

TRANSFORMING PRIMARY HEALTH CARE THROUGH DIGITAL HEALTH COOPERATIVES: A TECHNOLOGY-DRIVEN APPROACH LEVERAGING KENYAN UNIVERSITIES

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ABSTRACT

Digital transformation offers new opportunities for strengthening primary health care (PHC) systems and accelerating universal health coverage (UHC). In Kenya, PHC continues to face persistent challenges, including out-of-pocket health expenditure, health workforce shortages, inequitable access, infrastructure gaps and uneven system responsiveness. This paper examines the potential of university-linked digital health cooperatives as innovative mechanisms for transforming PHC delivery in Kenya. The study focused on selected institutions including the Management University of Africa, University of Embu, Amref International University and the University of Nairobi, together with cooperative leaders, health practitioners, policy actors and community representatives. A mixed-methods design was adopted, using purposive and stratified sampling to obtain 360 respondents. Data were collected through questionnaires, key informant interviews and document review. Findings indicate that digital health cooperatives can improve PHC access, enhance workforce capacity through academic partnerships, strengthen financial protection through cooperative risk-sharing and improve responsiveness through telemedicine, mobile health, digital records and community-based data systems. However, digital infrastructure gaps, regulatory limitations, digital literacy barriers, data privacy concerns and sustainability constraints remain key challenges. The paper recommends policy support, university-community partnerships, digital infrastructure investment and integration of cooperative models into national PHC strategies.

Keywords: Digital Health Cooperatives; Primary Health Care; Cooperatives and Technology; Universal Health Coverage; Kenya.

1.0 Introduction

Primary health care (PHC) remains the foundation of equitable, inclusive, people-centred and sustainable health systems. PHC focuses on accessible, comprehensive, continuous and community-based services, including health promotion, disease prevention, treatment, rehabilitation, palliative care and community participation. The World Health Organization (WHO) defines universal health coverage (UHC) as access to quality health services when and where people need them without financial hardship (WHO, 2025).

Globally, the case for PHC transformation remains urgent. WHO reported that in 2023 about 4.6 billion people were not fully covered by essential health services, while 2.1 billion people experienced financial hardship due to out-of-pocket health spending in 2022 (WHO, 2025). These figures show that both access and financial protection remain major barriers to UHC, especially in low- and middle-income countries.

Digital health has increasingly become central to health system transformation. The WHO Global Strategy on Digital Health 2020-2025 emphasizes the use of digital technologies to promote health and wellbeing, strengthen health systems, improve evidence-informed decision-making and reduce inequities (WHO, 2021). Digital tools such as telemedicine, mobile health applications, electronic health records, digital referral systems and community health information systems can improve access, reduce delays and enhance continuity of care.

Kenya has created an important legal foundation for digital health transformation through the Digital Health Act, 2023. The Act establishes the Digital Health Agency and mandates it to develop, operationalize and maintain a Comprehensive Integrated Health Information System to support seamless health information exchange, interoperability, data portability, health data analysis and secure health information infrastructure (Republic of Kenya, 2023). This policy environment provides an opportunity for innovative cooperative technology models that connect universities, communities and health systems.

Despite these reforms, Kenya continues to face health system constraints. World Bank data show that out-of-pocket expenditure accounted for 24.25% of current health expenditure in Kenya in 2023, while current health expenditure was 4.35% of gross domestic product (World Bank, 2025a; World Bank, 2025b). WHO Kenya also reported that the density of health workers was 13.8 per 10,000 people in 2020, indicating a significant health workforce gap (WHO Regional Office for Africa, 2024). Digital inclusion is also uneven: the International Telecommunication Union (ITU) estimated that 35% of Kenya's population used the Internet in 2024 (ITU, 2024).

Universities are strategic knowledge institutions that can support PHC transformation through research, innovation, training, community outreach, health professional development, digital platform design and policy dialogue. Kenyan universities are already involved in health professional training, research and community engagement. However, their potential to anchor digital health cooperatives remains underutilized.

Digital health cooperatives refer to member-owned, democratically governed and technology-enabled cooperative structures that support access to health information, telemedicine, pooled health financing, digital referrals, community health data, preventive care and linkages between communities and providers. When linked to universities, these cooperatives can combine academic expertise, digital innovation, cooperative governance and community participation to create scalable and sustainable PHC models.

