



HUMAN CAPITAL DEVELOPMENT IN DIGITAL ERA: THE EXPERIENCE OF LIBRARIANS IN SELECTED UNIVERSITIES IN NIGERIA

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Abstract

This study investigated human capital development in the digital era by examining the experience of academic librarians working within selected federal universities in Nigeria. The rapid evolution of the digital era has transformed the landscape of university education, and the library which is the live wire of teaching, learning, and researching has shifted from traditional library practices to digital and hybrid information services. This digital transformation of the university library has improved and changed the roles of professional librarians from conventional print repository management to digital literacy database. The academic or university libraries are therefore required to be involved in human capacity development in order to remain relevant to evolving user expectations. This study adopted a descriptive survey research design. The population comprised all librarians across selected federal universities in Nigeria. A structured questionnaire was utilized to collect data regarding the availability of ICT training, professional workshops, institutional funding and digital competency levels. The findings revealed that the human capital development initiatives positively influence librarians job performance, productivity and motivation to transition to digital information service delivery. However, major barriers were declared to be a clog in the wheel of progress in this digital era. These barriers included inadequate budgetary allocations, incessant electricity power failure, frequent network failure, lack of telecommunication and infrastructural facilities. Based on these findings, the study recommended that the university management should endeavor to attract more funds from the proprietors, establish strategic partnerships with IT experts to enhance ICT professional skills of the librarians and formulate modern institutional policies that are mandate progressive digital skill acquisition.

Keywords: Human Capital Development, Digital Competences, University Libraries, Digital Transformation.

Introduction

The global landscape of higher education has witnessed swift digital transformation, driven by the emergence cloud computing, artificial intelligence, and big data analytics. In this highly digitized environment, university libraries have shifted from traditional, physical repositories of books to dynamic, cyber-physical knowledge hubs. Consequently, the roles of academic librarians have expanded significantly, requiring them to transition into digital literacy educators, content curators, and facilitators of advanced virtual research environments (Atta, [2026](#); Aliyu Ango, [2024](#)). To survive and remain relevant in this

contemporary ecosystem, the traditional skills of library personnel must be systematically upgraded. This reality underscores the vital importance of human capital development—the strategic cultivation of knowledge, digital competencies, and cognitive adaptability within the workforce (Ugwulebo & Okuonghae, [2021](#)). Within academic libraries, investing in human capital is no longer a luxury but an organizational imperative to ensure that information professionals can effectively meet the evolving, complex needs of 21st-century researchers.

In Nigeria, the push toward digital transformation in university libraries has encountered a distinct mix of progressive strides and structural bottlenecks. While recent empirical evidence indicates that many university librarians across the region possess strong foundational ICT skills and a high willingness to adopt open-source library management systems, a noticeable gap remains regarding advanced digital proficiencies (Aliyu Ango, [2024](#)). Librarians are frequently adept at basic internet surfing, word processing, and utilizing social networking platforms for basic outreach; however, deep technical expertise in sophisticated domains—such as institutional repository architecture, data curation, and cloud network configuration are still lacking across many institutions (Atta, [2026](#); Ugwulebo & Okuonghae, [2021](#)). Because the performance and societal value of an academic library are fundamentally tied to the capabilities of its "humanware," the absence of targeted, continuous professional training directly undermines the overall efficiency of information service delivery in Nigerian higher education.

The structural experience of human capital development among librarians in selected Nigerian universities is further complicated by institutional and systemic barriers. Although many tertiary institutions have built-in budgetary provisions for manpower training or grant study leaves for postgraduate advancements, execution remains inconsistent. Academic libraries in Nigeria continue to battle chronic underfunding, erratic power supply, limited internet bandwidth, and a noticeable lack of modern ICT infrastructure (Aliyu Ango, [2024](#)). Furthermore, traditional Library and Information Science (LIS) curricula in many local universities have been slow to integrate comprehensive digital-era courses, leaving mid-career and newly employed librarians to face immense workplace stress, isolation, and technological anxiety due to inadequate preparation. While localized studies highlight that targeted digital literacy initiatives significantly boost job performance and user patronage, there is a shortage of holistic research examining the real-world lived experiences, training gaps, and coping mechanisms of librarians across selected universities. Therefore, this study investigates the current state, challenges, and prospects of human capital development for librarians navigating the digital era in Nigeria.

