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AWARENESS, APPLICATION AND USE OF FOURTH INDUSTRIAL REVOLUTION (4IR) TECHNOLOGIES IN SELECTED LIBRARIES IN OGUN STATE, NIGERIA

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Abstract
With the rapid growth in the volume of information in circulation orchestrated by the merging and increase of ICTs; many academic library professionals are becoming increasingly aware of the importance of technologies. This study examined the application of Fourth Industrial Revolution (4IR) technologies: Awareness and use in selected academic libraries in Ogun State, Nigeria. A survey research design was adopted for this study. A total enumeration sampling technique was employed to select 168 librarians in thirteen (13) academic libraries in Ogun State. A self-designed and close-ended questionnaire was used to gather data from the respondents. Descriptive statistics and multiple regression were used to analyze the data gathered. Findings revealed that, awareness of Fourth Industrial Revolution (4IR) technologies is high. The 4IR technologies that were used most are Fifth Generation (5G) Wireless, Virtual Reality, and Radio Frequency Identification Device (RFID) Technology. The level of usage of 4IR technologies is moderate. The major challenges associated with the application of 4IR technologies in selected academic libraries include inadequate ICT skills, inadequate funding for 4IR technologies, and inadequate staff capacity. There was a significant

relationship between awareness of 4IR technologies and the application of Fourth Industrial Revolution (4IR) technologies (p < .05). There was a significant relationship between the use of 4IR technologies and the application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State (p < .05). Based on the findings, it was recommended that academic libraries should advocate for increased financial support from government agencies, educational institutions, and private organizations to facilitate the acquisition and maintenance of advanced 4IR technologies. Regular and targeted training programs should be organized to enhance the ICT skills of library staff, equipping them with the technical expertise needed to operate and manage 4IR technologies effectively.

Keywords: Awareness, Application, Use, 4IR technologies

Introduction

With the rapid growth in the volume of information in circulation arranged by the convergence and proliferation of Information Communication Technology (ICT), it has become impossible for libraries of any type, academic libraries in particular to acquire all the information resources both print and online that are necessary to satisfy the growing and dynamic needs of their users. To be able to satisfy the needs of 21st-century users, there is therefore need for partnership and collaboration among libraries, academic libraries especially. Librarians especially in academic libraries need to adopt the use of computers and telecommunications and other sophisticated technologies associated with the 4th industrial revolution to facilitate partnership and collaboration that can lead to the exchange of ideas and information resources that are required to satisfy the information needs of their user community. Since the information sources and resources that are located in different libraries all over the world have been packaged in digital formats as a result of digital technologies, libraries and librarians can explore the availability of the technology to partner together and share online databases, electronic journals, online reference tools, web resources, electronic books, etc (Amugen, Gloria, Ochigbihi and Ademola, 2022).

The Fourth Industrial Revolution (4IR) is a transformative era characterized by the convergence of digital, physical, and biological systems. It builds upon the advancements of the previous industrial revolutions, particularly in the realms of automation, computing, and connectivity. Unlike earlier revolutions, 4IR is driven by technologies that blur the lines between the physical and virtual worlds. These innovations have the potential to fundamentally reshape industries, economies, and societies. Key technologies associated with 4IR include Artificial Intelligence (AI), the Internet of Things (IoT), blockchain, big data, cloud computing, robotics, Augmented Reality (AR) and Virtual Reality

(VR), as well as 3D printing. AI enables machines to mimic human cognitive functions, allowing for intelligent decision-making processes. IoT connects everyday devices to the internet, creating smart environments that can communicate and collect data. Blockchain offers secure and transparent methods for transaction and data management while big data allows for the analysis of vast amounts of information to uncover patterns and trends (Wigmore, 2022).