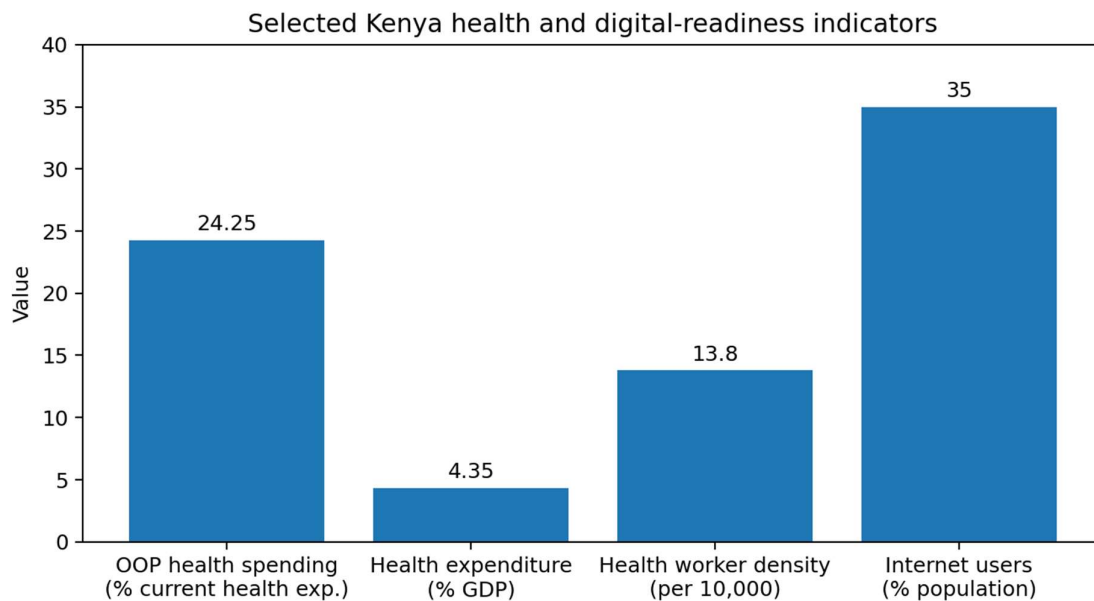
Table 1

Selected statistics justifying digital health cooperative models in Kenya

Indicator	Latest statistic used	Interpretation for this paper
Global essential service coverage gap	4.6 billion people not fully covered in 2023	PHC and UHC access gaps remain global problems.
Global financial hardship	2.1 billion people faced financial hardship in 2022	Health financing reforms must address household cost burdens.
Kenya out-of-pocket spending	24.25% of current health expenditure in 2023	Households still finance a significant share of care.
Kenya health expenditure	4.35% of GDP in 2023	Health investment remains constrained relative to system needs.
Kenya health workforce density	13.8 health workers per 10,000 people in 2020	Workforce shortages constrain PHC access and service quality.
Kenya Internet use	35% of population in 2024	Digital health must address inclusion, connectivity and literacy.

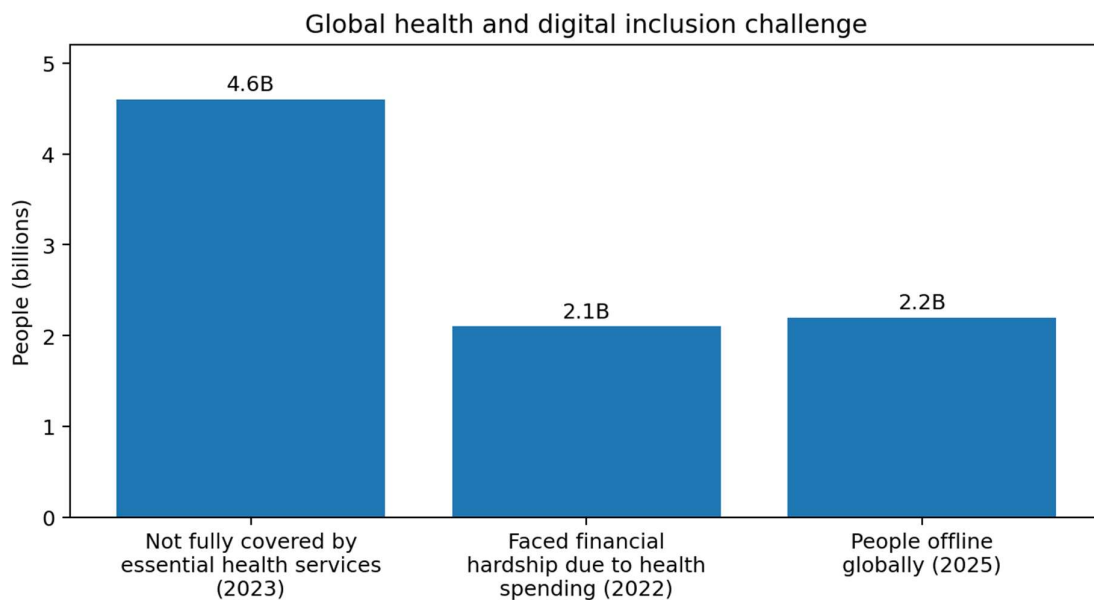
Source: WHO (2025); World Bank (2025a, 2025b); WHO Regional Office for Africa (2024); ITU (2024).