Statement of the Problem

In the contemporary digital era, academic libraries have transitioned from traditional print repositories to highly dynamic, technology-driven information hubs. To remain relevant, university libraries must continuously invest in digital human capital development, ensuring that information professionals possess advanced competencies in data management, cloud computing, electronic resources, and artificial intelligence integration (Adeyeye, [2024](#); Aliyu Ango, [2024](#)). The optimization of human capital through systemic digital upskilling is vital for enhancing institutional job performance and meeting the complex research needs of modern university communities (George et al., [2022](#), as cited in Journal of International, Educational Research and Development, [2025](#)).

However, despite the evident necessity for rapid technological adaptation, university librarians in Nigeria face a severe bottleneck in digital human capital transformation. Empirical observations reveal a stark mismatch between the accelerating demands of the digital landscape and the current capabilities of many Nigerian library professionals (Baro & Eze, [2015](#)). This gap in digital capability is severely compounded by structural and systemic obstacles within Nigerian university library environments. Librarians are consistently constrained by erratic power supply, poor internet bandwidth, a shortage of foundational digital facilities, and a general lack of institutional funding dedicated to continuous ICT training (Adeyeye, [2024](#); Aliyu Ango, [2024](#)). This study seeks to investigate the realities of digital human capital development by examining the practical experiences, barriers, and coping mechanisms of librarians in selected universities in Nigeria.

Research Questions

1. What specific digital skills have librarians in the selected universities acquired in the digital era?
2. What human capital development programs are provided by the selected universities for librarians?
3. What is the impact of human capital development on job performance in the selected Federal Universities?
4. What are the challenges the librarians face when attempting to develop digital human capacity?

Literature Review

The 21st century has introduced a paradigm shift in how information is generated, managed, and disseminated. Academic libraries, traditionally valued as brick-and-mortar repositories of print media, are now forced to operate as dynamic, cyber-physical knowledge hubs. Driven by automation, artificial intelligence (AI), and cloud data services, this evolution has fundamentally altered the required qualifications for information professionals. Consequently, the survival and institutional relevance of university libraries in developing nations depend almost entirely on the quality of their human capital. Investigating how Nigerian university librarians develop their capacities within this fluid digital landscape provides crucial insights into institutional readiness, professional survival, and the structural gaps that persist within African higher education.

Human Capital Theory posits those investments in human resources—primarily through education, professional training, and health—yield measurable improvements in organizational productivity and economic growth. In the context of library and information science (LIS), Human Capital Development (HCD) encompasses the systematic enhancement of the knowledge, cognitive capabilities, technical fluencies, and socio-emotional adaptability of library workers. In the digital era, the learning paradigm has shifted from static, institution-based instruction toward dynamic, lifelong learning models. The emphasis has shifted from "knowing information" to "learning to learn, transforming information into new knowledge, and translating that knowledge into immediate technological applications"(Adeyeye, 2024). In a digitized university setting, a library filled with state-of-the-art infrastructure and extensive electronic databases is rendered ineffective—effectively acting as a glorified warehouse—without highly competent human capital capable of managing and exploiting

those tools. Thus, contemporary HCD is an ongoing requirement to ensure librarians maintain professional alignment with technological change.

