

# Digitizing African Libraries for Sustainable Educational Advancement: Opportunities, Challenges, and Policy

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**Abstract:** In this study, the topic of digitizing African libraries for sustainable educational advancement: opportunities, challenges, and policy was discussed. Objectives of the study are: to examine the current state of library digitization across African countries, assess the role of digital libraries in improving access to educational resources for students, researchers, and educators in Africa, identify the major opportunities presented by library digitization for sustainable educational development in African communities, investigate the challenges affecting the digitization of African libraries, explore policy frameworks and government initiatives that support or hinder library digitization in Africa, and to propose policy recommendations and strategic models for strengthening library digitization as a tool for sustainable educational advancement in Africa. A pure literature review research design will be employed as this will enable the researcher to critically examine the state of affairs in Africa in terms of library digitization. In this review of the existing literature, scholarly articles, official policy papers, institutional reports, and studies conducted in various parts of Africa will be considered. According to the literature reviewed, despite the efforts by various countries to adopt digital systems in their libraries, the process is facing numerous challenges such as lack of proper infrastructure, insufficient funds, weak technical skills, poor power supply, and inadequate internet connectivity. Digitizing African libraries can help promote sustainable education through improved access to learning materials, preservation of indigenous and other relevant scholarly materials, facilitating distance education, bridging educational divides, enhancing visibility, and promoting research among others. Besides, the literature indicates that the policy environment plays an important role in shaping outcomes, with conducive ICT, education, and library policies being crucial facilitators while fragmented policy frameworks are likely to impede digitization processes.

**Keywords:** African libraries; digitization; digital libraries; sustainable education; policy and educational advancement

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## 1. Introduction

The digitization of libraries has become an indispensable part of information and knowledge preservation, information equality and educational development for sustainability in the twenty-first century. The transition from traditional libraries to digital or hybrid libraries is being realized across the world to accommodate the changing requirements of learning and researchers in contemporary times. In Africa, however, the digitization process assumes far more importance as libraries here continue to play pivotal roles in academic development, community learning and national development. In this regard, the digitization of African libraries has become

important because the education systems of several African nations find themselves facing rising numbers of students, lack of adequate infrastructure, high costs of print media and increasing demands for remote access to information (Alemna & Sam, 2021; IFLA, 2023). The topic of library digitization in African nations can be seen to overlap the domains of information sciences, policy making, digital inclusiveness and development studies. Library digitization may be defined as the process wherein the information and resources housed in conventional libraries are digitized using various forms of technology. Digital libraries are further characterized as the process of organizing these digital resources in electronic form and providing users access to these digitized collections via online and offline methods. In Africa, library digitization has implications that go beyond simple modernization, as in many cases, digitization is necessary for addressing certain developmental gaps. For instance, most learning institutions in Africa continue to experience inadequate print resources, outdated learning materials, insufficient subscriptions to journal databases and poor collaboration among institutions with similar libraries (Mutshewa, Bwalya, & Hoskins, 2022). Digital libraries may help address the problem of access to textbook, theses, journal articles, open educational resources, government publications, indigenous knowledge resource materials and archives irrespective of location (ibid).

In recent years, the development of digital library systems has been of great importance in Africa owing to certain circumstances. For instance, the outbreak of the coronavirus pandemic revealed how fragile the education systems were relying on only face-to-face service and print materials. During the closures of institutions, universities and schools were left unable to facilitate learning because their digital infrastructures were inadequate (UNESCO, 2022). The crisis, however, proved valuable lessons of how useful online repositories, remote library facilities, electronic database services and mobile learning platforms could be (ibid). In light of these experiences, policies makers, academic institutions and international development agencies have placed increased focus on transforming their education and knowledge infrastructure digitally. Digitized libraries have come to be regarded as essential tools in helping achieve quality education, lifelong learning and innovation as per the UN Sustainable Development Goal #4 (United Nations, 2023). In terms of current status, however, there are major differences in the extent of digitization across African nations. In some countries such as South Africa, Kenya, Egypt, Nigeria and Ghana, some university libraries and national libraries have achieved noticeable progress regarding digitizing institutional repositories, digitizing rare collections and subscribing to electronic databases. Moreover, many academic libraries now offer access to public catalogues, digital theses and open access repositories thanks to improvements in library digitization technology and Internet connectivity (Ezema, Ugwu, & Eze, 2021; Ocholla & Shongwe, 2021). However, in several other countries and institutions, there continues to be fragmentation, dependency on foreign funding and small-scale projects (Tchangalova & Moyo, 2024).

