

Unlocking Potentials of Smart Libraries: A Catalyst for Sustainable Development in Nigeria

By

Dahiru Adam Labaran CLN.

Department of Library and Information Science,
Federal University of Education, Zaria
adamlabarandahiru@gmail.com, 08035940279

Azumi Adamu Abdullahi CLN

University of Library, Federal University of Education, Zaria
adamuazumi87@gmail.com, 08065271387

Bikisu Abubakar Uwaisu CLN

University of Library, Federal University of Education, Zaria
adamuazumi87@gmail.com, 07033400688

Abstract

As the most populous country in Africa and the largest economy, Nigeria has a lot of problems with development, such as not enough education, economic inequality, and a digital divide that affects everyone. While traditional libraries are useful, they often don't have the tools they need to meet the changing information needs of the 21st century. This article looks at how smart libraries could change Nigeria's infrastructure to help with sustainable development. Smart libraries can help the United Nations reach its Sustainable Development Goals (SDGs), especially Quality Education (SDG 4), Decent Work and Economic Growth (SDG 8), and Reduced Inequalities (SDG 10). They do this by using technologies like the Internet of Things (IoT), automated systems, and large digital repositories. This paper looks at the many ways that smart libraries can help, talks about the problems with using them in Nigeria, and ends with a call for strategic investment and policy support to make the most of their potential for national development.

Keyword: Unlocking, Potential, Smart Libraries, Sustainable Development, Nigeria

Introduction

In today's global economy, which is based on knowledge, having access to timely and useful information is essential for both national progress and personal empowerment. Nigeria is a country that wants to diversify its economy and make society more fair. For Nigeria, sharing knowledge well is not a luxury but a need. For a long time, traditional libraries have been places where people can learn and share culture. But in a time when technology is changing quickly, their old way of doing things having physical collections with limited hours isn't working as well as it used to (Johnson, 2021). But libraries are changing from just places to store books into places where people can learn and grow. Smart libraries that use Information and Communication Technologies (ICT) like artificial intelligence (AI), the Internet of Things (IoT), and digital repositories can help

with sustainable development in a big way. Smart libraries have a lot of potential to help Nigeria reach the United Nations' Sustainable Development Goals (SDGs) by 2030. This is because more than 200 million people in Nigeria are dealing with problems like poverty, unequal access to education, and environmental degradation.

The rise of the "smart library" is a big change. A smart library is more than just a library with computers. It is a user-centered, technology-integrated ecosystem that makes it easy to get to information resources, both physical and digital, whenever you need them. It uses automation, data analytics, and connectivity to make a learning space that is responsive and open to everyone. This article contends that the strategic development and implementation of smart libraries throughout Nigeria can act as a significant catalyst for sustainable development, directly addressing critical national priorities and aligning with the UN's 2030 Agenda for Sustainable Development.

Defining the Modern Smart Library

Smart libraries are where traditional librarianship and cutting-edge ICT come together. They offer seamless, user-centered services that go beyond physical boundaries. Some of the main parts are automated services like self-checkout kiosks and virtual reference desks, IoT-enabled resource tracking using radio-frequency identification (RFID), and AI-driven personalization for resource recommendations (Anyira et al., 2023). These components, which are part of the SMART framework (Services, Methods, Automation, Resources, and Technology), make it possible to access e-books, databases, and collaborative platforms 24/7. This cuts costs and boosts efficiency (Anyira et al., 2023). Also, a smart library uses cutting-edge technologies like the Internet of Things (IoT), artificial intelligence (AI), cloud computing, and high-speed internet to offer information services that are easy to use, tailored to each user, and always available (Xu et al., 2020). These places are not like regular libraries because their collections don't define them; instead, their connectivity and ability to empower users do. Some of the features could be AI-powered research assistants, digital lending platforms for e-books and academic journals, smart learning spaces with VR and AR tools, automated inventory systems, and access to high-performance computing and digital skills training for the whole community.

In Nigeria, where libraries have always had trouble getting enough money and building good facilities, switching to smart models is not only new, it's also necessary. Smart libraries make knowledge available to everyone by digitizing collections and letting people access them from anywhere. This is especially important in rural areas where physical infrastructure is lacking (Nwankwo et al., 2020). This integration supports wider sustainable knowledge societies by encouraging digital literacy and fair access to information. This is in line with global trends toward smart urban ecosystems (Adeleke et al., 2025).

