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Review

Entrepreneurship, Innovative Education, and Cross-Sector Collaboration as Catalyst for Sustainable Health System in Nigeria

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ABSTRACT

Background: The challenges of the health system are further exacerbated by the growing impacts of climate change, particularly in northern Nigeria. Climate change-related issues such as heat waves, flooding, and insurgency have worsened the burden of disease and highlighted vulnerabilities in health infrastructure and management structures.

Aims: This study investigated entrepreneurship, innovative education, and cross-sector collaboration as catalysts for a sustainable health system in Nigeria.

Methods: This study adopted a desk research design, sourcing data from Google Scholar, ERIC, JSTOR, Scopus, ResearchGate, and other websites. A total of 20 documents were identified and screened; 10 studies were finally selected because they were written in English, had a clear study purpose, were obtained from the identified sources, met the inclusion and exclusion criteria, and were used for analysis.

Results: The study revealed that entrepreneurship contributes to the sustainability of the Nigerian Health System. Entrepreneurship in healthcare is considered the ability to bridge gaps in health service delivery through market-driven innovations that promote efficiency and responsiveness. The study also found that innovative education influences the sustainability of the health system. The study revealed that cross-sector collaboration catalyses a sustainable health system in Nigeria by introducing market-driven innovation, business practices that enhance health system resilience, improving coordination, and addressing social determinants of health that fall outside the purview of the conventional health sector.

Conclusion: Entrepreneurship, innovative education, and cross-sector collaboration offer a feasible approach to developing a resilient and sustainable health system in Nigeria. When a good environment is created, it enables the promotion of entrepreneurship, innovation, partnerships, and health policies. This study suggests that Nigeria could strengthen the sustainability of its health system by implementing policies and initiatives that promote entrepreneurship, foster innovation in health education, and enhance cross-sector collaboration.

Keywords: *Entrepreneurship; Innovative education; Cross-sector collaboration; Sustainable health; Health system.*

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1. Introduction

Globally, the health sector is undergoing reform as governments confront rising healthcare costs, demographic and epidemiological shifts, technological innovations, and rising citizen expectations. Adding to the climate change confronting Nigeria, especially in the northern part of the country, this has led to a poor health management system and calls for a major overhaul of the sector (United Nations, 2022). For any health programme to be meaningful in curbing challenges, it must be sustainable and managed effectively.

A sustainable health system is a basic requirement for national development, especially when a country faces health challenges that hinder socio-economic development. Good health is very crucial to human beings. According to Ubochi et al. (2019), and Oyibocha et al. (2014), health care in Nigeria is jointly provided by the three tiers of government (federal, state, and local). The health sector in Nigeria has faced many challenges, including inadequate facilities, unprofessional workers, poor financing, and limited access to healthcare services (Effiong et al., 2025; Ubochi et al., 2019). These challenges have been aggravated by several factors, including demographic growth, health issues, and climate change, predominantly in the northern part of Nigeria (United Nations, 2022). Previously, health challenges were tackled primarily through traditional or local approaches that have not yielded the desired results. However, the emergence of entrepreneurship, innovation education, and cross-sector collaboration is considered a catalyst for addressing the challenges facing the health sector, improving the provision of health services, catalysing revolutionary growth, and assembling capital across sectors. These inefficiencies in the health sector have called for entrepreneurship, innovation, education, and cross-sector collaboration. For any country to have a sustainable healthcare system, it must involve entrepreneurship and innovation; hence, its impact on the healthcare system is digital.

In the view of Ward et al. (2025), entrepreneurs in health encourage the development of innovative business models, technologies, and health service delivery models that improve access to basic health services in rural areas. According to Barto et al. (2022), entrepreneurship introduces innovative solutions, new health technologies, and markets for innovation by integrating cross-sector collaboration that improves the sustainability of the health system through an efficient and effective health delivery system. However, the success of entrepreneurship in the health system depends on the innovative skills that equip it with the necessary workforce, professional knowledge and skills, facilities, and other logistics. It also helps advance the current trend toward networks of different value chain participants, such as suppliers, platforms, service providers, and customers, integrated through standard commercial models and data. Edeh and Olumakinwa (2025) state that effective entrepreneurship education promotes critical thinking, problem-solving skills, and the ability to turn ideas into workable health solutions; a key requirement for developing a strong entrepreneurial system that supports innovation.