Academic libraries have always been central to higher education, providing vital resources and services that support teaching, research, and learning. Academic libraries curate and manage collections of scholarly work, supporting both students and faculty in the pursuit of knowledge. Through services like interlibrary loans, reference assistance, and research consultations, libraries ensure that users can access the information they need to complete assignments, publish research and stay current in their fields (Oden and Owolabi, 2021). The awareness and adoption of 4IR technologies in academic libraries are still in their early stages, although some institutions have made strides (Hussain, 2019). Many academic library professionals are becoming increasingly aware of the importance of technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), cloud computing, and blockchain, recognizing their potential to improve library services, enhance user experiences, and streamline operations (Yakubu and Abubakar, 2022). The integration of Fourth Industrial Revolution (4IR) technologies in academic libraries has the potential to revolutionize library operations, enhance user experience, and streamline management processes. While integrating cutting-edge technologies like Artificial Intelligence (AI), Internet of Things (IoT), Robotics Process Automation (RPA), Blockchain, 3D printing, Quantum computing, Augmented Reality (AR) / Virtual Reality (VR), Biometrics, Big Data Analytics, 5G wireless, Radio Frequency Identification (RFID), and Book Delivery Drones, academic libraries can offer more efficient, accessible, and user-centric services (Yakubu and Abubakar, 2022). Thus, from the foregoing background, it became imperative to examine the application of Fourth Industrial Revolution (4IR) technologies awareness and use in selected academic libraries in Ogun State, Nigeria.

Statement of the Problem

The adoption of Fourth Industrial Revolution (4IR) technologies in academic libraries has become imperative as these institutions face mounting pressure to align with the rapid technological advancements reshaping academia. Despite the potential of 4IR technologies—such as Artificial Intelligence (AI), Internet of Things (IoT), Blockchain, and Big Data analytics—to revolutionize library services, their integration into academic libraries remains limited,

especially in developing countries like Nigeria. Many academic libraries rely on outdated systems, which compromise their ability to deliver efficient modern services to users. The slow adoption of 4IR technologies stems from several challenges, including high implementation costs, limited awareness, and a lack of expertise in leveraging these technologies effectively. Consequently, these barriers result in inefficient resource management, poor user experiences and restricted access to digital content. Libraries that fail to embrace 4IR technologies risk falling behind, ultimately impeding teaching, learning, and research activities.

Furthermore, tech-savvy students and faculty increasingly expect seamless access to digital resources and interactive learning environments. Academic libraries that cannot meet these demands may face declining relevance, reduced competitiveness in the global education sector, and displeasure among users. While some progressive libraries in developed regions have successfully integrated 4IR technologies, the situation in many developing countries underscores a significant gap in implementation. This calls for a deeper investigation into the barriers to 4IR adoption and strategies for overcoming them, with a focus on enhancing the user experience and maintaining the competitive edge of academic libraries in a rapidly evolving digital landscape. Hence, it is therefore imperative to investigate the current state of 4IR technology awareness and usage in selected academic libraries in Ogun state.

Research Questions

The following research questions are carefully formulated to guide the study:

- What is the level of awareness of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State?
- Which fourth Industrial Revolution (4IR) technologies are currently being used in selected academic libraries in Ogun State?
- What is the level of usage of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State?
- Which fourth Industrial Revolution (4IR) technologies apply to library services in selected academic libraries in Ogun State?
- What are the challenges associated with the application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State?

Research Hypotheses

$H0_1$: There is no significant relationship between awareness of 4IR technologies

and application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State

$H0_2$: There is no significant relationship between the use of 4IR technologies and the application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State

Literature Review

The Fourth Industrial Revolution brings digital transformation by enabling everything to be connected by cyber-physical systems that are smart enough to communicate with one another using common internet-based protocols, analyze data to detect failure, configure themselves, and adapt to changes. Without a doubt, embracing 4IR will result in considerable productivity improvements as processes become faster and more effective, resulting in higher-quality products at lower costs. However, this raises concerns about the impact of this innovation on the human workforce (Anshari, Syafrudin and Fitriyani 2022). Philbeck and Nicholas (2019) asserted that the third industrial revolution began in the 1950s leading to the invention of computers and the internet. It is characterized as computerization and web-based interconnectivity, the expansion and access to education rose to a greater prominence with globalization of academic research accelerated by online technology.

Mazur (2019) expressed that the third industrial revolution brought education to an environment where access to information is immediate and free, shifting focus towards active learning pedagogies that place premium in collaboration within diverse teams and peer learning environments. The 4IR is the prevalent and developing environment in which disruptive technologies and trends are changing the way we live and work. The impact of the 4IR technologies is still unknown. It is certain that it will bring a profound change in every aspect of human endeavor. The need for Library and Information Schools to respond to it is very necessary. It will afford students the opportunity to develop capacity in the fast-emerging area. Spotti and Windelband (2020) stated that the fourth industrial revolution is associated with a lot of changes that intends to enforce digitalization, network and virtualization in every aspect of life. It has to do with automation and data exchange in manufacturing technologies which are based on digital technology.