Figure 1
Selected Kenya health and digital-readiness indicators



Source: World Bank (2025a, 2025b), WHO Regional Office for Africa (2024) and ITU (2024).

Figure 2
Global health and digital inclusion challenge



Source: WHO (2025) and ITU (2025).

1.1 Statement of the Problem

Kenya has made significant efforts to strengthen primary health care (PHC) and advance universal health coverage (UHC) through health financing reforms, community health strategies, digitization of health systems, and county-led health investments. The enactment of the Digital Health Act, 2023 provides a legal foundation for digital health services and establishes a comprehensive integrated health information system to support collection, storage, sharing, retrieval, and use of health data in Kenya (Government of Kenya, 2023). Despite these reforms, the central problem is that many communities still experience limited access to affordable, timely, quality, and responsive PHC services. This problem is reflected in household health spending, health workforce shortages, fragmented health information systems, infrastructure gaps, digital exclusion, and uneven service delivery across counties.

The problem is significant because PHC is expected to address most essential health needs close to where people live and work. Globally, progress towards UHC remains slow. The World Health Organization reported that about 4.6 billion people were not

fully covered by essential health services in 2023, while 2.1 billion people experienced financial hardship due to health spending in 2022 (WHO, 2025). This global challenge is reflected in Kenya, where World Bank data show that out-of-pocket expenditure accounted for about 24.25% of current health expenditure in 2023, while current health expenditure was about 4.35% of gross domestic product in the same year (World Bank, 2025). These figures indicate that many households still shoulder a substantial share of health costs, which may delay care-seeking, reduce continuity of care, and expose low-income households to financial hardship.

The problem also manifests through health workforce constraints. Okoroafor et al. (2022) reported that the density of doctors, nurses, and clinical officers in Kenya was 30.14 per 10,000 population in 2020, representing about 68% of the Sustainable Development Goal index threshold of 44.5 doctors, nurses, and midwives per 10,000 population. This workforce gap affects PHC delivery by increasing workload, lengthening waiting time, weakening follow-up, and limiting the capacity of health facilities to provide timely and quality services. Although digital health can support task-sharing, teleconsultation, e-learning, digital triage, referral coordination, and health information management, weak infrastructure and digital exclusion may deepen inequities if technology is not organised around community ownership, affordability, cooperative governance, and inclusion.

Digital health cooperatives anchored within universities offer a possible solution by integrating technology, cooperative risk-sharing, academic expertise, health innovation, and community participation. Universities can contribute through research, training, digital innovation, community outreach, health data analysis, and policy support, while cooperatives can provide democratic governance, member mobilisation, pooled financing, accountability, and concern for community. However, there is limited empirical evidence on how Kenyan universities can support digital health cooperative models for PHC transformation. Existing digital health and PHC reforms have largely focused on government platforms, facility-based systems, private innovations, and donor-supported interventions, with less attention given to university-linked, cooperative-owned digital health models. This paper therefore addresses this gap by examining the potential of university-linked digital health cooperatives to enhance PHC access, efficiency, inclusivity, workforce capacity, financial protection, community participation, and system responsiveness in Kenya.

1.2 Study Objectives

1.2.1 General Objective

The general objective of the paper is to examine the role of university-linked digital health cooperatives in transforming primary health care systems in Kenya.

1.2.2 Specific Objectives

- i. To assess the contribution of digital health cooperatives to access and inclusivity in PHC delivery.
- ii. To examine how university-linked digital health cooperatives enhance health workforce capacity and service efficiency.
- iii. To determine the role of cooperative-based digital platforms in strengthening financial protection and community participation.
- iv. To establish the challenges and policy requirements for scaling digital health cooperatives in Kenya's PHC system.

