JATLIM International

INTERNATIONAL JOURNAL OF APPLIED TECHNOLOGIES IN LIBRARY AND INFORMATION MANAGEMENT

http://www.jatlim.org

International Journal of Applied Technologies in Library and Information Management 11 (2) 09 -96-110
ISSN: (online) 2467 - 8120

Manuscript Number: JATLIM - 2025-11.02/96-110

Librarians' Awareness and Readiness for 5th Industrial Revolution Technology Application in Academic Libraries in Nigeria: Ebonyi State in Focus

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Abstract

This paper examines librarians' awareness and readiness for 5th Industrial Revolution technologies application in academic libraries in Nigeria focusing Ebonyi State. The study is guided by five research questions bordering on the librarians extent of awareness of the 5IR technologies, extent of availability of 5IR technologies in the libraries, readiness of the librarians to apply the technologies, perceived rationale for the application and the challenges confronting the application of the technologies in the libraries. Descriptive survey design was adopted for the study. 76 librarians constituted the population of the study were served the questionnaire. Total enumeration sampling technique was adopted. However, 51 copies of the questionnaire were retrieved in time for data analysis. Structured close-ended question was adopted in the instrument for data collection. The questionnaire was prepared with Google Form and distributed via the WhatsApp platform of Ebonyi State NLA members. The data collected were analysed with descriptive statistics, and the findings indicated that the librarians are very much aware of the 5IR technologies but are not fully ready for its application due to several factors including inadequate skills and unavailability of 5IR technologies. The recommendations of the study among others include enhanced reskilling of practicing librarians, continuing professional development, increased funding and multidisciplinary approach to LIS education. The paper advocates for a multifaceted approach involving all the stakeholders to address the numerous problems hampering the application of modern technologies in Nigeria's academic libraries.

Keywords: *Academic libraries, Librarians, Awareness, Readiness, 5th Industrial Revolution*

1.1 Introduction

Transformation is an essential aspect of human evolution and development. That is why every era of human civilization is associated with one technological development or the other. Apart from being the most mentally developed and sophisticated of all animals, adapting to changes is another key factor that has kept man on the path of development and at the apex of civilization. These changes are partly due to natural quest for survival and man's inherent desire for a better understanding of his socio-economic and geographical environment. For centuries, different resources have played roles in advancing the cause of man; from steam engines in the heart of Europe

to the Silicon Valley in Americas in the 21st Century, development has been sustained at different periods by adaptations and improvement. The Industrial Revolutions evolved from agrarian, handicraft and agricultural economies to more efficient industrial manufacturing processes. While the First Industrial Revolution was influenced by coal in the late 18th Century (c. 1780), the Second (c.1870) was marked by the invention of steam engine and largely influenced by electrification, and the Third which began in the late 1960s (till 2010) was the beginning of the shift from mechanical to digital technologies. The Fourth Industrial Revolution (2011-2020) according to Pandey (2024) was a progression of the 3IR (Third Industrial Revolution) towards the fusion of technologies that blur the lines between the physical, digital, and biological spheres. The Industrial Revolutions are not just perceived as historical periods, they are now considered socioeconomic and cultural phenomena.

The 5th Industrial Revolution, beginning in 2021, focuses on sustainability in three dimensions: economic, environmental, and social. The goal is to ensure the needs of the present without compromising that of the future generations. The 5th Industrial Revolution uses technological innovations such as AI, IoT, big data, smart systems integration, cybersecurity, cloud computing, and augmented reality while emphasizing the humane and ethical use of technology towards minimizing the destructive effects of technology on human environment. Common features of the emerging 5th Industrial Revolution are its human-centric feature, reliance on data and information, with emphasis on sustainability of the socio-economic environment. This means advanced human skills on sustainable handling of information and data in a friendly manner to the environment while maximizing the use of technologies. In this regard, information professionals, including those working in academic libraries, the heartbeat and centre of intellectual activities in tertiary institutions, must have to enhance their skills to meet the dynamics of the 5th Industrial Revolution.