In spite of these gaps, the capacity of digital libraries to enhance access to educational resources in Africa can be considerable. For learners, digital libraries decrease their reliance on the limited physical copies of texts and provide convenient access to learning materials anytime and on multiple devices. For researchers, digital libraries increase their visibility in academic space, provide greater access to research products globally, and support collaboration via institutional repositories and digital archives. For educators, digital platforms offer new opportunities to work with updated teaching materials and implement OERs in class activities (Aina, 2019; UNESCO, 2023). In general, digitization opens many doors to democratization of access to information as people with disabilities, living far away, or belonging to economically disadvantaged communities gain access to resources which used to be unavailable before. Digitization also contributes to the preservation and spread of unique information – such as records related to African history, indigenous cultures, and traditional knowledge bases. However, achieving these outcomes is possible only when certain problems are solved. Specifically, digitization of African libraries is hindered by a range of factors including poor access to electricity and broadband networks, inadequate financing, lack of qualified staff, weak digital preservation strategies, copyright restrictions, and lack of maintenance (Munyua & Stilwell, 2020; Igbinovia, 2022). Besides, the work of librarians in some institutions may be negatively impacted by opposition to technology, lack of management support, or absence of proper strategy for digitization. In other institutions, challenges include outdated hardware and software, risks associated with cybersecurity, and poor digital literacy among users. These facts

suggest that digitization should not be viewed as merely a process of scanning but rather as an institutional reform involving investment in infrastructure, capacity building, and strategy implementation.

Policy initiatives, digital transformation agendas, education sector plans, and similar documents play a decisive role in promoting digitization of libraries or preventing it from progressing successfully. National ICT policies, higher education reforms, open access mandates, copyright legislation, data protection regulations, and funding models affect the prospects of digital transformation in one direction or another. Indeed, some African countries have already started including libraries in their digital transformation agendas and educational development plans. Meanwhile, regional organizations and international development agencies have provided additional support to digital transformation in such areas as open science, digital inclusion, and educational technology, which also benefits the digitization of libraries (African Union, 2024; World Bank, 2023). However, such policy initiatives as there are remain inconsistent and tend to marginalize libraries. As a result, many digitization projects fail to go beyond single initiatives because they do not receive appropriate support at the institutional level or national scale. The proposed study, however, intends to analyze all the aspects related to digitization of African libraries in order to provide a comprehensive insight into how such projects can contribute to sustainable educational advancement. Specifically, this study will investigate the current trends and patterns associated with digitization in African countries. It will assess the contribution made by digital libraries to sustainable educational advancement via improved access to educational resources. Finally, it will evaluate the opportunities available, the challenges facing digitization, and existing policies that should be taken into account. Most importantly, the study will contribute policy recommendations and conceptual models.

The importance of this topic stems from the fact that sustainable educational advancement in Africa is inseparably connected with sustainable access to information. With growing knowledge economy and increasing focus on digital learning, libraries need to be rethought and reconfigured into digital learning environments that can support teaching, research, innovation, and community development. In short, digitization of libraries in Africa has much to do with educational justice, cultural preservation, and development strategy. The current situation calls for a more profound analysis.

### **Objectives of the Study**

1. To examine the current state of library digitization across African countries.
2. To assess the role of digital libraries in improving access to educational resources for students, researchers, and educators in Africa.
3. To identify the major opportunities presented by library digitization for sustainable educational development in African communities.
4. To investigate the challenges affecting the digitization of African libraries.
5. To explore policy frameworks and government initiatives that support or hinder library digitization in Africa.
6. To propose policy recommendations and strategic models for strengthening library digitization as a tool for sustainable educational advancement in Africa.