In other ward the concept of a smart library transcends simple digitization. It shows a complete rethinking of the library's purpose and shape. Some important features are:

- Self-service and automation: Radio-Frequency Identification (RFID) technology allows for automated check-in and check-out of materials, freeing up librarians to focus on higher-value user engagement and research support.
- Digital Repositories and E-Resources: Access to vast online databases, e-books, academic journals, and multimedia content is central, breaking down the physical limitations of shelf space.
- Internet of Things (IoT) Integration: Sensors can monitor and control building conditions like lighting and temperature for energy efficiency and user comfort, while also enhancing security.
- Makerspaces and Innovation Hubs: Many smart libraries incorporate collaborative spaces equipped with tools like 3D printers, laser cutters, and coding software to foster creativity, innovation, and practical skills development.
- Data Analytics: By analyzing user behavior and resource utilization, libraries can tailor their collections and services to meet the specific needs of their communities more effectively (Johnson, 2021)

Nigeria's Sustainable Development Imperative

A growing youth population contrasted with high unemployment (over 33%), poor literacy rates (59%) and susceptibility to climate change, including flooding and desertification, characterize Nigeria's path toward sustainable development (Ogunmodede et al., 2023). Implementation of the SDGs is hindered by information asymmetries, which cause farmers to lack market data, students to miss digital tools, and communities to struggle with health disinformation. As "gateways to information," libraries play a crucial role in filling these gaps by repackaging knowledge into easily accessible media, like digital resources in the local language (Ogunmodede et al., 2023).

This function is enhanced by ICT integration in Nigerian libraries, which makes it possible to provide services like institutional repositories and online public access catalogs (OPAC), which protect local knowledge while encouraging innovation (Friday & Oweibo, 2023). Consequently, to improve employability and economic resilience, academic libraries at schools such as Obafemi Awolowo University have implemented blended learning platforms

This development turns the library into an active hub for knowledge creation and skill development rather than just a passive collection of books.

Advancing Health and Well-Being (SDG 3)

Misinformation contributes to the persistence of health issues including maternal mortality. According to Nwankwo et al. (2020), ICT tools facilitate remote consultations, which reduces urban-rural inequities and aligns with SDG 3 aims. In order to support community clinics and awareness campaigns, smart libraries distribute preventive care guidelines via video conferencing and e-health databases (Ogunmodede et al., 2023).

Impact on Quality Education (SDG 4)

Over 10 million children in Nigeria are not attending school, despite the fact that education is the foundation of sustainable development. In order to combat this, smart libraries offer information literacy programs, virtual tutorials, and e-learning resources that give students and lifelong learners digital skills (Onwubiko, 2021). Librarians teach users how to use databases through selective dissemination of information (SDI) and current awareness services, which increases research output and vocational training (Onwubiko, 2021). In order to promote a knowledge society that supports egalitarian education, experts in Oyo State academic libraries place a strong emphasis on user training using AI tools (Adeleke et al., 2025). The promotion of high-quality education and lifelong learning is where smart libraries have the biggest direct influence (SDG 4). Smart libraries help democratize access to top-notch information in Nigeria, where educational resources are frequently concentrated in urban areas and underfunded institutions. Through a local smart library portal, students in remote locations can access the same e-books and intellectual journals as their peers at prestigious universities. This promotes curriculum development and high-quality research while filling a significant resource gap.

Additionally, smart libraries serve as centers for lifetime and career learning. They offer free access to skills-based training, digital literacy initiatives, and online courses (MOOCs), all of which are critical for today's workforce. According to Adebayo (2022), "the integration of digital learning platforms within community library structures is crucial for equipping Nigerian youth with the competencies required to compete in a globalized economy, thereby enhancing the overall quality of the national education system". Smart libraries become essential cornerstones of a national knowledge economy by assisting students of all ages, from elementary school students to mature professionals looking to advance their skills.

Bridging the Digital Divide Fostering Economic Growth and Innovation (SDG 8)

A large section of Nigeria's population, especially in rural regions, lacks access to high-quality information and communication technology (ICT), contributing to the country's severe digital divide. By offering computers, digital literacy instruction, and free or inexpensive internet access, smart libraries can act as neighborhood digital oases. By guaranteeing inclusive and equitable education and encouraging possibilities for lifelong learning for everyone, they thereby directly support *SDG 4: Quality Education* (United Nations, 2015). This democratizes information and levels the playing field in education by enabling students in distant villages to access the same online academic resources as students in Lagos.

Forty percent of Nigerians suffer from hunger as a result of agricultural inefficiency. Through collaborations with extension agents, smart libraries empower farmers by providing ICT-enabled extension services, including smartphone apps for market prices and agricultural yields (Lyaka et al., 2020). The Federal University of Technology Owerri's libraries improve food security and good work possibilities by repackaging agricultural data into multimedia formats (Lyaka et al.,

2020). Similarly, by providing youth with access to financial resources, employment portals and entrepreneurship webinars through library platforms support SDG 8 (Nwankwo et al., 2020).