Academic libraries, according to Otuu and Unegbu (2022) usually located in tertiary institutions of learning such as universities, polytechnics and colleges support teaching and research. It is imperative that these libraries provide materials in all formats for the actualization of the objectives of the parent body (Tijani, & Ihaza, 2021). Providing the needed resources and services to actualise the objectives of their parent bodies could be furthered if the contemporary resources offered by the 5th Industrial Revolution are integrated into academic library service delivery. Accordingly Oladokun, Ayinde and Enakrire (2024) observe that to be effective in their roles as information professionals in the 5th Industrial Revolution, information professionals must possess different skills and be ready to learn, unlearn, and relearn emerging skills, technologies, and organizational demands. They further explain that in the light of the development of Industry 5.0, there is a pressing demand for the cultivation of a new set of skills which are integral for an effective service delivery.

Currently, efforts are in top gear to make the discipline of Library and Information Science more competitive. This is noticeable in the new University Curriculum by the National Universities Commission and the benchmarks for training Librarians by the Librarians' Registration Council of Nigeria. However, the dynamics of the 5IR pose fresh challenges. Librarians and information professionals who have already received certifications at graduate and postgraduate levels, and have been practicing with the knowledge acquired earlier, cannot afford to be left out of the 5IR landscape that is characterised by exponentially evolving information users and their dynamic information needs. This research work therefore focuses on librarians' awareness and

readiness for 5th Industrial Revolution technologies application in academic libraries in Nigeria, with focus on Ebonyi State.

1.2 Statement of the Problem

The Industrial Revolutions are testaments to man's tenacity and push for continuous development. Thus, there is a general expectation that all spheres of human activity must be affected. Library and Information Science practice, education and professional development in Nigeria have for long gone through unfavourable conditions, partly due to the wrong societal perception of the discipline as a rather archaic and irrelevant profession. The forced domiciliation of LIS in educational faculties and forceful introduction of education courses into certain LIS programmes by some universities are examples of such societal misconception of LIS. Another major drawback is the obvious dilapidated status of Nigerian academic libraries in many institutions, which undermines and underrepresents the roles of the academic library in tertiary education, research and development. This therefore calls for concerted efforts on the part of librarians to reposition themselves by capitalizing on the opportunities provided by the 5IR technologies in order to provide contemporary academic library services that will project their profession in good light while contributing to societal development through efficient service delivery. However preliminary observations show that the adoption of 5IR is still at the elementary level in Nigerian academic libraries. According to Bichi (2021), managing automated library systems and other technologies related to information management in developing countries is difficult due to a lack of resources which limits access to technological tools easily as those found in developed countries. Perhaps this is as a result of inadequate awareness of the roles that 5IR can play in Nigerian academic libraries. This assumption and the need to enhance the delivery of contemporary academic library services have necessitated the need to conduct a study aimed examining librarians' awareness and readiness for 5th industrial revolution technologies application in academic libraries in Nigeria with focus on Ebonyi State. In view of this foregoing, the study poses the following research questions:

i. What is the extent of academic librarians awareness of 5th the Industrial Revolution technologies?
ii. What is the extent of availability of the 5th the Industrial Revolution technologies in academic libraries?
iii. What is the extent of readiness of librarians to apply 5th the Industrial Revolution technologies in academic libraries?
iv. What are the librarians' perceived rationale for the application of 5th the Industrial Revolution technologies in academic libraries?
v. Find out the challenges of applying 5th the Industrial Revolution technologies in academic libraries?

2.1 Literature Review

Academic libraries are libraries that are established in institutions of higher learning to support the academic activities of the parent institutions, and have always been in the forefront of supporting (universities, polytechnics, monotechnics and colleges of education) in the areas of teaching, learning, research and community services thus being the core mandates and mission of higher educational institutions (Saka, Aliero, & Ibrahim, 2022). These libraries serve two complementary purposes: to support the university curriculum, and to support research of the university faculty and students. In process, the library plays a key role in the nation building process (Adediran, 2020).