## **2. Research Methodology**

A qualitative literature review methodology will be employed in the present study with an aim to discuss the issue of digitization of African libraries as a way of promoting sustainable educational advancement. No primary data collection or statistics are necessary for the completion of this work. Literature search was carried out using scholarly online sources like Google Scholar, JSTOR, Scopus, Web of Science, and institutional databases. Policy papers, government publications, UNESCO documents, and records of libraries' organizations regarding digitization and educational advancement in African states were used for identification of relevant sources for the literature review. Publications about the present state of library digitization in Africa, its contribution to providing educational resources, the possibilities that have been created due to digitization of libraries, the difficulties connected to the issue, and supportive policies concerning the process under discussion were identified through the literature review process. Sources have been chosen according to their relevance, reliability, currency, and pertinence to the topic and goals of the paper. A thematic content analysis

method was applied in this research. The themes were developed in accordance with the aims of the research paper, such as the status of digitization, possibilities that were created, the role in access to education, barriers, supportive policies, and recommendations. Thus, the use of the methodology makes it possible to understand trends in the issue, identify gaps, and find answers to the posed questions in relation to library digitization in Africa.

### **3. Literature Review**

#### **The current state of library digitization across African countries**

Digitization of libraries in African countries is one of the rapidly developing trends in recent decades due to necessity to preserve unique cultural heritage, improve access to relevant information, and support scientific work in modern conditions. On the other hand, existing studies prove that digitization in various African countries is far from being evenly distributed due to disparities in terms of resources, funding, policies, etc. Thus, the overall situation with the digitization of libraries in Africa can be characterized by both positive developments and certain structural problems. According to recent literature, one of the key issues connected with library digitization in Africa lies in its redefinition. While initially considered as just another technological process of scanning different materials, digitization was soon recognized as an integral part of the library's function related to access, preservation, and equality in the distribution of knowledge (UNESCO, 2015). The main impact on the discussed transformation was exerted by the UN recommendation regarding preservation and access to documentary heritage. The document stated that digitization was essential to preserve the memory of institutions and enhance accessibility. These objectives have become crucial priorities for the development of libraries in Africa since there were a lot of rare manuscripts, government documents, and local press that could deteriorate in the course of time.

Based on recent research, one can say that library digitization is currently most successful in countries where the higher education system is strong and the ICT infrastructure is quite stable. Among these countries are South Africa, Kenya, Nigeria, Egypt, and Ghana (Bangani, 2018; IFLA, 2021). At the same time, digitization initiatives in these states are actively implemented by universities' libraries through the use of institutional repositories, digital theses and dissertations, and various other projects. For instance, South African universities are regularly mentioned in scholarly papers as regional examples of successful library digitization due to better access to broadband, more active repository activities, and open access policies. However, even in these cases, literature states that digitization in African libraries is project-based. Libraries in various countries lack sustainable practices of digitization due to their dependency on external funding (EIFL, 2022; IFLA, 2018). As a result, there are cases when libraries in Africa lack digitization because of their lack of necessary equipment, unstable electricity, poor connection, or insufficient technical skills of staff. The issue is explained by the fact that the digital transformation across the continent is associated with numerous structural disparities, which include those affecting libraries (The African Union, 2020).

Another key finding in existing literature is associated with staff skills required to effectively perform digitization initiatives. According to studies, successful digitization requires employees who know how to develop metadata, preserve documents, handle copyrights, administer repositories, etc. In Africa, however, many libraries lack people who have relevant knowledge or skills (Chisita, 2020; IFLA, 2023). Capacity-building initiatives initiated by various organizations, such as EIFL or IFLA, have already improved the issue, but it still persists. Moreover, training programs for librarians are predominantly provided to academic libraries, while public and rural libraries do not get equal attention in that regard. Finally, some scholars emphasize that there are various legal and policy-related obstacles to successful digitization, including copyright restrictions, lack of digitization policies in some African countries, and poor digital preservation policies (UNESCO, 2021). Such problems cause significant issues since there is a risk that the materials digitized will be lost, will not be interoperable, or will not be accessible. Therefore, experts stress that success in digitization cannot be evaluated by just counting scanned materials; discoverability, usability, and availability should also be considered. The COVID-19 pandemic has intensified the interest in library digitization due to increased vulnerability of libraries in print form (IFLA, 2021). During the discussed period, many libraries in Africa have

enhanced remote access tools, teaching, and research materials in digital form, as well as online service delivery. However, the pandemic has revealed that there was still a digital divide in many parts of the continent.

In summary, the current state of digitization of libraries in Africa can be described as progressing, but uneven. Significant achievements were reached in academic and research libraries, while others still require additional funding and staff training. In addition, successful digitization implies effective implementation of sustainable practices as well as adequate ICT infrastructure and policies.

