

Awareness, Perception, and Skills of Librarians for the Implementation of 5th IR in Academic Libraries: Implications on Open and Distant Learning

Loveth Ogoegbunam EKWUEME¹, Babarotimi Opeyemi OLUWASEUN², Ifeoma Abigail AJIE³, Patricia Ngozi OFODU⁴, Smart Eromosele AMBROSE⁵

National Open University of Nigeria
University Village, Plot 91,
Cadastral zone, Nnamdi
Azikiwe Express Way, Jabi, Abuja

ABSTRACT

The Fifth Industrial Revolution (5IR) merges digital, physical, and biological technologies, transforming society and education. Integrating 5IR in libraries can enhance librarians' roles in knowledge creation and dissemination, boosting student engagement and collaboration. This study explores the awareness, perceptions, and skills of librarians at the National Open University of Nigeria (NOUN) concerning 5IR integration in university libraries, especially in open and distance learning contexts. The study surveyed all sixty librarians at NOUN using a Google Form questionnaire, yielding forty-four responses. These responses were analyzed with SPSS, employing descriptive statistics and regression analysis. The findings reveal a high awareness of 5IR technologies among librarians, with robotics being the most recognized. Professional rank and qualification significantly influenced this awareness, with higher ranks and qualifications correlating with greater awareness. Librarians generally view 5IR technologies positively, believing they can enhance diversity and inclusiveness in library services, particularly by providing individualized learning materials. However, there are concerns about the skills required to effectively operate these technologies, particularly in evaluating and selecting appropriate ones. The study suggests that while NOUN librarians are well-aware of and positive about 5IR technologies, there is a need for improved skills and competencies. Targeted professional development and training programs are recommended to help librarians effectively and inclusively implement 5IR, thereby enhancing service delivery and support for open and distance learning.

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INTRODUCTION

There are assumptions that traditional libraries systems and practices would gradually go nonexistent if they don't upgrade their activities digitally for trending ways of providing services and delivery of information, due to the emerging technologies. Technology - enabled services have provided a better working situation for libraries and among the librarians, but the saying always goes like this, is there any advocacy on the use and

benefits of these technologies on the part of librarians and library management at large, to increase their awareness for their acceptance and use.

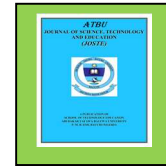
The 5th Industrial Revolution, characterized by the merging of digital, physical, and biological technology, is reshaping society, including education. This revolution is centred on the convergence of these technologies. (Valette, Bril El-Haouzi & Demesure 2023). Implementing

Corresponding author: Loveth Ogoegbunam Ekwueme

✉ lovethoe@gmail.com

National Open University of Nigeria (NOUN), Abuja, Nigeria.

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the fifth industrial revolution in university libraries allows librarians to enhance their position as facilitators of knowledge creation and dissemination. Librarians can enhance students' engagement with educational materials and improve collaboration among peers by adopting new technologies and creative methods in library services. It is a frequent idea that as awareness grows, usage also increases. An individual who lacks familiarity with a system or resource is unable to utilize it due to their lack of prior understanding. Libraries and librarians in developing nations like Nigeria need to grasp the notion of the fifth Industrial Revolution (IR) to provide top-notch and valuable services. Librarians' views on the fifth Industrial Revolution focus on how willing individual librarians in a university library are to adopt and communicate the knowledge they have acquired or created about the fifth Industrial Revolution. A librarian's level of information and communication technology (ICT) skills will have an impact on their ability to provide services during the fifth industrial revolution. (Owolabi, et al. 2021).