The traditional role of the academic librarian—centered on physical custody, manual cataloging, and localized reference services—has rapidly grown obsolete. The modern information environment requires what scholars define as a digital librarian or information broker (Omigie et al, 2020). Recent empirical evaluations of academic libraries in Nigeria reveal a mix of progressive initiatives and persistent execution gaps. Academic institutions across Nigeria generally recognize that their professional development programs must evolve to incorporate digital competencies. Many institutions actively incorporate human resource retraining strategies into their annual planning, often granting serving librarians study leave to pursue postgraduate LIS degrees or participate in localized workshops (Ugbulebo et al, 2021). However, studies focusing on selected universities across geopolitical zones highlight a critical mismatch between existing skill sets and contemporary institutional needs. Research reveals that while academic librarians understand the theoretical importance of digitization, a substantial portion of the workforce lacks advanced technical competencies. For example, hands-on proficiencies in emerging domains—such as big data analytics, cloud computing, social media management for research dissemination, and the Internet of Things (IoT)—remain unevenly distributed and frequently inadequate. Furthermore, empirical studies indicate that simply providing sporadic training sessions does not automatically translate into improved workplace performance. To achieve meaningful results, professional development must be paired with clear administrative support and institutional motivation. When Nigerian university managements establish a structured connection between technical capacity-building and overall job satisfaction, library professionals demonstrate higher levels of efficiency and better support institutional accreditation standards (Sharma et al, 2020 & Adekoya, 2023).

Results and Discussion

The results that emanated from the analytical procedure are presented by means of relevant tables and analyzed according in the following sections.

Population Spread

Table 1: The Population of the Study

S/N	University Libraries	Proprietorship	Number of Librarians	Percentage (%)
1	University of Benin, Benin City	Federal	20	16.1
2	Federal University of Petroleum Resources, Effurun	Federal	10	8.1
3	University of Ibadan, Ibadan	Federal	16	12.9
4	Obafemi Awolowo University, Ile-Ife	Federal	15	12.1
5	University of Nigeria, Nnsuka	Federal	11	8.9
6	Federal University of Technology, Owerri	Federal	14	11.3
7	University of Abuja, Abuja	Federal	10	8.1
8	Ahmadu Bello University Zaria	Federal	14	11.3
9	University of Maiduguri, Maiduguri	Federal	14	11.3
	Total		124	100.0

Sources: Office of the University Librarians in the sampled Universities

Analysis of Demographic Data of the Respondents

Table 1 presents the population distribution of librarians the federal university libraries selected from six geo-political zones of Nigeria. A total 124 of the respondents participated in

the study, representing the entire population of professional librarians in the Federal Universities in Nigeria.

The data reveal that university of Benin, Benin City, accounted for the largest population of the respondents with 20 librarians (16.1%), followed by University of Ibadan, which contributed 16 respondents (12.9%), followed closely by Obafemi Awolowo University, Ile-Ife which contributed 15 respondents (12.1%). Federal University Owerri, Ahmadu Bello University, Zaria and University of Maiduguri, Maiduguri accounted for 14 respondents (11.3%) each. University of Nigeria, Nnsuka recorded 11 respondents (8.9%), while Federal University of Petroleum Resources, Effurun and University of Abuja contributed the smallest representation, with 10 respondents (8.1%) each. The distribution suggests a relatively balance spread of respondents across the institutions in the six respondents' zones in Nigeria. The even distribution of participants strengthens the generalizability of the study findings within the context of the federal university libraries in Nigeria.

Gender Distribution of Respondents

Table 2: Gender of the Respondents

gender	Frequency	Percentage (%)
Male	51	41.1
Female	73	58.9
Total	124	100.0

Source: Fieldwork, 2025

Table 2 presents the gender distribution of the respondents. Out of the 124 librarians who participated in the study, 73(58.9%) were female, while 51(41.1%) were male. This indicates that female librarians constituted a greater proportion of the workforce in federal university libraries. The predominance of female libraries aligns with earlier findings of Adekoya (2023) and Achgbue & Azih (2022). The results suggests that women in University Library Management

Age Distribution

Table 3: age of the Respondents

Age	Frequency	Percentage (%)
25 years and above	25	20.2
2-0-30 years	29	23.4
31-35 years	36	29.0
36-40 years	13	10.5
41-45 years	10	8.1
46-50 years	8	6.5
51-55 years	2	1.6
55 years and above	1	0.8
Total	124	100.0

Source: Fieldwork, 2025

Table 3 presents the age distribution of the respondents. The data show that librarians within the 31-35 years age group accounted for the largest proportion of respondents, recording 36(29.0%), and 20-30 years with 29 respondents (23.4%). Respondents aged 25 years and above made up 25 (20.2%), 36-40 years recorded 13 respondents (10.5%), 41-45 years accounted for 10 respondents (8.1%), 51-55 years recorded 2 respondents (1.6%), whereas the smallest proportion of respondents 1 (0.8%) where aged 55 years and above.