### **Role of digital libraries in improving access to educational resources for students, researchers, and educators in Africa**

Digital libraries represent an emerging tool that promotes access to academic materials in the context of higher education and research systems in Africa. Generally, digital libraries refer to collections of digital materials such as e-books, institutional repositories, digitized theses, multimedia, open-access articles, and other digital content accessible via networks. According to recent scholarly discussions, in Africa, digital libraries contribute to overcoming challenges related to inadequate print collections, poorly funded physical libraries, and inequitable access between urban and rural universities (Hodgkinson-Williams & Arinto, 2017; UNESCO, 2023). An overarching theme in the literature is that digital libraries enhance **\*\*access equity\*\*** by making available academic material beyond conventional libraries. Many African institutions, especially smaller ones, have had problems ensuring that students and faculty have sufficient access to print collections due to budget constraints. Digital libraries solve this problem, allowing users to gain remote access to e-book collections, institutional repositories, digital archives, and online journals, which usually costs less compared to maintaining print libraries (Chan & Trotter, 2022; World Bank, 2020). Moreover, during the period following the outbreak of the COVID-19 pandemic, universities across Africa have relied heavily on digital libraries in order to maintain continuity in teaching and research activities (Czerniewicz et al., 2020).

Scholars agree that digital libraries also greatly support **\*\*academic productivity\*\***. Indeed, in addition to providing access to academic materials, digital libraries can be used by institutions to store locally produced material such as institutional repositories, theses, and dissertations. It is significant that, compared to global academia, African universities' contribution to global scholarly outputs is disproportionately low. Through enhancing accessibility of such output, digital libraries can enable African scholars to participate actively in global academic discourse (Bangani & Dube, 2023; UNESCO, 2021). Thus, in Africa, digital libraries are not only means of gaining access to external information but also platforms through which local knowledge creation is amplified. Another recurring theme in the literature is that digital libraries are associated with the improvement of quality of teaching and learning experiences. In particular, having access to up-to-date electronic resources, students can engage in independent learning and perform tasks necessary to succeed academically. As for educators, digital libraries offer access to resources that are useful for teaching such as OER. Recent empirical evidence indicates that the integration of learning management systems and mobile platforms in the context of digital libraries can facilitate self-directed learning (UNESCO, 2023).

The most common limitation mentioned in the reviewed literature is that digital libraries in Africa are constrained by infrastructure deficiencies. Unequal access to stable and affordable internet connectivity and electricity supply and access to computers represent persistent barriers to using digital libraries among many other technological products. Such problems mean that access to the library is insufficient to ensure effective usage (African Union, 2020; World Bank, 2020). It is argued that the efforts of introducing digital libraries should be considered as part of the digital inclusion policy aimed at providing sustainable access to ICT resources in Africa. Moreover, another issue highlighted in the literature involves digital literacies and user competencies. Namely, while people in Africa possess the necessary skills to browse the internet, they lack the competence to make optimal use of database searches, evaluating information credibility, and searching repositories efficiently. For this reason, librarians assume an additional function of training users in information literacies and other relevant skills (Chan & Trotter, 2022; IFLA, 2022). Therefore, the role of academic libraries in Africa expands from mere provision of resources to training.

Another aspect related to the limitations of digital libraries is that policy and sustainability problems remain. Namely, some digitally available content is paid for and requires continuous subscription and maintenance. Moreover, the training of personnel in using the platform and making updates are necessary. It seems that successful implementation depends on the institution's dedication, favorable policies in the field of ICT and education, and development of open access infrastructure (EIFL, 2021; INASP, 2018). Moreover, the initiative undertaken by the African Union for promoting digital transformation is crucial for future developments (African Union, 2020). Overall, scholars believe that digital libraries represent powerful instruments of facilitating access to educational resources in Africa through increasing access, supporting research, and enhancing teaching and learning. However, their efficiency remains uneven due to infrastructural limitations and others. Future research should focus on creating integrated strategies combining digital libraries and other elements of an effective policy.