Further, Omachonu and Einspruch (2010) observe that innovation in the health sector enables health workers to advance action, diagnosis, education, outreach, deterrence, and investigation into health-related issues, thereby improving quality, safety, outcomes, efficiency, and the cost of the health care system. According to Amann, Zanini and Rubinelli (2016), innovative education is crucial for developing future health leaders for the future, including the expertise and skills needed to drive a centralised health system. Innovative education plays a very significant role in building an exceptional health system and advancing human health, particularly in promoting global health (Yao & Zhang, 2023). Further, according to Suryavanshi et al. (2020), the health system that fosters creativity in hospitals and clinics (intrapreneurship or innovation within existing structures) has received much less attention than fostering innovation outside traditional healthcare structures. In the opinion of Mondoux et al. (2017), the health system improves when it integrates the innovative spirit of individuals already working within healthcare systems, rather than fostering innovation and entrepreneurship outside these traditional systems. According to Juzwishin and Bond (2012), all around the world, health systems and health professions education programmes are most certainly integrating elements of intrapreneurial quality improvement into their curricula, but this may not adequately address the emerging needs of professionals to truly engage in novel strategies to combat the wicked problems (an industry term for massive and complex problems that do not have obvious solutions) within medicine and healthcare, while the situation in Nigeria appear to be different from the rest of the world, as the health sector is lacking behind in the area innovative where modern technology will be used in the improving the sector.

Cross-sector collaboration, particularly among the health, education, and non-health sectors, is also essential for achieving health sustainability. Cross-sector collaboration is an association that includes the public, such as government at various levels, corporations, non-governmental organisations, groups, and citizens (Bryson & Crosby, 2015). Moreso, cross-sector collaboration could involve more than two segments, including governmental organisations, NGOs, public-private, public-non-profit, private-non-profit, or public-private-non-profit, to create a stable and functional health system in Nigeria. In a similar vein, Forrer et al. (2014) view the public segment to contain government at all levels, including local, state, and federal. However, in cross-sector collaboration within the health system, sermon among intra-government collaboration is sometimes not the central discussion. The collaboration procedure is usually considered "compulsory" and omits the main issue: cross-sector collaboration. Therefore, cross-sector collaboration in the health system involves aligning, developing, coordinating, allocating resources, leveraging expertise, and implementing policies from the public and private sectors to tackle health challenges.

According to Cheng-Wen et al. (2025), cross-sector collaboration has improved the effectiveness and efficiency of health system resilience, enhanced coordination, and addressed social factors of health that fall outside the purview of the orthodox health sector. Health sector collaboration through joint actions among the entrepreneurship and innovation sectors enhances inclusive energies to fight communicable and non-communicable diseases, thereby confirming the linkage of sectoral efforts in public health (Iloabachie et al., 2025).

However, the study hinged on three theories that provide a solid foundation for its conduct and offer a lens for understanding how multiple factors interact to shape sustainable health systems. Urie Bronfenbrenner's ecological systems theory (1979) emphasises that interconnected layers of the environment influence human development and institutional outcomes. According to the theories, a sustainable health system shapes all levels of health care, including primary, secondary, and tertiary care, and involves health workers and entrepreneurs. This perspective directly informs the analysis of how innovative education and entrepreneurship initiatives operate within broader universal challenges. For example, Ludwig von Bertalanffy's general systems theory (1920) views health as an interrelated system, in which one part influences the others within the entire health sector of the country. This paper examines how cross-sector collaboration is grounded in this background, highlighting the crucial link between the healthcare, entrepreneurship, and innovation sectors in achieving sustainability. The failure and systemic inefficiencies that impede the incorporation of the health sector, and the broken institutional coordination, are reflected in the findings.