1.3 Literature Review

Digital health literature shows that technology can strengthen health systems when it is integrated into service delivery, governance, workforce development and financing. WHO (2021) argues that digital health should be used to improve health outcomes, reduce inequities and support evidence-informed action. In PHC, digital tools can support appointment systems, remote consultations, digital triage, referrals, follow-up, health education and community health data systems.

Kenya's Digital Health Act, 2023 is important because it creates an institutional basis for digital health governance. The Act establishes the Digital Health Agency and a comprehensive integrated health information system, including components such as infrastructure, enterprise service bus, standards, data banks, data exchange, governance, interoperability layer, client registries, facility registries, health worker registries and shared health records (Republic of Kenya, 2023).

Cooperative theory is relevant because cooperatives are member-owned and democratically controlled organisations formed to meet common economic, social and cultural needs. The International Cooperative Alliance identifies principles such as voluntary membership, democratic member control, member economic participation, education, cooperation among cooperatives and concern for community (ICA, 1995). These principles make cooperatives suitable for PHC because health systems require solidarity, trust, local accountability and community ownership.

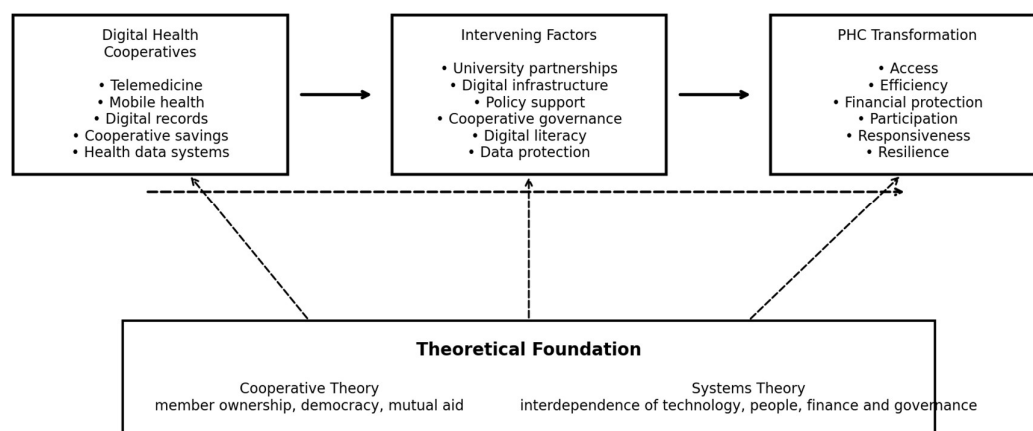
Universities can strengthen digital health cooperatives through training, research, innovation, digital literacy, professional health supervision, student engagement, community outreach, data analysis and policy dialogue. University-linked digital health cooperatives can therefore bridge academic knowledge, digital innovation, cooperative financing and PHC delivery.

However, digital health also presents risks. These include digital exclusion, weak internet connectivity, limited digital literacy, privacy concerns, fragmented platforms, poor interoperability and sustainability constraints. For this reason, digital health cooperatives must be designed around equity, ethical data governance, cooperative accountability and long-term financial sustainability.

1.4 Conceptual Framework

Figure 3

Conceptual framework for university-linked digital health cooperatives and PHC transformation



Source: Authors' conceptualisation based on WHO (2021), ICA (1995) and Republic of Kenya (2023).

The conceptual framework shows that digital health cooperatives influence primary health care (PHC) transformation through telemedicine, mobile health platforms, digital health records, pooled health financing, digital referral systems, and community health data systems. These digital mechanisms are consistent with the World Health Organization's position that digital health can strengthen health systems by improving access, service continuity, data use, health workforce support, and patient-centred care (World Health Organization [WHO], 2021). In the Kenyan context, the Digital Health Act, 2023 provides a legal and institutional foundation for digital health services, integrated health information systems, data governance, and interoperability, making digital health cooperatives relevant to ongoing PHC and universal health coverage reforms (Government of Kenya, 2023). Their effectiveness depends on university partnerships, digital infrastructure, policy support, cooperative governance, digital literacy, data privacy, and interoperability. The theoretical foundation combines Cooperative Theory, which emphasizes democratic member control, economic participation, solidarity, and concern for community (International Cooperative Alliance [ICA], 1995), and Systems Theory, which explains how health financing, governance, service delivery, information systems, workforce capacity, and community structures interact to influence health system performance (WHO, 2010; WHO, 2021).