Grim (2020) in his study support that 47% of jobs in US maybe at risk of automation in the near future. This will bring about a future where many of the elements of what we consider as industry labour force within large companies will no longer exist. Emerging technologies has transformed the way library and

information services are been delivered to users. Zeruodi (2020) expressed that the new emerging technologies will also bring about a paradigm shift on how educators teach, with the evolution of online, artificial intelligence, new guidelines are needed to provide a theoretical basis for digital pedagogy. Igbokwe-Ibeto, Okonkon and Onuzulike-Chukwuemeka (2022) believed that the world today is undergoing complex and dynamic industrial revolution. Government all over the world are coming up with different ways and methods of addressing the challenges posed by service delivery innovation. The Fourth Industrial Revolution (4IR) is one of the foremost innovations that the human mind has come up with to confront the rising challenges attendant on globalization and industrialization. Igbokwe-Ibeto, Okonkon and Onuzulike Chukwuemeka (2022) expressed that the third used electronics and information technology to automate production. Now, a 4IR is building on the third, the digital revolution ensures speed and efficiency that fundamentally alters the way we live, work, and relate to one another in all areas of human endeavours. 4IR is helping to revolutionize the transaction of government business, libraries, knowledge and satellite technologies for communication and displace most human resources activities in organizations. Automated innovations in libraries are having significant effects on employment and work process patterns in the public sector organisations.

Liman and Abdulkadir (2022) that libraries in some parts of African countries still find it difficult to perform basic tasks of online searching, web technology, understand and use computer hardware and software and perform basic Internet search activities due to poor knowledge of digital technology. Despite these problems, digital technologies have opened up opportunities for libraries to engage, inspire, enable, and connect in information sharing, media literacy, digital learning ability, communication, digital content creation, digital identification, and information and communication technology (ICT) services. Libraries require digital technology services in operating computers, ICTs, and other digital facilities for development to meet the Fourth Industrial Revolution expectations in providing effective and efficient information services.

Research Methodology

A survey research design of correlational type was used for this study. The population of this study comprised librarians of Nimbe Adedipe Library, University of Agriculture (FUNAAB), Abeokuta, Ogun state; University of Ibadan (UI), Ibadan, Oyo state, University of Lagos (UNILAG), Lagos state; Tai Solarin University of Education, Ijagun, Ogun state; Olabisi Onabanjo University, Ago-Iwoye, Ogun state; Babcock University, Ilishan-Remo, Ogun state; Lead City

University, Ibadan, Oyo state; Covenant University, Ota, Ogun state; Crawford University, Igbesa, Ogun state; Crescent University, Abeokuta, Ogun state; Christopher University, Mowe, Ogun state; Mountain Top University, Prayer City, Ogun state and National Open University of Nigeria, Abeokuta, Ogun state, which is estimated at 168.

Table 1: Population of the Study

S/N	Academic Libraries	Population
1.	Nimbe Adedipe Library, University of Agriculture (FUNAAB), Abeokuta, Ogun State	23
2.	University of Ibadan (UI), Ibadan, Oyo State	30
3.	University of Lagos (UNILAG), Lagos State	12
4.	Tai Solarin University of Education, Ijagun, Ogun State	7
5.	Olabisi Onabanjo University, Ago-Iwoye, Ogun State	12
6.	Babcock University, Ilishan-Remo, Ogun State	28
7.	Lead City University, Ibadan, Oyo State	10
8.	Covenant University, Ota, Ogun State	22
9.	Crawford University, Igbesa, Ogun State	7
10.	Crescent University, Abeokuta, Ogun State	7
11.	Christopher University, Mowe, Ogun State	2
12.	Mountain Top University, Prayer City, Ogun State	4
13.	National Open University of Nigeria, Abeokuta, Ogun State	4
	Total	**168**

Source: Field Survey, 2024

Total enumeration technique was used for the study. The sample size was 168. Research instrument used was a structured closed-end questionnaire titled, 'Application of Fourth Industrial Revolution (4IR) Technologies Awareness and Use Questionnaire (AFIRTAUQ)' was developed and used as an instrument to gather data from librarians in the selected academic libraries in Ogun State, Nigeria. To provide meaning to data collected from the questionnaire, information was analyzed and interpreted using descriptive statistics (frequency, percentage, mean, and standard deviation), and Multiple Regression Analysis (MRA), with the use of Statistical Package for Social Science (SPSS) version 26.