The emerging 5th Industrial Revolution, otherwise known as 5IR, Industry 5.0 or Society 5.0 is an emerging era of industrial transformation that is characterized by the growing paradigm shift from manual form of production and services delivery to digital

technology-driven smart industries and innovations that have enabled efficient labour productivity and mass production in the manufacturing and services industries, including the information production and services industries. Industry 5.0 builds upon the technological advancements of its predecessors (1IR, 2IR, 3IR and 4IR) with an added emphasis on human-machine collaboration, sustainability, and societal well-being, aiming to create a more equitable and sustainable future (Pandey, 2024).

According to Ziadtnidov et al (2023), the fifth industrial revolution is characterized by technological advancements that have led to a shift from manual to machine-based production, resulting in new smart industries, AI- and robotics-based technologies, and other innovations enabling mass production and increased labour productivity, allowing more goods and services to be produced per unit of time, with significant implications for all aspects of human well-being such as improved technological advancements which will then help service and end users obtain what they need in the business and service industry. This will result in employees gaining meaningful, productive, fulfilling careers.

Concerning the awareness of 5th Industrial Revolutiontechnologies in academic libraries**,** Nava-Muñoz and Moran (2013) define awareness as the knowledge that a person has about a situation or condition. Awareness is the state or ability to perceive, to feel, or to be conscious of events, objects, or sensory patterns (Abdul-Gafoor, 2012). It is the knowledge, understanding, or perception about something (Kalamus, 2019). Muhammad and Abdullahi (2021) examined awareness and adoption of cloud computing in digital and university libraries for effective service delivery, and the study revealed that academic librarians in federal universities in North West Nigeria are aware of various cloud computing activities. Safana and Fari (2024) assessed the awareness and perception of library staff in applying artificial intelligence for information service delivery in some university libraries of Katsina State, Nigeria. The study findings revealed that the majority of the library staff members are aware of AI in information services delivery and they believe AI can be applied in their respective libraries in the areas of pattern and image recognition and natural language processing.

Jaja and Emerole (2024) assessed the awareness, availability and use of emerging technologies for effective curriculum implementation by librarians and teachers' of Senior Secondary Schools in Karu LGA, Nasarawa State. Findings revealed that that Ai, Robotics, Internet of Things, Machine learning and blockchain technologies revealed low extent of awareness, availability and utilization among the librarians and teachers sampled.

On the availability of 5th Industrial Revolution technologies in academic libraries, Osisanwo and Adeola (2024) examined perceived ease of use of innovative library practices for service delivery by librarians in public institutions in Ogun State. The findings showed that the available innovative library services for service delivery in selected institutions in Ogun State are web conferencing service, library website service and social media-based service. Similarly, Akande, Bankole, and Jimoh (2024) studied the adoption of innovative technologies as correlate of information service delivery in university libraries in Kwara State, Nigeria. The findings revealed that Cloud computing and RFID were two innovative technologies available and deployed in libraries in Kwara State, Nigeria.

On the readiness of academic librarians to Apply 5th Industrial Revolution technologies, Muhammad and Abdullahi (2021) revealed that librarians support the idea of introducing cloud computing into the library and are desirous of various services that can be implemented on the cloud platform. Similarly, Mayesti, Huang, Azmir, and Adzan (2024) examined librarians' views of the readiness of university libraries in

Indonesia to adopt virtual and augmented reality. The findings show that Indonesian university libraries, especially in Central Java, express strong interest in VR/AR despite low current adoption. Librarians are optimistic about innovating academic activities with VR/AR, despite concerns about collaboration, data governance and human resource insecurity.

Concerning the rationale for the application of 5^{IR} in academic libraries, Oladokun et al (2024) aver that the emergence of Industry 5.0 has necessitated a pressing demand for the cultivation of a new set of skills which is integral for an effective service delivery by professionals in the world of information. It appears that these skills are not only essential for individual success but also for driving the overall progress and sustainability of the information profession in this transformative era. Meanwhile Ajani et al. (2022) had argued that librarians are no longer restricted to the repetitive tasks of cataloguing and shelving books; they now serve as curators of digital content, navigators of information landscapes, and educators in digital literacy.