The study's emphasis on cross-sector cooperation is supported by this framework, which underscores the importance of connections among the healthcare, education, and economic sectors for achieving sustainability. Systemic inefficiencies that impede optimal health outcomes are reflected in the findings on fragmented institutional coordination and poor organisation in the health sector. Moreover, Vicente Navarro's theory of political economy (1976) provides a major framework for analysing health policies and programmes and for understanding how power and resources are shared to support an effective and efficient health system in the country. This explained the structural deficiencies observed in the study, including insufficient institutional connections, regulatory challenges, and limited access to financing for health-related entrepreneurship. These elements are part of broader socioeconomic and political forces rather than mere technical difficulties.

Most studies tend to centre on one dimension of health practice system reform in areas like entrepreneurship in health services (Ward et al., 2025; Barto et al., 2022), innovation in healthcare services (Omachonu & Einspruch, 2010), or cross-sector collaboration for public service improvement (Bryson & Crosby, 2015; Forrer et al., 2014). Moreover, these studies do not discuss the combination of entrepreneurial, innovative education and cross-sector collaboration, along with communal support mechanisms for health system sustainability. The health sector in Nigeria has faced significant organisational challenges, including poor infrastructure, a shortage of health personnel, and poor government implementation of policies (Effiong et al., 2025). There is also insufficient research on how entrepreneurial, innovative education and cross-sector collaboration have strengthened the suppleness and sustainability of the health system. Therefore, this study examines these gaps by integrating the roles of entrepreneurship, innovative education, and cross-sector collaboration as catalysts for sustainable health systems in Nigeria.

The objective of the study was to examine the role of entrepreneurship, innovative education, and cross-sector collaboration as catalysts for sustainable health systems in Nigeria. The following research questions guided the study:

1. To examine entrepreneurship as a catalyst for a sustainable health system in Nigeria;
2. To analyse innovative education as a catalyst for a sustainable health system in Nigeria;
3. To verify cross-sector collaboration as a catalyst for a sustainable health system in Nigeria.

2. Methods

The study adopted a desk research design. Desk research on desk design involves collecting information from existing literature and other relevant sources. The choice of this research design is due to the study's aim to document patterns, trends, and conclusions that have emerged from past studies on entrepreneurship, innovative education, and cross-sector collaboration as catalysts for a sustainable health system in Nigeria.

Search Strategy

The search strategy used a systematic approach to identify relevant literature. The study sourced its information from academic sources, including Google Scholar, ERIC, JSTOR, Scopus, ResearchGate, and relevant websites. The study used a combination of phrases and Boolean operators, such as entrepreneurship, innovative education, cross-sector collaboration, and sustainable health systems. To ensure recency and relevance, the study considered literature published between 2015 and 2025. However, for the literature review and conceptualisation, some earlier literature was considered. The Boolean strings include:

1. Entrepreneurship education and sustainable health systems;
2. Innovative education and sustainable health systems;
3. Cross-sector collaboration and sustainable health systems.

Inclusion and Exclusion

To ensure the relevance, rigour and transparency of the study, inclusion and exclusion criteria were used:

Under Inclusion Criteria

The studies conducted on entrepreneurship, innovative education, cross-sector collaboration, and sustainable health systems in Nigeria, especially those published in peer-reviewed, credible academic journals, written in English, and of theoretical value or relevance.

Under Exclusion Criteria

The study excludes studies that focus solely on entrepreneurial practices without a health system, as well as documents that lack academic and theoretical value or relevance. The study also excludes articles and documents not in English.

Selection Process

The study gathered and documented 20 articles, and duplicate records were removed. This study screened article titles, abstracts, and purposes to determine their relevance to the study, thereby eliminating irrelevant studies. This was done using inclusion and exclusion criteria to determine the eligibility of the full texts. After the screening process, 10 articles and documents were selected that met the criteria. The remaining 10 studies were assessed against predetermined inclusion and exclusion criteria, resulting in their selection. In the inclusion stage, 10 articles were eligible and used to conduct the study, which served as the basis for the analysis, as shown in Figure 1.