2.0 Methodology

The study adopted mixed-methods research design. This design was appropriate because the paper required both quantitative evidence and qualitative insights on the role of university-linked digital health cooperatives in primary health care (PHC) transformation. Mixed-methods research enables researchers to integrate numerical data with qualitative explanations, thereby providing a more comprehensive understanding of complex social and organisational phenomena (Creswell & Creswell, 2023). Quantitative data enabled measurement of respondents' perceptions on access, efficiency, financial protection, community participation, and system responsiveness, while qualitative data provided deeper insights into governance, sustainability, regulation, digital infrastructure, and university-community partnerships.

The target population comprised stakeholders from selected institutions, including the Management University of Africa, University of Embu, Amref International University, and the University of Nairobi. The study also included cooperative leaders, health practitioners, digital health actors, policymakers, and community representatives. This stakeholder mix was considered appropriate because PHC transformation requires the participation of multiple actors, including health systems, academic institutions, technology providers, cooperative structures, and communities (World Health Organization [WHO], 2021). The inclusion of universities was also justified by their role in research, innovation, training, health workforce development, community outreach, and policy engagement.

A sample size of 360 respondents was selected using stratified and purposive sampling techniques. Stratified sampling was used to ensure representation of the main stakeholder categories, while purposive sampling was used to select key informants with specialized knowledge of digital health, PHC, cooperative governance, university partnerships, and health policy. Stratified sampling is suitable where a population contains distinct subgroups that need to be adequately represented, while purposive sampling is appropriate for selecting information-rich participants who possess relevant experience or expertise (Saunders et al., 2023).

Data were collected using structured questionnaires, key informant interview guides, and document review checklists. Questionnaires were used to collect quantitative data from respondents, while key informant interviews generated qualitative insights on implementation opportunities, governance arrangements, regulatory issues, sustainability concerns, and stakeholder roles. Document review was used to examine relevant policy documents, digital health frameworks, cooperative guidelines, university documents, and health sector reports. The use of multiple data collection methods enhanced triangulation and improved the credibility of the findings (Creswell & Creswell, 2023).

Quantitative data were analyzed using descriptive statistics, including frequencies, percentages, means, and standard deviations. These techniques were appropriate for summarizing respondents' views on access, efficiency, financial protection, community participation, digital readiness, and system responsiveness (Mugenda & Mugenda, 2003). Qualitative data were analyzed thematically by identifying recurring issues related to access, digital innovation, workforce capacity, financial protection, cooperative governance, system responsiveness, digital literacy, data privacy, interoperability, and sustainability. Thematic analysis was appropriate because it enabled the researcher to identify, organize, and interpret patterns of meaning from interview and document review data (Braun & Clarke, 2022).

Ethical considerations included informed consent, voluntary participation, confidentiality, anonymity, and institutional permission. Respondents were informed about the purpose of the study and their right to participate voluntarily or withdraw at any stage. Confidentiality and anonymity were maintained by ensuring that individual responses were not linked to respondents' personal identities. The study also recognised the importance of ethical data governance, especially because digital health involves sensitive health information, privacy, consent, and data protection concerns (Government of Kenya, 2023; WHO, 2021).