Results

RQ1: What is the level of awareness of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State?

Table 2: Level of awareness of Fourth Industrial Revolution (4IR) technologies

Level of Librarians' Awareness	VHE	HE	LE	VLE	Mean $(\bar{x})$	Std. Dev.
Artificial Intelligence	61	75	15	17	2.99	0.921
Internet of Things	65	57	21	25	2.89	1.087
Robotic Process Automation (RPA)	63	61	13	31	2.86	1.138
Block Chain Technology	49	73	27	19	2.83	0.988
3D Printing	51	55	33	29	2.77	1.103
Quantum Computing	47	62	23	36	2.71	1.091
Augmented Reality/Virtual Reality	41	74	41	12	2.71	0.921
Biometrics Technology	39	71	48	10	2.70	0.907
Big Data Analytics	35	66	57	10	2.69	0.869
Fifth-generation (5G) Wireless	31	79	44	14	2.69	0.884
RFID Technology	27	88	43	10	2.67	0.832
Virtual Reality	25	87	50	6	2.65	0.798
Augmented Reality	17	98	42	11	2.64	0.774
Book Delivery Drones	37	59	33	39	2.50	1.088
Average Mean					**2.74**	**0.959**

Decision rule: < 2.5=Low; 2.5 – 2.7 =Moderate; 2.8 and above=High

Result in Table 3 showed the level of awareness of Fourth Industrial Revolution (4IR) technologies and the result showed that the average mean awareness score ($\bar{x}$ = 2.74, S.D. = 0.959) is higher than the criterion mean ($\bar{x}$ = 2.50). The result indicates that the level of awareness of Fourth Industrial Revolution (4IR) technologies is high.

RQ2: Which Fourth Industrial Revolution (4IR) technologies are currently being used in selected academic libraries in Ogun State?

Table 3: Fourth Industrial Revolution (4IR) technologies currently used in academic libraries.

Fourth Industrial Revolution Technologies	YES (Freq, %)	NO (Freq, %)
Fifth Generation (5G) Wireless	91 (54.2%)	77 (45.8%)
Virtual Reality	89 (53.0%)	79 (47.0%)
Radio Frequency Identification Device (RFID)	87 (51.8%)	81 (48.2%)
Biometrics Technology	82 (48.8%)	86 (51.2%)
Big Data Analytics	74 (44.0%)	94 (56.0%)
Augmented Reality	67 (39.9%)	101 (60.1%)
Artificial Intelligence	66 (39.3%)	102 (60.7%)
Augmented Reality/Virtual Reality	63 (37.5%)	105 (62.5%)
3D Printing	62 (36.9%)	106 (63.1%)
Internet of Things	59 (35.1%)	109 (64.9%)
Blockchain Technology	55 (32.7%)	113 (67.3%)
Robotic Process Automation (RPA)	55 (32.7%)	113 (67.3%)
Quantum Computing	54 (32.1%)	114 (67.9%)
Book Delivery Drones	51 (30.4%)	117 (69.6%)

The results in Table 3 show the types of Fourth Industrial Revolution (4IR) technologies currently used in selected academic libraries in Ogun State. The most widely used technologies include Fifth Generation (5G) Wireless (54.2%), Virtual Reality (53.0%), and Radio Frequency Identification Device (RFID) Technology (51.8%).

RQ3: What is the level of usage of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State?

Table 4: Level of usage of fourth industrial revolution technologies

4IR Technologies	VHE	HE	LE	VLE	Mean	Std. Dev.
Artificial Intelligence	35	64	43	26	2.64	0.941
Internet of Things	50	61	33	24	2.82	1.017
Robotic Process Automation (RPA)	23	72	45	28	2.54	0.903
Blockchain Technology	31	54	48	35	2.48	1.023
3D Printing	47	57	39	25	2.75	0.994
Quantum Computing	38	52	46	32	2.57	1.015
Augmented Reality/Visual Reality	28	66	48	26	2.57	0.906
Biometrics Technology	29	63	48	28	2.55	0.917
Big Data Analytics	15	78	47	28	2.47	0.843
Fifth Generation (5G) Wireless	26	62	49	31	2.49	0.929
Radio Frequency Identification Device (RFID)	18	70	48	32	2.44	0.867
Virtual Reality	34	43	58	33	2.46	1.011
Augmented Reality	12	70	52	34	2.35	0.911
Book Delivery Drones	24	55	48	41	2.37	1.011
Average Mean					**2.54**	**0.949**

Decision rule: < 2.5=Low; 2.5 – 2.7 =Moderate; 2.8 and above=High

Table 4 displays the extent of usage of Fourth Industrial Revolution (4IR) technologies in academic libraries in Ogun State. With an average mean of 2.54 and standard deviation value of 0.949, which reflects a moderate usage of 4IR technologies in the libraries.