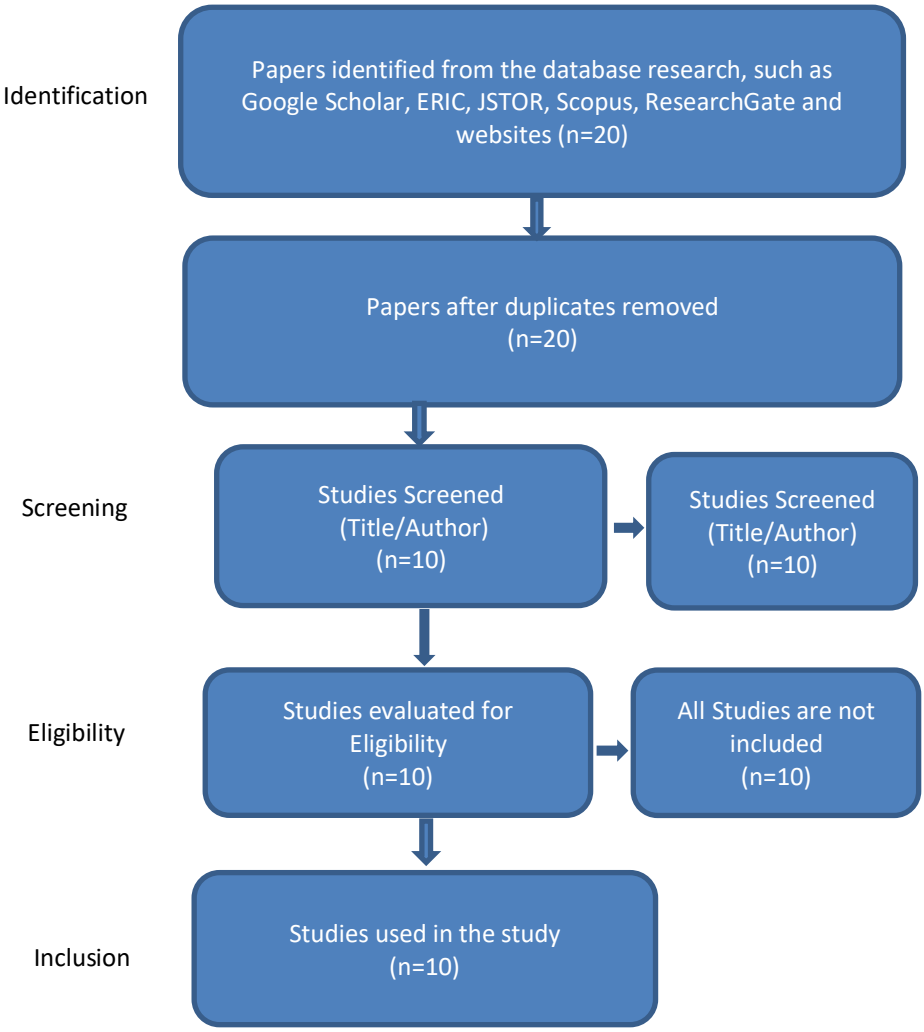

Figure 1. PRISMA flow to set up the study selections following the inclusion and exclusion criteria.

Quality Assessment of Selected Studies

To ensure that the studies measure what they ought to measure and to assess their reliability and credibility, selected studies underwent a quality assessment. Each study was assessed based on the following criteria: objective, method used, significance to entrepreneurship, innovative education, cross-sectional collaboration, sustainable health system, theoretical contributions, and publication sources.