### **Major opportunities presented by library digitization for sustainable educational development in African communities**

Digitization has become a key innovation in addressing the challenges faced by many communities seeking effective ways to ensure that their members can access information and learning resources to facilitate lifelong learning and sustainable educational development. Digitization can be described as the process of converting information in physical form into digital data to enable its storage, sharing, and distribution via electronic means. Given that African communities have been experiencing numerous barriers to educational development, including a lack of well-developed educational infrastructure, insufficient access to up-to-date learning materials, and geographic remoteness, digital library systems have created tremendous opportunities to advance educational inclusion and improvement in these communities. One of the major opportunities provided by library digitization is an increased level of access to educational resources. Many school and community libraries have insufficient collections of printed materials that contain up-to-date information, as well as poorly funded information departments that cannot afford to develop extensive collections (Alemna & Adanu, 2018; Mutshewa, 2020). Digitization allows the learners to access electronic books, journal articles, and open source learning materials remotely and less expensively than via traditional collection development models (Alemna & Adanu, 2018; Mutshewa, 2020). Thus, digital libraries can significantly increase access to current academic materials among the learners living in remote communities. The principle of providing quality and equitable access to learning opportunities and materials is vital for the achievement of sustainable educational development (UNESCO, 2023).

The second opportunity provided by library digitization is its contribution to the enhancement of teaching, learning, and research activities. Modern academic and public libraries provide access to different digital systems that help students and instructors in finding information and doing research more effectively. Dadzie (2016) states that digitization increases the effectiveness of the information search and utilization, particularly in higher education institutions. With regard to African higher education institutions, digital repositories became important for preserving the intellectual output of researchers, theses and dissertations, and local indigenous knowledge that is underrepresented in global databases (Raju, 2017; Chisita & Chiparausha, 2019). As a result, library digitization is instrumental to ensuring learning that is grounded in specific contexts. In addition, digitization creates new opportunities for the preservation of indigenous knowledge. African communities have numerous oral traditions, handwritten documents, historical records, and other sources of information that can deteriorate and lose significance with time. Library digitization offers a sustainable way to preserve these sources of information and make them accessible for use in education. According to Chisita and Raju (2021), digital preservation is highly instrumental to intergenerational learning and cultural continuity. Thus, by providing access to digitized versions of the history of the community, its oral traditions, and traditional ecological knowledge, digital libraries promote learning and education that is culturally relevant to African communities.

Another opportunity associated with library digitization lies in its contribution to the development of digital literacy. With the advancement of the use of technology in modern educational environments, libraries have become much more actively involved in the education of digital literacy skills in their users. Digital literacy is



considered vital for successful participation in the knowledge economy and achievement of Sustainable Development Goals (International Federation of Library Associations and Institutions [IFLA], 2022). Moreover, libraries can serve as important gateways to digital inclusion in many communities where some segments of the population lack digital skills and experience. Specifically, libraries can provide their users with access to the Internet, ICT courses, and e-learning platforms that contribute to digital literacy (Tella & Mutula, 2018). In the case of African communities, it is especially vital for the empowerment of youth and women that lack access to digital technologies. In addition, library digitization facilitates collaboration between different institutions in providing educational resources. Consortia-based access to electronic resources became common practice in several African countries (Kasirye, 2019). As a result, digital library systems allow for more effective use of resources and more expansive access to information. Furthermore, collaboration helps to overcome interruptions in accessing the services due to unforeseen events, such as pandemic.

While noting that there are certain challenges related to digitization, including poor internet connection, unstable electricity supply, shortage of funding, copyright issues, and shortage of skills (Mutshewa, 202; IFLA, 2022), one should understand that these barriers do not affect the importance of digitization. To conclude, digitization creates tremendous opportunities for promoting sustainable educational development in African communities by facilitating access to learning resources, enhancing teaching and research activities, facilitating preservation of indigenous knowledge, fostering digital literacy, and encouraging collaboration between institutions.

#### **Challenges affecting the digitization of African libraries**

Digitalization in libraries is an important agenda that has been receiving much attention from scholars in recent years. It entails the conversion of books, audiovisual content, archives, and other material into digital formats that can easily be stored, retrieved and circulated through internet-based platforms. However, there are several constraints facing the adoption of digitalization in African libraries that have been noted in the literature. Lack of sufficient funding is the most common problem among other challenges facing the process. Digitalization needs expensive scanners, servers, software and other equipment as well as continuous maintenance of these systems. Many libraries in Africa are underfunded, relying on government grants and/or aid received from international donors, which may cause interruption in the provision of digital services (World Bank, 2016; African Union, 2020). In addition, inadequate financing affects the sustainability of digitization projects since their implementation and maintenance cost quite much and without adequate funding, the process would stall.