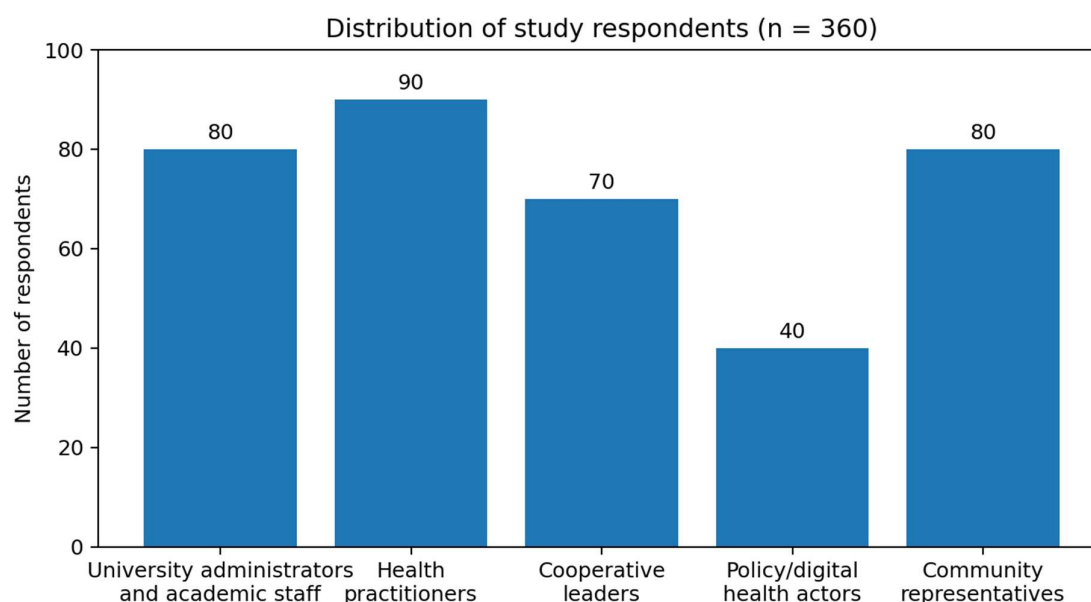
Table 2 :Distribution of study respondents

Category of respondents	Sample size	Percentage
University administrators and academic staff	80	22.2
Health practitioners	90	25.0
Cooperative leaders	70	19.4
Policymakers and digital health actors	40	11.1
Community representatives	80	22.2
Total	360	100.0

Source: Field design, 2026.

Figure 4

Distribution of study respondents



Source: Field design, 2026.

3.0 Results and Discussions

3.1 Digital Health Cooperatives and Access to PHC

The findings indicate that digital health cooperatives can improve access to PHC services, particularly in underserved communities. Respondents and key informants emphasised that telemedicine, mobile health applications, digital referral systems and

community-based platforms can reduce geographical and information barriers. University-linked platforms can also connect communities to academic expertise, supervised health students, health professionals and partner facilities.

Table 3

Contribution of digital health cooperatives to PHC access

Access dimension	Contribution of digital health cooperatives
Geographical access	Telemedicine reduces the need for long-distance travel for selected consultations and follow-up.
Timely access	Digital triage and appointment systems reduce delays and improve patient flow.
Information access	Mobile platforms provide health education, reminders and preventive messages.
Referral access	Digital referral tools improve coordination between community and facility care.
Inclusive access	Cooperative structures can identify vulnerable members and support them through pooled resources.

Source: Field synthesis, 2026.

This finding is consistent with WHO's Global Strategy on Digital Health 2020–2025, which emphasises that digital tools can improve access, strengthen data use and enhance health system performance when aligned with health system goals (World Health Organization [WHO], 2021). However, access gains depend on reliable connectivity, affordable devices, digital literacy and trust in digital platforms. Since only 35% of Kenya's population used the Internet in 2024, digital health cooperatives must include offline, assisted-digital and community-based access channels to avoid deepening digital exclusion (International Telecommunication Union [ITU], 2024; World Bank, 2025).

3.2 University Partnerships, Workforce Capacity and Service Efficiency

The study established that universities can play a strategic role in strengthening primary health care (PHC) workforce capacity through digital health cooperatives. Universities can support training, research, digital health literacy, telehealth supervision, data analysis, innovation incubation and continuous professional development, consistent with WHO's digital health strategy, which emphasises digital capacity-building for health systems and health workers (World Health Organization [WHO], 2021). This is relevant in Kenya because WHO Kenya reported a health worker density of 13.8 per 10,000 people in 2020, highlighting a significant service-delivery gap (WHO Regional Office for Africa, 2024). Evidence from Kenya also shows that the density of doctors, nurses and clinical officers remains below the Sustainable Development Goal index threshold required for strong health service coverage (Okoroafor et al., 2022).

Table 4

University contribution to digital health cooperative-based PHC transformation

University role	Expected PHC contribution
Training	Builds digital health, PHC and cooperative management capacity.
Research	Generates evidence for policy, service improvement and community needs assessment.
Innovation	Supports development and testing of digital health platforms and tools.
Community outreach	Links academic expertise to local health needs.
Data analysis	Improves decision-making, planning and system responsiveness.
Incubation	Supports cooperative technology and social enterprise models.

Source: Authors' analysis, 2026.