Data Extraction Synthesis

To ensure the rigour and eligibility of the study, two independent experts, chosen from Economics and Measurement and Evaluation, assisted in reviewing the 20 articles against the redefined inclusion criteria, including relevance to sustainable health systems in Nigeria, methodological appropriateness, and in line with the purposes of the study. Any conflicts were resolved through discussion and agreement. A systematic data extraction process was used to capture key details of the selected articles, such as author(s), year of publication, study purpose, sample, research design, research methods, and contextual relevance. This provides consistent categorisation and allows comparison across studies.

The study utilised a thematic synthesis approach to organise the findings. Initial coding of the data was conducted to identify recurring concepts, which were subsequently organised into broader analytical themes. Three major themes emerged from the synthesis: entrepreneurship in sustainable health systems, innovative education in sustainable health systems and cross-sector collaboration in sustainable health systems in Nigeria. The selected studies were synthesised within these thematic categories to identify recurring patterns, relationships, and critical research gaps, thereby providing a coherent and comprehensive understanding of the subject area.

Ethical clearance

This study used secondary data, which does not require ethical clearance. The sources used are available in databases such as Google Scholar, ERIC, JSTOR, Scopus, and ResearchGate, as well as on relevant websites. Also, all sources used in the study are appropriately acknowledged in the reference list. Also, ChatGPT and Grammarly were used to improve grammar and reduce errors.

3. Results

The synthesised evidence shows that entrepreneurship contributes to the sustainability of the Nigerian Health System. Entrepreneurship in healthcare is considered the ability to bridge gaps in health service delivery through creating an efficient health system in Nigeria. According to Ibikunle et al. (2024), entrepreneurship in the health system encourages the development of innovative business models, technologies, and health service delivery approaches that improve individuals' access to basic health services. The review demonstrates that entrepreneurs are driving advancements in the health sector by improving the accessibility and affordability of healthcare solutions and technologies, and by developing marketable solutions to the sector's needs. Barto et al. (2022) states that entrepreneurship helps advance the current trend toward networks of different value chain participants, such as suppliers, platforms, service providers, and customers, integrated through standard commercial models and data. Further, Sulaiman et al. (2025) also reported that entrepreneurship enables cooperative bodies to conduct robust research and build the capacities of health workers, thereby enabling an effective and efficient health delivery system.

The review shows that innovative education influences the sustainability of Nigeria's health system. Studies such as Suryavanshi et al. (2020) and Mondoux et al. (2017) highlight the significant role innovative education plays in the health sector for sustainability. According to them, innovation education fosters creativity in hospitals and clinics (intrapreneurship within existing structures); much less is known about fostering innovation outside traditional healthcare structures. Health system improves when it integrates the innovative spirit of individuals already working within healthcare systems, rather than fostering innovation and entrepreneurship outside these traditional systems. According to Juzwishin and Bond (2012), health systems and health professions education programs are most certainly integrating elements of intrapreneurial quality improvement into their curricula, but this may not adequately address the emerging needs of professionals to truly engage in novel strategies to combat the wicked problems (an industry term for massive and complex problems that do not have obvious solutions) within medicine and healthcare.

Further, the synthesis indicates that cross-sector collaboration catalyses the development of a sustainable health system in Nigeria. Ezenwaka et al. (2025) and Iloabachie et al. (2025) report that introducing market-driven innovation can enhance health system resilience and improve coordination in Nigeria. Furthermore, Onyedinma et al. (2023) reported that cross-sector collaboration enhances holistic efforts to combat infectious and non-communicable diseases by providing the necessary public health facilities. Moreover, Owolabi et. al (2024) found that, through cross-sector collaboration, many private organisations provide health facilities across Nigeria, including health centres. Generally, the synthesis of these reviews indicates that the incorporation of entrepreneurship, innovative education, and cross-sector collaboration delivers an all-inclusive agenda for sustainable, consolidated health systems in Nigeria.

The review found that cross-sector collaboration is a major catalyst for achieving a sustainable health system in Nigeria. `Cross-sector collaboration provides direction among numerous backers, including government agencies, private-sector actors, and non-governmental organisations by simplifying resource mobilisation, information exchange, and procedures (Ezenwaka et al., 2025; Onyedinma et al., 2023).