RQ4: What are the challenges associated with the application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State?

Table 5: Challenges associated with the application of 4IR technologies

Challenges	SA	A	D	SD	Mean	Std. Dev.
Inadequate staff capacity	44	72	26	26	2.80	0.963
Incompatibility of library software/hardware	36	66	40	26	2.67	0.902
Low awareness of 4IR technologies	48	58	36	26	2.76	0.951
Librarians' resistance to change	40	60	42	26	2.68	0.942
Inadequate ICT skills	55	65	28	20	2.92	0.892
Lack of exposure to international standards	28	65	48	27	2.56	1.016
Lack of policies to support 4IR technologies	35	58	45	30	2.58	1.038
Lack of technical know -how of 4IR technologies	32	54	45	37	2.48	1.103
Technological obsolescence	42	55	48	23	2.69	0.965
Inadequate technological infrastructure	50	52	41	25	2.76	0.988
Inadequate funding for 4IR technologies	52	54	38	24	2.80	0.912
Poor maintenance culture	46	49	44	29	2.66	1.011

Result in Table 5 shows that the major challenges associated with the application of 4IR technologies in selected academic libraries include inadequate ICT skills (Mean = 2.92, SD = 0.892), inadequate funding for 4IR technologies (Mean = 2.80, SD = 0.912), and inadequate staff capacity (Mean = 2.80, SD = 0.963).

Test of Hypotheses

$H0_1$: There is no significant relationship between awareness of 4IR technologies and application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State

Table 6: ANOVA[a] summary of significance level in the Multiple Regression Analysis of Research

Hypothesis 1

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.484[a]	.234	.231	.839

a. Predictors: (Constant), Awareness

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	52.965	1	52.965	75.314	.000[b]
	Residual	172.999	166	.703		
	Total	225.964	167			

•Dependent Variable: Application of Fourth Industrial Revolution (4IR) technologies

Looking at the results of regression analysis of Table 6 (R = .484[a]; R^2 = .234; R^2adj = .231), independent variable (awareness of 4IR technologies), contributes to variance in application of Fourth Industrial Revolution (4IR) technologies by 23.4%. The remaining unexplained 76.6% could be attributable to the preponderance of several other variables not covered by this study. Moreover, the result indicates that there is statistically significant relationship between awareness of 4IR technologies and application of Fourth Industrial Revolution (4IR) technologies. Therefore, it can be assumed that librarians' awareness significantly predicts the application of 4IR technologies in selected academic libraries in Ogun State.

$H0_2$: There is no significant relationship between use of 4IR technologies and application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State

Table 7: ANOVA[a] summary of significance level in the Multiple Regression Analysis of Research Hypothesis 2

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.931[a]	.866	.866	.351

a. Predictors: (Constant), Use of 4IR

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	195.721	1	195.721	1592.04	.000[b]
	Residual	30.243	166	.123		
	Total	225.964	167			

•Dependent Variable: Application of Fourth Industrial Revolution (4IR) technologies

Looking at the results of regression analysis of Table 7 (R = .931[a]; R^2 = .866; R^2adj = .866), independent variable (use of 4IR technologies), contributes to variance in application of Fourth Industrial Revolution (4IR) technologies by 86.6%. The remaining unexplained 13.4% could be attributable to the preponderance of several other variables not covered by this study. Moreover, the result indicates that there is statistically significant relationship between use of 4IR technologies and application of 4IR technologies. Therefore, it can be assumed that use of 4IR technologies by librarians significantly predicts the application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State.