University-linked digital health cooperatives can support task-sharing, remote consultation, mentorship and e-learning. However, the model must be carefully governed to protect patient safety, data privacy, ethical standards and professional accountability.

3.3 Cooperative Digital Platforms, Financial Protection and Participation

The findings indicate that cooperative-based digital platforms can strengthen financial protection through member savings, cooperative risk-sharing, micro-contributions, emergency health funds and negotiated provider packages (International Cooperative Alliance [ICA], 1995; International Labour Organization [ILO], 2015). Digital platforms can also improve transparency by allowing members to track contributions, benefit rules, payments and disbursements, consistent with digital health governance principles on accountability, data use and trust (World Health Organization [WHO], 2021; Government of Kenya, 2023)

Table 5

Digital cooperative mechanisms for financial protection and participation

Mechanism	Contribution to PHC transformation
Digital health savings	Enables regular savings for routine PHC needs.
Cooperative risk-sharing	Spreads selected health costs across members.
Emergency health funds	Supports urgent PHC, transport and referral needs.
Negotiated service packages	Reduces the cost of selected PHC services through provider agreements.
Member dashboards	Improves transparency, participation and accountability.
Digital feedback channels	Enables members to report service gaps and community priorities.

Source: Field synthesis, 2026.

The finding aligns with cooperative principles of member economic participation, mutual aid and concern for community (International Cooperative Alliance [ICA], 1995; International Labour Organization [ILO], 2015). It also responds to Kenya's continuing out-of-pocket spending burden, which remains a barrier to equitable health access (World Bank, 2025). However, cooperative health financing should complement rather than replace national and county health financing systems. Small voluntary schemes may be insufficient for high-cost medical conditions unless linked to formal social health protection mechanisms (World Health Organization [WHO], 2025).

3.4 Digital Health Cooperatives and System Responsiveness

Digital health cooperatives can improve system responsiveness by generating timely community health data, supporting digital referrals, enabling feedback, tracking service needs and creating communication channels between communities, universities, cooperatives and health providers (World Health Organization [WHO], 2021; Government of Kenya, 2023). This helps transform community members from passive service users into active participants and co-owners of health solutions, consistent with PHC principles of community participation and cooperative principles of democratic member control and concern for community (WHO, 2018; International Cooperative Alliance [ICA], 1995).

Table 6

Digital health cooperative pathway for PHC transformation

Input	Process	Output	Outcome
Universities, cooperatives, communities and technology	Telemedicine, digital savings, health education, referral coordination and data systems	Improved access, efficiency, accountability and financial protection	Resilient, inclusive and technology-driven PHC

Source: Authors' conceptualisation, 2026.

This pathway reflects Systems Theory because PHC transformation depends on the interaction of people, technology, finance, governance and service delivery within a wider health system (World Health Organization [WHO], 2010; WHO, 2021). It also reflects Cooperative Theory because democratic ownership and participation can strengthen accountability and sustainability through member control, economic participation and concern for community (International Cooperative Alliance [ICA], 1995).

3.5 Challenges Affecting Digital Health Cooperatives

Table 7

Challenges affecting digital health cooperatives

Challenge	Implication for PHC transformation
Digital infrastructure gaps	Limits telemedicine, mobile health, data exchange and real-time reporting.
Regulatory limitations	Creates uncertainty on licensing, platform certification, data sharing and accountability.
Digital literacy barriers	Excludes members who cannot use digital platforms effectively.
Data privacy concerns	Reduces trust and creates ethical and legal risks.
Sustainability constraints	Weakens long-term financing and continuity of services.
Limited university-community coordination	Reduces implementation capacity and community ownership.

Source: Field synthesis, 2026.

These challenges show that digital health cooperatives cannot succeed through technology alone. They require enabling policy frameworks, infrastructure investment, interoperability standards, data protection, digital literacy training, cooperative leadership and sustainable financing (World Health Organization [WHO], 2021; International Cooperative Alliance [ICA], 1995). The Digital Health Act, 2023 provides a strong foundation, but implementation requires coordination among universities, cooperatives, county governments, health facilities, communities and technology providers (Government of Kenya, 2023).

3.6 Discussion

The findings demonstrate that university-linked digital health cooperatives provide an innovative model for transforming PHC in Kenya. They bring together four important elements: digital technology, cooperative governance, university expertise and community participation. This combination can improve PHC access, reduce delays, enhance workforce capacity, strengthen financial protection and increase system responsiveness (World Health Organization [WHO], 2021; Government of Kenya, 2023).