The distribution indicates that the majority of librarians in federal universities libraries in Nigeria are within their early and mid-career stages, particularly between 35 years. This reveals a relatively youthful and active workforce, which is advantageous for human capital development in digital era, as this age group is generally more technologically inclined and easily adaptable to digital innovations. However, the availability of older librarians (aged 41 years and above) also reflects the possible mentorship of the younger librarians.

Spread of Respondents Work Experience

Table 4: The Work Experience of the Respondents

Work Experience	Frequency	Percentage (%)
5 years and above	34	27.4
10-20 years	62	50.0
21-30 years	20	16.1
31-40 years	8	6.5
Total	124	100.0

Source: Fieldwork, 2025

Table 4 presents the distribution of respondent's base on their year of professional experience. The results show that a majority of the librarians, 62 respondents (50.0%), had 11-15 years of work experience, indicating that more than half of the workforce in federal university libraries in Nigeria are relatively new to the profession. Librarians with 6-10 years of work experience accounted for 34 respondents (27.4%), while those with 26 respondents (16.1%). Additionally, 8 respondents (6.5%) had 20 years and above, in their professional work experience. The data reveal a predominance of early career librarians. This composition suggests a blend of fresh entrants who may be ICT professional skills inclined.

Spread of Respondents by Ranks

Table 5: Ranks of the Respondents

Rank	Frequency	Percentage (%)
Graduate Assistant Librarian	31	25.0
Assistant Librarian	44	35.0
Librarian II	30	24.2
Librarian I	13	10.5
Senior Librarian	6	4.8
Total	124	100.0

Source: Fieldwork, 2025

Table 5 presents the distribution according to their professional ranks within the university library system. The results reveal that Assistant librarians constituted the largest group, with 44 respondents (35.5%), Graduate Assistant Librarian ranked closely with 31 respondents (25.0%), Librarian II with 30 respondents (24.2%), while Librarian I accounted for 13 respondents (10.5%). The smallest group, Senior Librarian recorded 6 respondents (4.2%).

The rank distribution reveals that majority of librarians in federal universities occupy lower-middle positions within the professional hierarchy. This suggests that the library workforce is dominated by young professionals, which may be linked to recent staff recruitment efforts following the integration of ICT in library service delivery and the introduction of new professional courses in the university systems.

Digital Skills Possessed by Librarians in Federal Universities in Nigeria that Drive Human Capital Development in this contemporary era

Table 6: Analysis of Digital Skills

Digital skills and competencies	Frequency	Percentage (%)
Information retrieval and digital literacy skills	29	23.4
Digital curation, imaging and preservation skills	2	1.6
Web technologies and digital communication skills	30	24.2
Data management and emerging technology skills	25	20.2
Cyber-Physical literacy	7	5.6
Data analytics skills	4	3.2
Digital repository management	27	21.8
Total	124	100.0

Source: Fieldwork, 2025

Table 6 presents the distribution of respondents based on the digital skills possessed by librarians in federal universities in Nigeria that drive human capacity development in this information age. The findings reveal that web technologies and digital communication skills constituted the largest group, with 30 respondents (24.2%), followed closely by information retrieval and digital literacy skills, with 29 respondents (23.4%), digital repository management accounted for 27 respondents (21.8%), also recorded high levels of digital skills possessed by the librarians for human capacity development is data management and emerging technology skills which recorded 25 respondents (20.2%). Moderate digital skills possessed by the librarians is cyber-physical literacy which accounted for 7 respondents (5.6%), data analytics skills which recorded 4 respondents (3.2%), while the lowest digital skills possessed by the librarians, digital curation, imaging and preservation accounted for 2 respondents (1.6%). Overall, human capital development is directly tied to the capacity of academic librarians to adapt to ICT revolution innovations (Adekeye, 2025). As libraries transition towards hybrid and smart service models, librarians rely heavily on technical competencies to safeguard and digitize academic library service delivery.