Secondly, the ICT infrastructure in many libraries is poor in terms of electricity and internet connectivity needed to support digitalization. While some areas have good infrastructure networks, there are other places where electricity and/or the availability of high-speed internet is lacking. Besides, the gap between the digital divide in urban and rural areas has greatly hindered the success of digitization in African libraries. The third issue affecting digitalization concerns with the human capacity. Inadequate training of librarians is causing challenges in digitizing material in some institutions. While librarians are now required to provide information in digital form, most institutions lack appropriate training in these aspects. As a result, the level of technical skill in many libraries in Africa may hinder the success of the digitization process (IFLA & UNESCO, 2022).

Moreover, the problem associated with copyright laws and agreements causes hindrances in the successful implementation of digitization in African libraries. Since there are various materials that could be used by scholars and researchers for academic work and the general population for learning purposes, the issue of ownership rights of materials is becoming very problematic. The fact that many institutions have not developed appropriate policies regarding copyright of their digital products, the digitization project is faced with numerous barriers. Particularly, the orphaned work, indigenous knowledge resources, and unpublished material pose a great danger. The World Intellectual Property Organization asserts that the balance should be maintained regarding the two goals of access and preservation of copyrighted materials (WIPO, 2020).

Fourthly, there is a lack of national or institutional policies in the area of digitalization. Many studies suggest that the process lacks a sound strategy, framework and plan to guide librarians in selecting, preserving, accessing and providing sustainable digital services (African Union, 202; UNESCO, 2021). Such a fragmented

approach in the provision of digitization services makes it very challenging to ensure continuity. Finally, there is no effective digital preservation infrastructure and skills to ensure that digitization is sustained. The risk of digital loss of files due to corruption, virus attacks, and other factors make it difficult to maintain digital materials permanently.

To summarize, the above-discussed literature reveals that digitization in African libraries faces numerous constraints including inadequate funding, poor infrastructure, lack of technical expertise, unclear copyright laws, policy frameworks and preservation problems.

#### **Policy frameworks and government initiatives that support or hinder library digitization in Africa**

Library digitization in Africa has received increasing recognition for being a valuable instrument for the preservation of documentary heritage, the provision of access to knowledge, and the development of education, research, and innovations. Still, the success of library digitization initiatives relies heavily on the effectiveness of related policy frameworks, legal regulations, and governmental actions. Recent publications indicate that while several African states have introduced policies that stimulate the digital transformation agenda and ensure knowledge access, gaps in policy implementations, weaknesses in funding arrangements, and restrictive copyright laws prevent efficient digitization processes. First of all, the development of policies that contribute to digitization is associated with the general continental digital transformation strategy. Thus, the policy context for library digitization in Africa is provided by the Digital Transformation Strategy for Africa (202–203) developed by the African Union, which calls on member states to engage in the development of digital infrastructure, build skills in the field of digital technologies, and increase access to digital knowledge services (African Union, 2020). Even though the document does not mention libraries specifically, experts believe that this strategy helps create favorable conditions for digitization in African libraries through the legitimization of public spending on the development of digital knowledge infrastructure, which includes libraries, archives, and educational repositories (ECA, 2021). Similarly, the role of policies developed by UNESCO in the sphere of digital preservation of documentary heritage and equal access to cultural materials should be noted (UNESCO, 2021).

Moreover, at the national level, the supportive policy context is achieved due to ICT policies, national development strategies, open government agendas, and higher education modernization plans. For instance, the process of digitization has been promoted in several African countries, including South Africa, Kenya, and Rwanda due to the introduction of policies related to the improvement of ICT infrastructure and e-government initiatives that aim at delivering digital public services (Gillwald et al., 2019). As mentioned above, South Africa is a country where relatively successful digitization processes occur as the result of the existence of a favorable policy context in the spheres of digital and technological transformation. In this case, broadband infrastructure policies, research funding schemes, and university- and institution-based digitization initiatives help improve accessibility of knowledge services and the preservation of documentary heritage (Chisita & Ngulube, 2019). The involvement of national governments in digitization is also achieved via direct investments in projects of library digitization and cooperation with universities, donors, and international organizations in the same sphere. It is believed that such cooperation helps develop national libraries, establish digitization laboratories, and create digital knowledge repositories in those countries that suffer from financial problems (Dlamini & Snyman, 2017). However, such projects usually bring about concerns regarding their sustainability and maintenance as well as long-term effects (Nwagwu, 2020).