Thubi (2019) studied the integration of cloud computing and service delivery in academic libraries with reference to South Eastern Kenya University. The study found out that the use of cloud computing in libraries has tremendous benefits to users as it enables access to services anywhere and anytime. Omehia, Okwu and Nsirim (2021) also assert that the integration of emerging technologies into library and information services has accelerated the creation of new modes of service delivery and activities for knowledge enhancement and productivity. For instance, Hubert-Nwangwu and Ijantiku, (2023) note that Artificial Intelligence technologies offer several benefits for university libraries, including the automation of routine tasks, personalized recommendations for users, and data-driven decision-making. Furthermore, Solomon, Ahiazu and Nyemezu (2023) also examined the influence of emerging technologies on promoting efficiency of institutional repositories in university libraries in Rivers and Bayelsa states. The findings revealed that professional and para-professional librarians are of the opinion that emerging technologies such as cloud computing, blockchain technology and artificial intelligence promotes efficiency of institutional repositories in university libraries in Rivers and Bayelsa States. Yusuf, Owolabi, Okani and Badmus (2023), Ekwueme, Babarotimi, Ajie, Ododu, Ambrose (2024) andOyedokun (2025) in different studies agree that librarians generally view 5IR positively; believing that 5IR technologies application in academic libraries can enhance diversity and inclusiveness in library services, particularly by providing individualized learning materials.

The application of the 5IR technologies to library services is not without challenges. Such challenges include legislations and established frameworks, security and privacy (Bertino, 2016). Adel (2022) had earlier stated that the adoption of industry 5.0 is required to follow industrial laws and regulations. These laws and regulations perhaps are still at the developmental levels in developing economies, hence not yet operational to guide the development, operation and evaluation of Industry 5.0 in the information professions. Therefore, it requires critical attention among stakeholders. The attainment of the availability of these technologies and their application in most academic libraries not only in Ebonyi state but in Nigeria in general is even more daunting with poor institutional support and low level of capacity-building programmes for the library personnel.

3.1 Methodology

The descriptive survey research design was adopted for this study**.** The population was the entire 76 professional librarians in academic libraries in Ebonyi State. The 76 professional librarians were used as the sample

size using total enumeration sample size determination technique. A Structured close-ended questionnaire, prepared with Google Forms and distributed via the WhatsApp group of NLA members in Ebonyi State was used as the instrument for data collection. The data collected were analysed using descriptive statistics, with a 4-point rating scale of 4, 3, 2 and 1. Questionnaire items with a mean of 2.5 and above were considered acceptable, while responses with a mean below 2.5 were rejected.

3.2 Data Analysis and Discussion of Findings

From the 76 sample size of the study, 51 responded to the questionnaire. This represents 67.10% of the total sample size. This is considered adequate for the study according to Story and Trait (2019) who state that good survey research reports provide results with valid and reliable answers to the research question with an adequate response rate (of at least 40%) and adequate precision (margin of error ideally 5% or less). Thus, this study's data analysis is based on the acceptable 51 responses

Section A: Demographic Data

Table 1: Gender

SN	Gender	Frequency	Percentage%
A	Male	31	60.78
B	Female	20	39.21
	Total	51	100

Table 1 on gender indicates that 31 (60.78%) are male while 20 (39.21%) are female. This data suggests that there are more male librarians in academic libraries in Ebonyi than there are female.

Table 2: Highest Academic Qualification

SN	Years of Service	Frequency	Percentage%
A	BLIS/BLSc	25	49.01
B	MLIS/MLSc	19	37.25
C	PhD	7	13.72
	Total	51	100

Table 2 above shows that about a half of the respondents 25 (49.01%) hold a BLIS/BLSc while the others hold higher degrees of MLS and Ph.D.