As essential elements of regional and national innovation ecosystems, smart libraries are becoming more widely acknowledged for their direct support of Decent Work and Economic Growth (SDG 8). Aspiring entrepreneurs and small company owners would not otherwise be able to afford the low-cost access to equipment and technologies made possible by makerspaces at libraries. This effectively lowers the barrier to entry for innovation by allowing anyone to learn how to code, prototype a new product, or work with others on a tech startup (Davies, 2020).

Additionally, these libraries are essential hubs for Small and Medium-Sized Businesses (SMEs), the foundation of Nigeria's economy. Smart libraries enable entrepreneurs to make well-informed decisions, strengthen their business plans, and become more competitive by giving them access to business periodicals, intellectual property resources, and market research data. Libraries, "provide access to information that is critical for supporting innovation, research, and the development of new businesses, thereby acting as incubators for economic growth" (IFLA, 2018).

Driving Economic Empowerment and Innovation (SDG 8 & 9)

Economic vitality is intrinsically connected to sustainable development. SDGs 8: Decent Work and Economic Growth and SDG 9: Industry, Innovation, and Infrastructure can both be fostered via smart libraries. These libraries reduce the barriers to entry for innovation by giving entrepreneurs and small and medium-sized businesses (SMEs) access to business development materials, market research data, and online collaboration tools (Edoka, 2020). In order to prepare the Nigerian workforce for the Fourth Industrial Revolution, they can also hold seminars on emerging technologies, data analytics workshops, and coding boot camps.

Reducing Inequalities (SDG 10)

The ability of smart libraries to lessen ingrained inequality is arguably one of their most significant effects in Nigeria (SDG 10). One of the main causes of social and economic inequality is the "digital divide," which is the difference between those who have access to contemporary information technology and those who do not. By offering computer access, high-speed internet, and training in digital literacy at no cost or at a reduced cost, smart libraries directly address this problem.

The smart library can be a lifesaver for people with impairments, those living in rural locations, or those living in low-income communities. It provides a secure and welcoming environment for applying for jobs, connecting with family, using government services online, and engaging with the digital world. Users with visual or auditory impairments can access resources by integrating assistive technologies. Smart libraries empower marginalized populations and advance social fairness by guaranteeing that financial status or geographic location does not dictate an individual's access to information (Nkosi, 2021). In essence, they are effective instruments for creating a society that is more equitable and inclusive.

Environmental and Social Sustainability (SDGs 13, 15, and 16)

Libraries use IoT for resource monitoring to reduce ecological footprints and host digital forums on adaption options as part of climate action (Anyira et al., 2023). According to Friday and Oweibo (2023), the preservation of indigenous knowledge through repositories fosters peace through information equity (SDG 16) and safeguards biodiversity (SDG 15).

Challenges and the Way Forward

Despite the potentials of smart libraries for sustainable development, in Nigeria, there are many impending obstacles to ICT adoption, including inconsistent electricity, limited digital literacy, and a lack of finance (Onwubiko, 2021). Training issues are highlighted by the fact that 35.7% of library heads in Enugu State report not being conversant with the SDGs (Onwubiko, 2021). The deployment of smart libraries in Nigeria is not without difficulties, despite its enormous potential. The main challenges consist of:

Funding and Infrastructure: Nigeria's unstable power grid, erratic internet access, and the large initial financial investment needed for technology provide a major challenge.

Digital Literacy: The capacity of patrons to use a smart library's systems is essential to its success. It is imperative that the public and library employees receive widespread training in digital literacy.

Maintenance and Sustainability: Beyond initial setup grants, a sustainable funding mechanism is needed to ensure long-term maintenance, software updates, and hardware replacements.

It takes a multi-stakeholder strategy to overcome these obstacles. Smart library initiatives can be funded and managed through Public-Private Partnerships (PPPs), which can take advantage of the private sector's resources and experience. Libraries must be acknowledged as essential elements of the national development strategy, and the government must provide a supporting policy framework that gives digital infrastructure top priority. Before a statewide rollout, a phased implementation that begins with pilot projects in key places might allow for learning and adaptation. Public-private partnerships for broadband, curriculum improvements for LIS professionals, and government investment in solar-powered infrastructure are among the recommendations (Anyira et al., 2023; Adeleke et al., 2025).