4. Discussion

According to Endeavour Insight (2020), entrepreneurship and innovative education are driving progress in the segment by refining user-friendliness and integrating healthcare outcomes and expertise. Entrepreneurship and Innovative organisations developed market skills, resulting in tenacious wants. Given the opportunities, challenges, and potential for entrepreneurship and innovative education in the health sector, the following strategies outline how entrepreneurship and innovation could promote sustainable healthcare in Nigeria.

Telemedicine

According to Lalla-Edward et al. (2022), the deployment of telemedicine worldwide through various technologies across different contexts includes mobile applications (apps) designed for smartphones and tablets; SMS or text messaging (Bobrow, et al., 2016) for delivering health reminders, treatment adherence support, and health tips; video conferencing for face-to-face communication between patients and healthcare providers; secure web-based portals. According to Khan et al. (2022), the communication follow-up is the only option for gaining acess medical records, conducting virtual consultations, and communicating by phone in areas with limited internet access. According to Agbeyangi and Lukose (2025), telemedicine innovations are bridging healthcare access gaps, improving patient engagement, and enhancing healthcare system delivery in South Africa, Kenya, and Nigeria.

Technology Innovation in the Healthcare Sector

According to Ene and Ajibo (2023), worldwide, the health system is organised to provide timely, efficient, and effective medical services. However, in Nigeria, the system's imbalances are so disturbing. This could be attributed to poor system coverage and worsened by poor service delivery, which is an unprecedented effect in the provision of healthcare services in low-resource societies. The authors add that equity in healthcare is a core concern in Sustainable Development Goals (SDGs). They also state that technological innovation can help deliver efficient, practical, accessible, and high-quality services to the public. The expansion and growth of the health system in Nigeria are centred on encouraging breakthrough technical know-how for clean, safe medical applications.

Entrepreneurship and an innovative Ecosystem

Support organisations offer many benefits to healthcare companies. Participation in a support program can help to establish credibility, particularly with investors and B2B customers (Endeavour Insight, 2020). In India, the ecosystem of entrepreneurial and innovative healthcare organisations offers several programmes to drive breakthrough results in the emerging healthcare system. According to Sulaiman et al. (2025), entrepreneurship and innovation offer broader opportunities for international organisations to support research and build confidence and capacity among health workers, thereby enabling an effective and efficient health delivery system.

Entrepreneurial Promoting Home-grown Healthcare

In the views of Lawal and Oduyemi (2025), entrepreneurship and innovation roles in the healthcare sector have not gained the attention they deserve. Yet, the focus has principally been on urban centres and the delivery of official healthcare services. This is why Egharevba et al. (2022) observe that entrepreneurship fosters resilient and sustainable development in the health sector. Gusoff and Schickedanz (2023) argue that leveraging innovative financial and entrepreneurial models within the health sector settings can create scalable solutions adaptable to diverse socio-economic contexts.

Public-Private Partnerships (PPPs)

Through PPPs health facilities are provided to the public. Several cross-sectoral organisations often provide drugs, hospital equipment, and other health services across hospitals, clinics, and other health facilities within the community (Owolabi et al., 2024). Some cross-sector initiatives are involved in introducing advanced health technologies. According to Salangwa, Munthali, Mfune, and Nyirenda (2019), integrating PPPs helps to modernise many health facilities within the country.

Challenges of the Sustainable Health System in Nigeria

Nigeria's health system is in a state of deep crisis, marked by decaying infrastructure, inadequate funding, weak governance, and massive inequality in access to healthcare. According to Ezema (2025), the sustainable health challenges in Nigeria include:

Inadequate funding

Finance is crucial to the success of any organisation, such as the health sector. Meanwhile, insufficient resources are a problem in the Nigerian health sector. The amount the Nigerian government spends on the health sector falls short of expectations, as it spent only 5%, which is below the 15% target set by the Abuja declaration (Ezenduka & Onwujekwe, 2025).