Table 3: Institution

SN	Institution	Frequency	Percentage
A	Akanu Ibiam Federal Polytechnic Unwana Library	8	13.72
B	Alex Ekwueme Federal University Library, Ndufu -Alike, Ikwo, Ebonyi State.	15	29.41
C	Blessed Martins International Institute of Science and Technology, Ikwo, Ebonyi State.	1	1.96
D	David Umah i Federal University of Health Sciences Library, Uburu, Ebonyi State.	4	7.84
E	Ebenezer College of Education, Amangwu, Ebonyi State.	1	1.96
F	Ebonyi State College of Education, Ikwo Library	1	1.96
G	Ebonyi State College of Health and Midwifery Library, Uburu, Ebonyi State.	1	1.96
H	Ebonyi State College of Health Technology, Ezza Mgbo	1	1.96
I	Ebonyi State University of Aeronautics, Ebonyi State.	1	1.96
J	Ebonyi State University Library, Abakaliki, Ebonyi State.	9	17.64
K	Ebonyi State University of ICT, Ebonyi State.	2	3.92

L	Evangel University, Akaeze, Ebonyi State.	1	1.96
N	Federal College of Agriculture Library, Ishiagu	3	5.88
O	Federal College of Education (Technical) Library, Isu	2	3.92
P	Federal College of Forest Resources Management	-	-
Q	Savanah Institute of Technology, Abakaliki, Ebonyi State.	1	1.96
	Total	51	100

Table 3 above represents the distribution of response rate which indicates that Alex Ekwueme Federal University Library, Ndufu-Alike, Ikwo, Ebonyi State has the highest number of respondents 15 (29.41%).

Section B: Research Questions

Research Question 1: What is the extent of academic librarians' awareness of 5th Industrial Revolution technologies? HA: Highly Aware (4); A: Aware (3); PA: Partially Aware (2); NA: Not Aware (1). 4, 3, 2, 1

Table 4: Awareness of 5 th Industrial Revolution Technologies

SN	Extent of awareness of 5th Industrial Revolution technologies	HA (4)	A (3)	PA(2)	NA(1)	Mean	Decision
A	Blockchain technology	14(27.45)	26(50.98)	5(9.80)	6(11.76)	2.94	Accepted
B	RFID (Radio Frequency Identification)	15(29.41)	21(41.17)	11(21.56)	4(7.84)	2.92	Accepted
C	Cloud computing	18(35.29)	25(49.01)	5(9.80)	3(5.88)	3.1	Accepted
D	Internet of Things (IoT)	24 (47.05)	22(43.13)	4(7.84)	1(1.96)	2.88	Accepted
E	Robotics e.g. cobots and chatbots	16 (31.3)	21(41.17)	11(21.56)	3(5.88)	2.98	Accepted
F	3D (Three dimensional) technologies	27(52.94)	17(33.33)	3(5.88)	4(7.84)	3.31	Accepted
G	Artificial Intelligence and Machine Learning	21(41.17)	19(37.25)	11(21.56)	-	3.19	Accepted
H	Virtual Reality (VR) and Augmented Reality (AR)	20(39.21)	15(29.41)	8(15.68)	8(15.68)	2.92	Accepted
I	Li-Fi (Light Fidelity) technology	4(7.84)	11(21.56)	17(33.33)	19(37.25)	2.0	Rejected
J	Wi-Fi technology	21(41.17)	27(52.94)	3(5.88)	-	3.41	Accepted
K	Data analytics on visualization	15(29.41)	21(41.17)	11(21.56)	4(7.84)	2.92	Accepted
L	Drone technology	16(31.3)	19(37.25)	9 (17.64)	7 (13.72)	2.86	Accepted
	Grand mean					2.95	Accepted

Table 4 reveals the top three 5IR technologies librarians are most aware which are 3D technologies (mean = 3.31), Artificial Intelligence and Machine Learning (mean = 3.19), and Wi-Fi technology (mean = 3.41). The grand mean of 2.95, is an indication that librarians are aware of 5th IR technologies.

Research Question 2: What is the extent of availability of 5th Industrial Revolution technologies in academic libraries? HA: Highly Available (4); A: Available (3); PA: Partially Available (2); NA: Not Available (1).