The finding on access is consistent with digital health literature showing that telemedicine, mobile health platforms and electronic health systems can reduce geographical and information barriers (WHO, 2021). In Kenya, this is particularly relevant because PHC facilities and health workers are unevenly distributed, and communities often face cost and distance barriers (Okoroafor et al., 2022; World Bank, 2025). Digital health cooperatives can create community-owned platforms that connect members to PHC services, health education and referral support.

The workforce finding is important because universities are central to training, research, innovation and professional development. By linking universities to communities through digital health cooperatives, academic institutions can support PHC beyond

classroom teaching and research publication. They can become direct partners in community health transformation through supervised outreach, digital literacy, telehealth, data analysis and policy support (WHO, 2021; Okoroafor et al., 2022).

The financial protection finding suggests that digital health cooperatives can support members through pooled savings, emergency health funds and cooperative risk-sharing. This is consistent with cooperative principles of mutual support and economic participation (International Cooperative Alliance [ICA], 1995; International Labour Organization [ILO], 2015). However, the model should be linked to formal health financing systems because cooperative schemes may not independently cover high-cost care (WHO, 2025; World Bank, 2025).

The findings also show that digital health cooperatives can strengthen community participation and accountability. Members can participate in decision-making, monitor services, provide feedback and identify community health priorities. This aligns with PHC principles that emphasise community participation and people-centred care, as well as cooperative principles of democratic member control and concern for community (WHO, 2018; ICA, 1995).

However, the identified challenges show that careful implementation is required. Digital infrastructure gaps, weak digital literacy, regulatory limitations, data privacy risks and sustainability constraints can undermine the model. Therefore, policy alignment, university-community partnership, cooperative governance and digital inclusion strategies are essential (Government of Kenya, 2023; WHO, 2021).

4.0 Conclusion and Recommendations

4.1 Conclusion

The paper concludes that university-linked digital health cooperatives offer a viable and innovative pathway for transforming PHC systems in Kenya. By combining digital technologies, cooperative governance, academic expertise and community participation, these models can improve access, efficiency, financial protection, workforce support, health education and system responsiveness. Digital health cooperatives are particularly relevant in the context of Kenya's UHC agenda, Digital Health Act, health workforce challenges and continuing PHC access barriers. They can help bridge gaps between communities and health facilities, strengthen referral systems, promote preventive care and support local accountability. However, their success depends on strong policy support, reliable infrastructure, digital literacy, ethical data governance, sustainable financing and integration into national and county health strategies.

4.2 Recommendations

- i. The Ministry of Health and county governments should recognise digital health cooperatives as complementary community-based models for PHC transformation.
- ii. Universities should establish digital health cooperative hubs to support telemedicine, health education, research, innovation and community outreach.
- iii. Cooperative agencies should develop guidelines for digital health cooperative governance, accountability, financial management and member protection.
- iv. Government and partners should invest in digital infrastructure, especially in underserved communities.
- v. Digital literacy programmes should be implemented to ensure that vulnerable populations are not excluded from digital health services.
- vi. Digital health cooperative platforms should comply with data protection, privacy, interoperability and ethical health information standards.
- vii. Digital health cooperatives should be integrated with formal health financing systems to improve sustainability and financial protection.
- viii. Further research should assess the cost-effectiveness, scalability and long-term impact of university-linked digital health cooperatives in Kenya.

Author Contributions

Dr. Domeniter N. Kathula conceptualised the paper and led the development of the digital health and university partnership argument. Prof. John Cheluget contributed to the cooperative governance, sustainability and institutional transformation sections.

Dr. Daniel A. Otworì contributed to the primary health care, methodology, analysis, tables, figures and policy sections. All authors reviewed and approved the final paper.

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Appendix

Table A1

Proposed university digital health cooperative integration framework

Component	Role	Expected result
University hub	Research, innovation, training and supervision	Stronger workforce and evidence generation
Cooperative platform	Member mobilisation, savings, governance and accountability	Community ownership and financial protection
Digital health tools	Telemedicine, mobile health, digital records and referral systems	Improved access and efficiency
Health facility linkage	Clinical care, referral and quality assurance	Continuity of care
County government support	Policy, infrastructure and integration	Sustainability and scale-up
Community participation	Feedback, uptake and local accountability	Responsive PHC services

Source: Authors' conceptualisation, 2026.