Shortage of Health Personnel

No organisation can function perfectly without people to work in it. Likewise, the health sector needs workers to manage its affairs for Nigeria to have a sustainable health system. According to Alawode et al. (2025), several health care systems depend on well-trained workers who manage the affairs of the health centre. However, the situation in Nigeria is abhorrent, as many Nigerian health professionals prefer migrating abroad to work. Hence, this causes a shortage of workforce to handle the health challenges affecting Nigeria at large.

Poor State of Infrastructure Facilities

The gross underfunding of health sector institutions is reflected in the feeble structures and logistical support, which are weak, outdated, and faulty (Omoleke & Taleat, 2017). Omoleke and Taleat further add that these challenges accumulated into problems such as inadequate maintenance of structures, medical equipment, and automobiles, inadequate drugs, poor storage and organisation of drugs, continued use of old drugs and outdated health facilities.

Insecurity

Security is crucial to every human being on earth; without it, no individual will feel safe or comfortable working. This also applies to the health sector. The prevalence of insecurity challenges in Nigeria has led many health workers to accept postings or employment in certain areas. More, Omoleke and Taleat (2017) observe that in a condition where many health workers are taking hostage and heavy ransom are demanded before releasing them, kidnapping and bumping are continuous daily or weekly occurrence, implementation of health policy in such hostile environments is a mirage/ruse and is handicapped as no doctors, pharmacists, nurses, image scientists and laboratory technologists or Chief Medical Directors would want to lose their life untimely or prematurely, nobody will be willing to work there.

5. Conclusion and Recommendations

The complementarity among entrepreneurship, innovative education, and cross-sector collaboration offers a feasible approach to developing a resilient and sustainable health system in Nigeria. The sustainable development of the healthcare system is thus not the government's duty but a collective responsibility that requires collective action. Despite this study's contributions, it has several constraints. This paper relies primarily on secondary data sourced from previously published literature, which may hinder the capacity to arrest current advances in Nigeria's health system. Further, the ten articles used in the study are insufficient to draw broad conclusions about the country. The study's failure to use primary data from healthcare professionals, legislators, and business owners limited the empirical validity of its conclusions. Only articles published in English-language journals were included in the study, and some databases might have overlooked pertinent research. Further research could be conducted using more sophisticated methodologies, including surveys and mixed-method designs, to provide deep insights into how entrepreneurship, innovative education, and cross-sector collaboration influence sustainable health systems in Nigeria.

Based on the conclusion, it was recommended that:

a. Nigerian Government, through the national assembly, should make laws and policies that support an effective health system for all citizens, which align with the entrepreneurship and innovation programmes in the health sector reforms. The regulatory bodies should formulate a framework for health start-ups, digital health technologies, and medical devices that is streamlined to eliminate bureaucratic hurdles while ensuring quality and safety. This will promote investment and the adoption of innovations.

b. Universities and their colleges of health sciences could also integrate entrepreneurship and innovation education into their health-related programmes to create educational awareness. This should cover hands-on training in problem-solving, design thinking, digital health, health economics, and business development. Enhancing linkages between health institutions and industries will ensure that health graduates possess the skills to address contemporary healthcare issues.

c. The Federal, State, and Local Governments should strengthen and formalise Public-Private Partnerships to enable them to provide infrastructural facilities, such as telemedicine, mobile hospitals that would enhance health services delivery. This could be done through investment in hospital infrastructure, diagnostic equipment, telemedicine services, and pharmaceutical manufacturing. There should be effective governance structures to ensure accountability and sustainability in these partnerships.

d. The Nigerian government should expand digital health technologies such as telemedicine, electronic medical records, and mobile health applications, especially in rural and underserved areas. Investment in broadband and digital literacy initiatives will improve the impact *of* these innovations and help close the healthcare gap.

Conflict of Interest

The authors declared that there was no conflict of interest; they received no funding from any individuals or organisations to motivate them to carry out the study.

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