Table 5: Availability of 5 th Industrial Revolution Technologies in academic libraries

SN	Availability of 5th Industrial Revolution technologies in Ebonyi State academic libraries	HA	A	PA	NA	Mean	Decision
A	Blockchain technology	3(5.88)	2(3.92)	21(41.17)	25 (49.01)	1.66	Rejected
B	RFID (Radio Frequency Identification)	7(13.72)	9 (17.64)	13(25-49)	22 (43.13)	2.01	Rejected
C	Cloud computing	9(17.64)	8(15.68)	17(33.33)	17(33.33)	2.17	Rejected
D	Internet of Things (IoT)	1(1.96)	1(1.96)	23(45.09)	26(50.98)	1.54	Rejected
E	Robotics e.g. cobots and chatbots	2(3.92)	5(9.80)	19(37.25)	25(49.01)	1.68	Rejected
F	3D (Three dimensional) technologies	1(1.96)	-	(21(41.17)	29(56.86)	1.47	Rejected
G	Artificial Intelligence and Machine Learning	3(5.88)	3(5.88)	19(37.25)	26(50.98)	1.66	Rejected
H	Virtual Reality (VR) and Augmented Reality (AR)	1(1.96)	3(5.88)	17(33.33)	30 (51.82)	1.50	Rejected
I	Li-Fi (Light Fidelity) technology	-	1(1.96)	21(41.17)	29(56.86)	1.45	Rejected
J	Wi-Fi technology	18 (25.39)	17(33.33)	10(19.60)	6(11.76)	2.91	Accepted
K	Data analytics and visualization	-	-	23(45.09)	28(54.90)	1.45	Rejected
L	Drone technology	6(11.76)	11(21.56)	16(31.37)	18(35.29)	2.09	Rejected
	Grand mean					1.79	Rejected

Key: HA: Highly Available (4); A: Available (3); PA: Partially Available (2); NA: Not Available(1).

The above table shows that only Wi-Fi technology (mean = 2.91) is available in the academic libraries in Ebonyi state. The unavailability of all the other technologies are in these academic libraries are evident in the grand mean score of 1.79.

Research Question 3: What is the extent of readiness of librarians to apply 5th Industrial Revolution technologies in Ebonyi State academic libraries?

VR: Very Ready (4); R: Ready (3); PR: Partially Ready (2); NR: Not Ready (1).

Table 6: Extent of Readiness to Apply 5th IR Technologies

SN	Extent of readiness of librarians to apply 5 th Industrial Revolution technologies	VR	R	PR	NR	Mean	Decision
A	Blockchain technology	2(3.92)	3(5.88)	18(35.29)	28(54.90)	1.58	Rejected
B	RFID (Radio Frequency Identification)	5(9.80)	6(11.76)	19(27.25)	21(41.17)	1.90	Rejected
C	Cloud computing	1(1.96)	4(7.84)	15(29.41)	31(60.78)	1.50	Rejected
D	Internet of Things (IoT)	3(5.88)	2(3.92)	21(41.17)	25 (49.01)	1.66	Rejected
E	Robotics e.g. cobots and chatbots	4(7.84)	11(21.56)	17(33.33)	19(37.25)	2.0	Rejected
F	3D (Three dimensional) technologies	-	-	27(52.94)	24(47.05)	1.52	Rejected
G	Artificial Intelligence and Machine Learning	3(5.88)	3(5.88)	19(37.25)	26(50.98)	1.66	Rejected
H	Virtual Reality (VR) and Augmented Reality (AR)	2(3.92)	3(5.88)	15(9.41)	31(60.78)	1.52	Rejected
I	Li-Fi (Light Fidelity) technology	-	-	25 (49.01)	26(50.98)	1.49	Rejected
J	Wi-Fi technology	21(41.17)	19(37.25)	11(21.56)	-	3.19	Accepted
K	Data analytics and visualization	-	-	24(47.05)	27(52.94)	1.47	Rejected
L	Drone technology	1(1.96)	1(1.96)	25 (49.01)	24(47.05)	1.58	Rejected
	Grand mean					1.75	Rejected

Key: VR: Very Ready (4); R: Ready (3); PR: Partially Ready (2); NR: Not Ready (1).

Table 6 reveals that the librarians are not ready to adopt 5IR technologies. Each of the questionnaire items had a mean score below the bench mark of 2.50 with a grand mean of 1.75 which is not significant.

Research Question 4: What are the librarians' perceived rationales for the application of 5th Industrial Revolution technologies in academic libraries? Strongly Agree (4); Agree (3); Disagree (2); Strongly Disagree (1).

