregnant women, facilitating timely interventions and reducing maternal and infant mortality rates.

Implementing IoMT in the health sector comes with various challenges that need to be addressed, the predominant one being concerns with security and privacy of patient data. Additionally, IoMT devices and systems often come from different manufacturers and may use proprietary technologies, leading to interoperability issues. Addressing these challenges requires collaboration among healthcare providers, technology vendors, regulators, and policymakers to establish standards, guidelines, and best practices for secure and effective deployment of IoMT in the healthcare sector.

There are some important gaps to be addressed for future research and investments, which relate to the IoMT technologies, the health system, and the users of IoMT technology. Some key priority areas are as follows:

- Improving energy access and Internet connectivity, particularly in rural and underserved areas, to support IoMT deployment. There is a need to conduct studies on developing reliable power sources and solutions to ensure uninterrupted operation of IoMT devices.
- Designing cost-effective IoMT devices tailored to the needs and economic conditions of African healthcare systems. IoMT devices must be designed with standardised protocols and interoperability with international and cross-state health systems.
- Researching ways to ensure IoMT devices and platforms integrate seamlessly with existing health information systems and electronic health records.
- Studying the ethical implications of IoMT use, including issues related to informed consent, patient autonomy, and data ownership.
- Standardising data formats and protocols to facilitate interoperability between different IoMT devices and healthcare information systems.
- Researching the clinical effectiveness of IoMT devices in improving healthcare outcomes, patient management, and treatment adherence.

Policy Recommendations

To promote the availability and utilisation of the Internet of Medical Things (IoMT) in the healthcare system in Africa, policymakers can consider the following key recommendations:

1. Invest in improving internet and telecommunications infrastructure, particularly in rural and underserved areas, to ensure reliable connectivity for IoMT devices.
2. Develop and harmonise regulatory frameworks across African countries to streamline the approval and deployment of IoMT devices to ensure safety, quality, and interoperability.
3. Invest in educational and training programmes to build the technical skills of healthcare professionals in using and maintaining IoMT devices.
4. Promote research and development in IoMT technologies through partnerships with academic institutions, and collaboration with the private sector.
5. Encourage local innovation and the development of IoMT solutions tailored to the specific needs and contexts of African healthcare systems.
6. Develop ethical guidelines for the use of IoMT in healthcare, addressing issues such as data ownership, consent, and equitable access.

Conclusion

Across the African continent, health practitioners, researchers, scientists, industries, and governments are exploring the utilisation of IoMT within the healthcare sector. IoMT is seen as a cost-effective medical solution for improved patient comfort, quick hospital treatments, and more personalised healthcare for Africa. It is deemed a revolutionary technology to change the current operations of the healthcare system by overcoming several challenges in e-healthcare, including security, privacy, accuracy, and performance. However, the widespread adoption of IoMT technologies also brings up concerns related to data privacy and security, interoperability, and regulatory compliance. Addressing these concerns is crucial to fully realise the potential of the IoMT and improve healthcare outcomes for patients.

Bibliography

Adepoju, A. A., & Karim, R. (2024). Leveraging IoMT for Improved Disease Management in Africa: A Systematic Review. *Journal of Medical Systems, 48*, 15.

Ayo, C. K., & Akintola, A. (2023). The Role of Internet of Medical Things in Improving Healthcare Access in Rural Africa *Journal of Health Management, 25*(1), 56–67.

Chibanda, D., & Chibanga, P. (2024). IoMT for Managing Chronic Diseases in Sub-Saharan Africa: Innovative Approaches and Research Directions. *BMC Health Services Research*.

Eldin, K., & Saeed, F. (2023), Internet of Medical Things in Africa: Barriers to Adoption and Future Prospects. *Journal of Health Informatics in Africa, 9*(1), 32–44.

Fadaka, B., & Olawale, O. (2022). The Internet of Medical Things: A Transformative Force in African Healthcare. *Journal of Medical Systems, 46*(4), 1–11.

Gana, I. A., & Mba, A. (2024). Impact of Internet of Medical Things on Healthcare Outcomes in Africa: A Systematic Review. *Journal of Global Health Reports.*

Kamata, K. M., & Okeke, C. (2023). Adoption of IoMT Technologies in Africa: A Framework for Understanding. *International Journal of Healthcare Technology and Management, 24*(3), 181-196.

Mussa, I. M., & Zawadi, A. (2023). Adopting IoMT for Enhanced Maternal and Child Health in East Africa: A Comprehensive Overview. *African Journal of Health Informatics.*

Nene, K., & Chime, N. (2022). The Future of IoMT and Healthcare in Africa: Challenges, Opportunities, and Innovations. *Journal of Health Informatics in Africa, 9*(4), 89-100.

Umeokafor, U. M., & Okwor, A. (2023). Artificial Intelligence and IoMT: A New Horizon for Healthcare Delivery in Africa. *Journal of Healthcare Engineering.*

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