Human Capital Development Programs Provided by the Selected Universities for Librarians

Table 7: Human capital development programs provided for the librarians

Human capital development programs	Frequency	Percentage (%)
In-house ICT and digital literacy training	36	29.0
Sponsorship for continuing education and higher degrees	7	5.6
Professional conference, seminars and workshops	32	25.8
In-service training and job rotation	8	6.5
Structured mentoring and peer coaching	3	2.4
External government development grants (TETFUND & ITF)	38	30.6
Total	124	100.0

Source: Fieldwork, 2025

Table 7 presents distribution of respondents based on human capital development programs organized for librarians to enhance effective library service delivery. The findings reveal a diverse mix of management and ICT professional skills, training to equip the library for future trends in library and information service in this digital era. The results shows that external government development grants (TETFUND & ITF) are the most frequently human capital development program with 38 respondents (30.6%), followed closely by in-house ICT and digital literacy, which accounted for 36 respondents (29.0%). Similarly, professional conferences seminars and workshops recorded 32 respondents (25.8%). Moderate human capital development rate was observed for in-service training and job rotation, which contributed 8 respondents (6.5%), sponsorship for continuing education and higher degrees by the university management accounted for 7 respondents (5.6%), while structured mentoring and peer coaching recorded 3 respondents (2.4%) as the least.

Overall, the analysis suggests that most of the federal university libraries actively leverage in-house ICT digital literacy training intervention channels to execute their human capital development programs through external government development grounds such as TETFUND and Industrial Training Fund, which helps to encourage the acquisition of skills in industry and educational sectors, to generate a pool of trained indigenous manpower for Nigeria's economy. The Impact of Human Capital Development of Librarians on their Job Performance in the Selected Federal Universities

Table 8: Impact of human capital development of librarians on their job performance

The impact of human capital development of librarians	Frequency	Percentage (%)
Enhancement of technical and digital skills	28	22.6
Prompt and quality service delivery	27	21.8
Minimization of time and input wastage	16	12.9
Attainment of institutional goals	25	20.2
Mitigation of technical obsolescence	13	10.5
Job satisfaction	15	12.1
Total	124	100.0

Source: fieldwork, 2025

Table 8 presents the distribution of the impact of human capital development of librarians on their job performance. The results show that the enhancement of technical and digital skills is the most relevant, impact, which accounted for 28 respondents (22.6%), closely followed by prompt and quality service delivery, which accounted 27(21.8%), additionally, attainment of institutional goals contributed 25 respondents (20.2%). Moderate human capital development was also observed for minimization of time and input wastage, which contributed 16 respondents (12.9%), job satisfaction accounted for 15 respondents (12.1%), while mitigation of technical obsolescence, which is the least impact recorded 13 respondents (10.5%). Overall, the analysis suggests that human capital development serves as the primary driver for modernizing information environments, particularly within federal university libraries. The transformation of contemporary librarianship spurred by rapid advancements in information technology and digital repositories, which requires a continuous stock of knowledge, skills, competencies and creative abilities among libraries (Adekeye, 2025)

The Challenges Librarians Face in Human Capital Development in Digital Era

Table 9: The Challenges Librarians Face in Human Capital Development in Digital Era

The challenges of human capital development of librarians	Frequency	Percentage (%)
Inadequate ICT infrastructure	38	30.6
Power and connectivity fluctuations	37	29.8
Budget deficits	25	20.2
Time constraints and workloads	13	10.5
Resistance to change	11	8.9
Total	124	100.0