Even though several policies support library digitization, the analysis of existing literature sources proves that there are still many barriers in terms of national digitization policies, copyright laws, funding issues, and infrastructure challenges. One of the most significant barriers is the lack of national digitization policies for libraries as they operate individually and have no unified digital agenda, which causes duplication, inconsistency, and unavailability of materials due to insufficient standards and poor interoperability (Chisita & Ngulube, 2019). Moreover, many digitization projects fail to develop due to the absence of policy-based guidance in such areas as metadata standardization, digital preservation, and infrastructure development. Another barrier to the development of library digitization is related to copyright and intellectual property laws. In this regard, several sources claim that copyright laws in Africa have failed to keep up with the times and thus



become obstacles in the way of efficient library digitization (EIFL, 2019; WIPO, 2020). They may limit possibilities to digitize, use, store, and preserve books, documents, and other materials needed for research purposes.

The last but not least barrier that prevents digitization is linked to insufficient financial and infrastructural support. Even if digitization-related policies and frameworks have been introduced at the state-level, their implementation often faces difficulties related to insufficient electricity supply, poor Internet connection, lack of trained personnel, and the overall lack of financial resources (ECA, 2021; Nwagwu, 2020). In addition, rural libraries as well as public libraries are often left aside and not included in national digitization agendas. All in all, based on the findings provided above, it is possible to conclude that policies and government initiatives serve both as facilitators and barriers for library digitization in African countries.

#### **Proposing policy recommendations and strategic models for strengthening library digitization as a tool for sustainable educational advancement in Africa**

A major theme in recent scholarship is that digitization expands equitable access to educational resources. In many African countries, physical libraries remain constrained by limited collections, inadequate staffing, and geographical inaccessibility. Digital library platforms help overcome these barriers by making academic materials available across time and place, especially for rural learners and distance education students (IFLA, 2019; UNESCO, 2023). During and after the COVID-19 pandemic, the value of digital knowledge systems became even more apparent, as institutions with digitized collections were better positioned to support continuity in teaching, learning, and research (UNESCO, 2023; World Bank, 2020). This suggests that digitization is no longer a supplementary service but a core component of resilient educational ecosystems. The literature also emphasizes the role of digitization in preserving Africa's intellectual and cultural heritage. Many African libraries and archives hold rare manuscripts, oral histories, government records, and local research outputs that are vulnerable to deterioration, conflict, and environmental threats. Digitization offers a preservation mechanism while simultaneously increasing scholarly visibility of African knowledge systems (Alemneh, 2016; Ngulube, 2019). In this regard, digital repositories are particularly significant because they can counter the historical marginalization of African scholarship in global knowledge production. Institutional repositories hosted by universities have been shown to increase access to theses, dissertations, and locally produced research that would otherwise remain underutilized (Raju, 2021).

Despite these benefits, the literature identifies substantial structural barriers. The most frequently cited challenges include unstable electricity, weak broadband infrastructure, low ICT funding, fragmented digitization policies, copyright restrictions, and inadequate staff training (IFLA, 2018; Trotter et al., 2020). In sub-Saharan Africa, digital inequality is still strongly shaped by income, gender, geography, and institutional capacity, which affects the extent to which digitized library resources can support educational inclusion (GSMA, 2023; UNESCO, 2023). Moreover, many digitization projects are donor-dependent and not embedded in long-term national education or information policies, making them difficult to sustain beyond initial grant cycles (World Bank, 2020). Current research therefore supports policy recommendations centered on integration, sustainability, and capacity building. First, governments should adopt national library digitization frameworks aligned with broader education, ICT, and open access policies. Such frameworks should define standards for metadata, preservation, interoperability, and copyright management while ensuring that libraries are treated as digital learning infrastructure rather than as peripheral cultural institutions (IFLA, 2019; UNESCO, 2023). Second, sustainable public financing is critical. Rather than relying primarily on external funding, digitization should be incorporated into national education budgets and university strategic plans. Third, investments in human capital are essential. Librarians increasingly require competencies in digital curation, repository management, data literacy, and user training to maximize educational outcomes (Raju, 2021).