Table 7: Perceived Rationale for the Application of 5 th Industrial Revolution Technologies

SN	Librarians' perceived rationale for the application of 5th Industrial Revolution technologies	SA	A	D	SD	Mean	Decision
A	Enhanced services delivery	27(52.94)	17(33.33)	3(5.88)	4(7.84)	3.31	Accepted
B	Improved librarians' capability for efficiency	18(35.29)	17(33.33)	5 (9.80)	11(21.56)	2.82	Accepted
C	Promotion of library's reputation	21(41.17)	19(37.25)	11(21.56)	-	3.19	Accepted
D	Improved user experience	16 (31.3)	21(41.17)	11(21.56)	3(5.88)	2.98	Accepted
E	Promotion of innovation and creativity	18(36.29)	19(37.25)	11(21.56)	3(5.88)	3.01	Accepted
F	Bridging of digital divide	21(41.17)	19(37.25)	11(21.56)	-	3.19	Accepted
G	Provision of new roles for librarians	27(52.94)	17(33.33)	3(5.88)	4(7.84)	3.31	Accepted
	Grand mean					3.11	Accepted

Key: Strongly Agree (4); Agree (3); Disagree (2); Disagree (1).

Table 7 on librarians' perceived rationale for the application of 5th Industrial Revolution technologies in academic libraries in Ebonyi State shows that the grand mean score for perceived rationale is 3.11, indicating that librarians agree on the importance of applying 5th industrial revolution technologies for various reasons ranging from enhanced services delivery (mean = 3.31) to **provision of new roles for librarians with a mean of 3.31.**

Research Question 5: What are the challenges of applying 5th Industrial Revolution technologies in academic libraries? Strongly Agree (4); Agree (3); Disagree (2); Disagree (1).

Table 8: Challenges of Applying 5th Industrial Revolution Technologies

SN	Challenges of applying 5th Industrial Revolution technologies	SA	A	D	SD	Mean	Decision
A	Technophobia	20(39.21)	15(29.41)	8(15.68)	8(15.68)	2.92	Accepted
B	Technical limitations	16(31.3)	19(37.25)	9 (17.64)	7 (13.72)	2.86	Accepted
C	Inadequate digital literacy skills	16 (31.3)	21(41.17)	11(21.56)	3(5.88)	2.98	Accepted
D	Lack of management support	25(49.01)	18(35.29)	3(5.88)	5(9.80)	3.2	Accepted
E	Budgetary constraints	15(29.41)	21(41.17)	11(21.56)	4(7.84)	2.92	Accepted
F	Privacy and legal concerns	17 (33.33)	14(27.45)	13(25.49)	7(13.72)	2.80	Accepted
G	Lack of awareness of 5IR technologies	14(27.45)	26(50.98)	5(9.80)	6(11.76)	2.94	Accepted
H	Lack of willingness to ad opt 5IR technologies in libraries	1(1.96)	4(7.84)	15(29.41)	31(60.78)	1.50	Rejected
	Grand mean					2.76	Accepted

Key: Strongly Agree (4); Agree (3); Disagree (2); Disagree (1).

The above table 8 shows clearly that academic libraries in Ebonyi State have challenges adopting the 5IR technologies in libraries. The grand mean score of 2.76 is significant hence each questionnaire items except lack of willingness to adopt the 5IR technologies with a mean of 1.5 was rejected as a problem by the respondents.

5.1 Findings of the Study

The findings of the study are as follow:

1. Wi-Fi is the only 5IR technologies that are readily available in academic libraries in Ebonyi State.
2. The librarians in academic libraries in Ebonyi state are aware of all the 5IR technologies except Light Fidelity (Li-Fi) technology.
3. Librarians in academic libraries in Ebonyi state are not ready to adopt 5IR technologies despite recognizing their importance.
4. Innovation, creativity, capacity for efficiency service delivery, bridging of digital divide and users satisfaction are the rationale for the adoption of 5IR technologies in the libraries.
5. Lack of management support, inadequate digital literacy skills, technophobia, budgetary constraints, technical limitations, privacy and legal concerns are some of the challenge to the application of 5IR technologies in academic libraries in Ebonyi State.