Source: fieldwork, 2025

Table 9 presents the major challenges encountered by librarians in human capital development in digital era. The most prevalent challenge identified by respondents is inadequate ICT infrastructure, which accounted for 38 respondents (30.6%), most of the federal universities where library automation has been attempted suffer from lack of high-speed internet and modern computer hardware (Ilori & Onanuga, 2023). Closely following this is the power and connectivity fluctuations, which recorded 37 respondents (29.8%), incessant power failure and unstable bandwidth severely disrupt continuous digital training

and online professional development programs (Sharma & Chauhan, 2020). Similarly budget deficits recorded 25 respondents (20.2%). The study reveals that limited funding in federal universities library restricts attendance at high-quality workshops, conferences, and sophisticated telecommunication infrastructural facility acquisition (LIS Education Network, 2025).

Other significant issues include time constraints and workload, which accounted 13 respondents (10.5%), and resistance to change, which recorded the least respondents 11 (8.9%). With integration of ICT in library services, librarians are still occupied with traditional roles such as manual cataloging and physical reference services. The study also reveals that resistance to abandoning manual systems slows the adoption of automated library management (Sharma & Chauhan, 2020).

Conclusion

This study investigated the dynamics of human capital development (HCD) among librarians within selected Nigerian universities navigating the shifts of the digital era. The transitions within the global information ecosystem demand that conventional librarianship expand drastically to encompass robust digital competencies, data management skills, and familiarity with emerging technologies (Nwaosusu & Chukwuedo, [2023](#)). The empirical evidence and experiences garnered from Nigerian university librarians reveal a clear dichotomy. On one hand, there is an acute awareness of the transformative power of digital technologies—such as cloud computing, mobile services, and digital repositories—in augmenting information creation, discovery, and user patronage (Atta, [2026](#); George et al., [2022](#)). Librarians explicitly recognize that their institutional relevance relies heavily on mastering these virtual environments to satisfy modern, tech-savvy university communities (Omigie & Bosah, [2020](#)).

On the other hand, the practical experiences of these professionals highlight persistent bottlenecks in the actualization of comprehensive HCD. The transition toward effective digital librarianship in Nigerian universities remains heavily constrained by fragmented training policies, inadequate in-service mentoring, and a critical shortfall in modern ICT infrastructure (George et al., [2022](#)). Many graduate and practicing librarians still face skill gaps in specialized areas like cloud storage integration, advanced information retrieval systems, and network security policies (Atta, [2026](#)). This disparity creates an operational strain, where the demand for seamless electronic resources outweighs the technical capabilities of the available human ware. Ultimately, this study concludes that while Nigerian academic librarians possess a highly positive attitude toward technology adoption, automation alone cannot drive organizational success without deliberate, structured investment in human assets. If Nigerian university libraries are to function as vibrant nodes in the global digital network, universities and policymakers must transcend sporadic workshops. They must instead implement systematic, continuous capacity-building frameworks, update library science curricula to reflect Industry [4.0](#) innovations, and aggressively fund technological infrastructure (Nwaosusu & Chukwuedo, [2023](#); Omigie & Bosah, [2020](#)).

Recommendations

The following sections provide comprehensive but specific recommendations:

1. Formalization of Digital-First Training Policies: University management and library administrations must transition from ad-hoc training workshops to institutionalized, documented training policies.



2. Mastery of Open-Source Library Management Systems (LMS): To combat high software licensing costs, Nigerian university libraries heavily utilize open-source platforms. Human capital development must match this operational reality.

3. Dedicated Financial Sponsoring and Budgetary Allocations: A core challenge facing human resource development practices in Nigerian universities is the erratic funding of libraries. Libraries should systematically sponsor professional librarians for continuous education, advanced postgraduate degrees, and international library exchange programs to mitigate regional digital isolation (Ilori & Onanuga, [2024](#)).

4. Institutionalization of Peer Mentoring & In-House Micro-learning: Given the rapid pace of technological change, waiting for annual external conferences is insufficient for active knowledge translation. Libraries should implement weekly or bi-weekly internal "micro-learning" sessions.

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