The literature also points toward several strategic models for strengthening library digitization in Africa. One promising model is the **consortial model**, where universities and public libraries share platforms, subscriptions, storage systems, and technical expertise. This reduces costs and promotes standardization across institutions. A second is the **open access and institutional repository model**, which supports visibility and affordability by providing free access to locally generated educational content. A third is the **public-private**

partnership model\*\*, which can leverage telecommunications firms, technology companies, and development agencies to improve connectivity, cloud storage, and digitization equipment, provided public institutions retain governance over access and preservation priorities (World Bank, 2020; GSMA, 2023). Finally, a \*\*community-centered model\*\* is increasingly recommended, especially for public libraries, where digitization strategies are designed around local language content, mobile accessibility, and inclusive user training.

Overall, the literature suggests that library digitization can significantly advance sustainable education in Africa when supported by integrated policy, reliable infrastructure, skilled personnel, and collaborative governance. The strongest evidence favors models that combine open access, national coordination, and context-sensitive implementation. Future research should focus on measuring the direct educational impact of digitized libraries on student performance, research productivity, and inclusive access across marginalized communities.

#### **4. Conclusion**

The study on Digitizing African Libraries for Sustainable Educational Advancement: Opportunities, Challenges, and Policy shows that library digitization is increasingly becoming a vital pathway for expanding access to knowledge and strengthening education across Africa. Although the level of digitization varies significantly among countries and institutions, evidence suggests that many African libraries are gradually embracing digital technologies to improve information storage, retrieval, preservation, and dissemination. Digital libraries have enhanced access to educational resources for students, researchers, and educators, especially where physical materials are scarce or difficult to access. This has important implications for academic development, lifelong learning, and research productivity. The findings further reveal that digitization presents major opportunities for sustainable educational development, including wider access to local and global knowledge, preservation of indigenous materials, support for distance learning, and increased institutional collaboration. However, these opportunities are constrained by several persistent challenges such as inadequate funding, poor ICT infrastructure, unstable electricity supply, limited internet connectivity, shortage of trained personnel, and weak maintenance systems. In addition, policy and governance issues remain significant. While some governments and institutions have introduced supportive ICT and education policies, implementation gaps, weak legal frameworks, and insufficient coordination often reduce their effectiveness. Overall, the study concludes that digitizing African libraries is not merely a technological upgrade but a strategic educational investment. For digitization to meaningfully contribute to sustainable educational advancement in Africa, it must be supported by deliberate policies, long-term funding, capacity building, and inclusive partnerships among governments, academic institutions, development agencies, and local communities.

#### **5. Recommendation**

To strengthen library digitization as a tool for sustainable educational advancement in Africa, this study recommends that governments and institutional leaders adopt a coordinated, long-term approach. First, African governments should increase budgetary allocation to libraries and digital infrastructure, recognizing library digitization as an essential component of national education and innovation systems. Sustainable funding should support hardware acquisition, software deployment, internet access, digital repositories, and preservation systems.

Second, there is a need to improve ICT infrastructure, including reliable electricity, broadband connectivity, and technical support services, especially in rural and underserved areas. Without these foundations, digital library initiatives will remain uneven and unsustainable.

Third, universities, public libraries, and research institutions should invest in continuous training for librarians, ICT personnel, and educators to enhance digital competencies, content management, and system maintenance.

Fourth, governments should develop and enforce clear policy frameworks on digitization, copyright, open access, data protection, and digital preservation. These policies should encourage collaboration among institutions and support the creation of shared repositories for educational and research materials. Fifth,

libraries should prioritize the digitization of local content, indigenous knowledge, and culturally relevant academic resources to ensure that African educational systems benefit from context-specific materials. Finally, partnerships with private technology firms, international organizations, and regional bodies should be expanded to mobilize expertise, funding, and innovation. Strategic monitoring and evaluation mechanisms should also be established to track progress and ensure accountability. Through these measures, African libraries can become inclusive digital knowledge hubs that support equitable, resilient, and sustainable educational development across the continent.

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