5.1 Discussion of Findings

One of findings of this study is that librarians are aware of the 5IR Industrial technologies agrees with earlier work by Yousaf, Ali, Latif, Ahmed, and Abbas (2024) on augmented/ virtual reality, cloud computing, semantic web/linked data, Bibliographic Framework, Big Data and and Radio Frequency Identification being used in contemporary library services delivery. However, it contradicts an earlier study by Ajani, Olorunyomi and Tella (2023), which found several Nigerian academic librarians are not aware of extended reality technologies (Augmented and Virtual reality). The differences in the findings may be associated with the rapid increase in the number of emerging technologies in the last couple of years.

The lack of readiness by the respondents for the 5IR technologies adaptation is not a surprise hence these technologies are not available in their libraries and the libraries themselves are facing myriad of challenges to the provision of these technologies. A related study in public universities in Rivers State, Nigeria, by Owate and Iroeze (2023) found that lack of necessary skills and knowledge on effectively utilization of emerging technologies, and lack of equitable access to emerging technologies among librarians lead to low usage of emerging technologies in academic libraries. A similar finding was also related by Ajani, Olorunyomi and Tella (2023) that most Nigerian academic librarians do not envision deploying the 5IR technologies in the libraries.

The importance of applying 5th Industrial Revolution technologies in libraries, including enhanced services delivery, provision of new roles for librarians, promotion of innovation and creativity, improved librarians' capability for efficiency, improved user experience, bridging of digital divide, and promotion of library's reputation as found out in this study, are in line with the findings of Owolabi, Adenekan, Adeleke, Ajayi, and Adesina (2021) and Oyedokun (2025) who revealed that the strategic integration of 5IR technologies such as robotics, AI, the metaverse, and blockchain in library services delivery will help ensure that libraries remain pertinent and effective in the digital era.

The findings of this study that privacy and legal concerns are sources of challenges

for the use of some emerging 5IR technologies conforms to the findings of Muhammad and Abdullahi (2021) and Fashola, Oyadeyi and Iyoro (2024), who reported that privacy and legal concerns and lack of willingness to adopt 5IR as a challenge are major challenges.

Conclusion

This study focused on the librarians' awareness and readiness for 5th Industrial Revolution technology application in academic libraries in Nigeria, with Ebonyi State, South East geopolitical zone in focus. The study revealed that even though librarians are aware of most of the emerging technologies itemised, the extent of readiness to integrate the technology is low, mainly because of several technical and administrative bottlenecks. The 5th Industrial Revolution comes with huge prospects and challenges for the academic library community as information professionals are presented with cutting-edge technologies to ensure a sustainable and enhanced information delivery to users. Librarians must therefore be prepared to scale up their skills to be fully integrated into the 5th Industrial Revolution landscape and remain relevant in the contemporary information age. Librarians equally need the support and cooperation of major stakeholders particularly governments at all levels, corporate organisations and public spirited individuals to be able to navigate through the myriads of problems confronting their profession in Nigeria if the academic libraries would leverage benefits of the 5IR technologies for enhanced and efficient library services.

Recommendations

Against the backdrop of the challenges identified, the following recommendations are proposed:

1 Introduction of contemporary emerging technologies into the curriculum of LIS programmes in tertiary institutions. This will ensure that the librarians of the nearest future are readily equipped with hands-on practical knowledge and expertise to handle digital technologies that can be applied to library services.

2 Collaborative partnership with library professionals in the design of digital technologies for use in academic libraries. This will also help in the adaptation of emerging 5IR technologies that take care of specific library needs and contents.

3 Provision of alternative source of power supply such as solar energy to power libraries in order to address the challenges of erratic and sometimes total absence of power supply in libraries.

4 Academic libraries should engage in sustainable consultancy services to generate extra funds and reduce over-dependency on their parent organisations for funding. Advocacies and sensitization targeting corporate organisations and philanthropic individuals on library needs should be pursued.

5 Increased budgetary allocation by the government to libraries has become highly necessary in view of the high cost of library materials especially ICT components.

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