Discussion of Findings

The study showed that the level of awareness of Fourth Industrial Revolution (4IR) technologies is high. This finding aligns with the study of Yakubu and Abubakar (2022), who asserted that there is growing awareness among academic libraries regarding the potential of 4IR technologies to enhance library services, improve user experiences, and streamline operations. The recognition of technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and Virtual Reality (VR) is increasing, particularly as academic libraries explore ways to stay relevant in the digital age. Similarly, Chigwada and Chisita (2021) highlighted that the integration of these technologies is recognized as essential for academic libraries to remain competitive and adapt to the evolving needs of their users.

The study showed that the types of 4IR technologies majorly used include Fifth Generation (5G) Wireless, Virtual Reality, and Radio Frequency Identification Device (RFID) Technology. This finding is in line with the study of Anshari, Syafrudin and Fitriyani (2022), who identified key technologies, including RFID and 5G, as being widely used in the academic sector. The authors pointed out that RFID technology has been pivotal in improving the efficiency of library management systems, such as inventory tracking and user access control, which enhances operational efficiency.

The study showed that the level of usage of 4IR technologies is moderate. This finding aligns with the study of Hussain (2019), who highlighted that although awareness of 4IR technologies is high, their actual usage in academic libraries remains moderate due to barriers such as limited funding, staff capacity, and training. These challenges often prevent libraries from fully embracing the transformative potential of these technologies.

The study showed that the major challenges associated with the application of 4IR technologies in selected academic libraries include inadequate ICT skills, inadequate funding for 4IR technologies, and inadequate staff capacity. This finding aligns with the study of Yakubu and Abubakar (2022), who asserted that the integration of 4IR technologies in academic libraries is hindered by the lack of adequate ICT skills among library staff. Training and capacity building are crucial to enabling effective technology implementation, but many institutions still face challenges in providing these resources. Similarly, Anshari, Syafrudin, and Fitriyani (2022) highlighted that financial constraints are a significant barrier, as libraries often struggle to secure the necessary funding to acquire and maintain advanced technologies.

The study revealed that there was a significant relationship between awareness of 4IR technologies and the application of Fourth Industrial Revolution

(4IR) technologies in selected academic libraries in Ogun State. This finding highlights the importance of awareness in the adoption and application of 4IR technologies in academic libraries. It aligns with the study of Igbokwe-Ibeto, Okonkon, and Onuzulike-Chukwuemeka (2022), who asserted that the Fourth Industrial Revolution (4IR) has profoundly impacted library services, where technological awareness is crucial for effective implementation. As librarians become more aware of technologies like artificial intelligence, machine learning, and big data, they are better equipped to integrate these tools into library services to enhance user experiences and improve information accessibility.

The study revealed that there was a significant relationship between the use of 4IR technologies and the application of Fourth Industrial Revolution (4IR) technologies in selected academic libraries in Ogun State. This is supported by the research of Ansari, Syafrudin, and Fitriyani (2022), who found that libraries that actively utilized technologies such as big data, artificial intelligence, and cloud computing experienced significant improvements in the efficiency and scope of their services. The study highlighted how practical integration of these technologies enabled libraries to streamline processes, reduce manual workloads, and enhance user experience, thus facilitating the broader application of 4IR tools.

Conclusion

In conclusion, while awareness of 4IR technologies is high, the level of usage remains moderate. This indicates that libraries have acknowledged the importance of 4IR but face barriers in fully integrating them into their operations. The major challenges such as inadequate ICT skills, insufficient funding, and low staff capacity, which hinder the effective application of 4IR technologies. Despite these challenges, certain 4IR technologies, including 5G wireless, Virtual Reality, and Radio Frequency Identification (RFID) technology, are in use, indicating a degree of adoption. While academic libraries in Ogun State are aware of the potential benefits of 4IR technologies, a gap exists in terms of resources and technical expertise to maximize their utilization. Moreover, creating a supportive environment that fosters innovation and technological advancement could enable these libraries to overcome existing challenges and better serve their academic communities.

Recommendations

Based on the findings, the following recommendations were made:

- Academic libraries should advocate for increased financial support from government agencies, educational institutions, and private organizations to facilitate the acquisition and maintenance of advanced 4IR technologies.

- **Regular** and targeted training programs should be organized to enhance the ICT skills of library staff, equipping them with the technical expertise needed to operate and manage 4IR technologies effectively.
- **Libraries** should implement robust awareness campaigns highlighting the benefits and applications of 4IR technologies to increase user adoption and engagement.
- **Partnerships** with technology companies and innovators could provide academic libraries with access to the latest 4IR tools and solutions at subsidized rates.

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