Conclusion

Smart libraries are revolutionary spaces that have the potential to hasten Nigeria's transition to sustainable development; they are much more than a technology advancement for national development. They clearly align with the fundamental principles of the UN SDGs by improving the quality of education, encouraging economic innovation, supporting health and well-being (SDG 3), lowering significant social inequities, and advancing environmental and social sustainability (SDGs 13, 15, and 16). Funding, infrastructure, and literacy issues are real, but they are not insurmountable. Nigeria can use smart libraries to unlock the enormous potential of its people and create a more informed, creative, and just future for everybody if it has a strategic

vision, works with others to invest, and has strong policy backing. Therefore, funding smart libraries is an investment in the very framework of a wealthy and sustainable Nigeria. They may change communities by supporting SDGs, from creative classrooms to farms free of hunger. To ensure that no one is left behind in the digital age, stakeholders must give finance and training top priority. Smart libraries are prepared to light the way as Nigeria moves closer to 2030.

References

- Adebayo, E. B. (2022). Bridging the educational divide: The role of digital libraries in Nigerian higher education. *Journal of African Information Studies*, 14(1), 39-52. <http://doi.org/10.1007/s13410-022-00123-x>
- Adeleke, K. W., Bello, A. A., & Ayodele, T. A. (2025). Roles of library professionals in developing smart libraries for sustainable knowledge societies in academic libraries in Oyo State, Nigeria. *COEASU Erudite Journal*, 6(1). <https://doi.org/10.2023/j7gj7n09>
- Anyira, I. E., Kalu, C. O., & Usiedo, B. A. (2023). Smart libraries: The present and future of Nigerian libraries [Conference paper]. Nigerian Library Association Edo State Chapter Conference/AGM, Wellspring University, Benin City, Nigeria. https://www.researchgate.net/publication/374135014_smart_libraries_the_present_and_future_of_nigerian_libraries
- Davies, C. L. (2020). From books to bots: Makerspaces as engines of entrepreneurial activity in public libraries. *Journal of Business & Technology Librarianship*, 35(4), 301-315. <https://doi.org/10.1080/01962670.2020.1819123>
- Edoka, B. E. (2020). Introduction to library and information science. Onitsha: Rex Charles & Patrick.
- Friday, J. E., & Oweibo, F. O. (2023). The role of information and communication technology in sustainable development: The input of Nigerian academic libraries. *Library Philosophy and Practice (e-journal)*, 8095. <https://digitalcommons.unl.edu/libphilprac/8095>
- International Federation of Library Associations and Institutions. (2018). Access and opportunity for all: How libraries contribute to the United Nations 2030 Agenda. IFLA. <https://www.ifla.org/publications/node/92874>
- Iwhiwhu, E., & Okorodudu, P. O. (2012). Public library information for sustainable agricultural development in Nigeria. *Library Philosophy and Practice (e-journal)*, 2012. <https://digitalcommons.unl.edu/libphilprac/2012>
- Johnson, A. O. (2021). The evolution of the smart library: A framework for the 21st century. *Library Hi Tech News*, 38(5), 7-12. <https://doi.org/10.1108/LHTN-04-2021-0041>

- Lyaka, M., Mbagwu, F. C., Kiwelu, E. J., Nyantakyi-Baah, L., & Holmner, M. (2020). Achieving sustainable development goals two and three: Role of academic libraries. *Library Philosophy and Practice (e-Journal)*. <https://digitalcommons.unl.edu/libphilprac/3995/>
- Nkosi, M. K. (2021). The digital divide in sub-Saharan Africa: The role of public access institutions in promoting social inclusion. *Information Development*, 37(2), 250-265. <https://doi.org/10.1177/0266666920958761>
- Nwankwo, N. G., Ismaila, O. S., Seimode, D. F., & Eda, R. (2020). Information and communication technology (ICT) in Nigerian libraries for sustainable development goals (SDG). *Library Philosophy and Practice (e-journal)*, 2020, Article 4474. <https://digitalcommons.unl.edu/libphilprac/4474>
- Ogunmodede, T. A., Adio, G., Aboyade, M. A., Ebijuwa, A. S., & Oyetola, S. O. (2023). The role of library and information services in achieving sustainable development: Issues and challenges. *International Journal of Library and Information Science Studies*, 9(2), 30–40. <https://doi.org/10.37745/ijliss.15/vol9n23040>
- Onwubiko, E. C. (2021). Role of librarians and libraries in the realization of the United Nations Sustainable Development Goals: An empirical study. *Library Philosophy and Practice (e-journal)*, 2021, 6497. <https://digitalcommons.unl.edu/libphilprac/6497>
- United Nations (2015). Transforming our world: The 2030 Agenda for Sustainable Development. Department of Economic and Social Affairs. <https://sdgs.un.org/2030agenda>
- Xu, C., Pei, L., & Liu, Y. (2020). The construction of smart library in the era of artificial intelligence. *Journal of Academic Librarianship*, 46(6), 102253. <https://doi.org/10.1016/j.acalib.2020.102253>