In today's fast-paced technological age, open and distance learning has evolved as a primary mode of education delivery, enabling access to new and unparalleled learning resources. Academic libraries are critical for educational institutions because they provide a wide range of content and services to support open and distance learning. University libraries will encounter opportunities and challenges as they execute the fifth industrial revolution. Aderonumu (2021) emphasized that as of right now, everyone worries that Industry 5.0 is approaching too quickly because the Fourth Industrial Revolution is still spreading. He further explained that while disruptive technologies like big data, cloud computing, the Internet of Things, artificial intelligence, blockchain, and others are rapidly altering the socio-economic landscape, they are also creating new business models, reshaping industries, and facilitating the amazing era of a new industrial revolution while also changing the skills needed for the future.

The Fifth Industrial Revolution, or Industry 5.0, is the name given to that next

industrial revolution that is supposedly knocking on doors. Librarians must improve their awareness, perceptions, and skills to effectively support open and distance learning, which is a key challenge they face. Staying up to date on contemporary technological breakthroughs such as artificial intelligence, machine learning, and big data analytics is critical since they are transforming how information is accessed, analysed, and used in education. Librarians must stay current on students' changing needs and expectations in the digital age, as students today expect ongoing access to information from anywhere and at any time.

AI chatbots, intelligent libraries, robots, and other AI applications will improve information retrieval, automate routine tasks, personalise user interactions, and provide innovative services to library users, according to the author, who believes that the use of artificial intelligence (AI) in libraries has enormous potential for revolutionising library operations and improving user experiences. The author also discusses the various ways AI technologies are used in universities and libraries. The capacity of chatbots powered by artificial intelligence to efficiently manage consumer inquiries and provide prompt assistance can considerably boost overall user satisfaction. Intelligent libraries that use artificial intelligence technology can streamline their cataloguing, classification, and recommendation processes, allowing customers to access material more effectively.

Adetayo (2023) stated that AI-powered chatbots, such as ChatGPT, have emerged as valuable tools for academic libraries since their launch. In addition to providing patrons with timely and accurate answers to their questions, they also offer convenience and accessibility outside of regular library hours. ChatGPT's sophisticated language processing capabilities allow it to offer human-like and contextually relevant responses, making it an effective virtual assistant. Academic libraries can use ChatGPT to provide reference services, selectively disseminate material, and create complete collections. On the other hand, there are several challenges to overcome, such as the prospect of job loss in libraries, inappropriate

Corresponding author: Loveth Ogoegbunam Ekwueme
✉ lovethoe@gmail.com

National Open University of Nigeria (NOUN), Abuja, Nigeria.

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use of technology, erroneous responses to questions, and poor comprehension as compared to human librarians. Despite these challenges, ChatGPT has the potential to improve library services by automating simple tasks and saving librarians' time to give more complex help. This will eventually lead to higher quality and more efficient academic library services. Librarians must be aware of the 5th Industrial Revolution trends, embrace its emergence, and acquire the necessary information and communication technology skills to provide quality services and remain relevant. (Ajani, et al. 2022). This study aims to investigate librarians' awareness, perception, and skills regarding the integration of the Fifth Industrial Revolution in university libraries, particularly in the context of open and distance learning.

Research Objectives

1. Extent of the awareness of the 5th Industrial Revolution Technologies among librarians in Open and distance learning.
2. Examine the skills and competencies needed by librarians for the implementation of the 5th Industrial Revolution for Improving Diversity and Inclusive Services in Open and Distance Learning.
3. Identify the perception of the Librarian on the 5th Industrial Revolution technology in Improving Diversity and Inclusive library services in Open and Distance Learning.

Research Questions

1. To what extent are librarians in open and distance learning institutions aware of the technologies associated with the 5th Industrial Revolution?
2. What are the skills and competencies librarians need to effectively implement the 5th Industrial Revolution for improving diversity and inclusive services in open and distance learning?
3. What are the perceptions of librarians regarding the role of 5th Industrial

Revolution technologies in enhancing diversity and inclusive library services in open and distance learning?

LITERATURE REVIEW

Extent of librarians' awareness of the 5th Industrial Revolution

Eiriemiokhale and Sulyman (2023) carried out a study titled "Awareness and Perceptions of Artificial Intelligence among Librarians in University Libraries in Kwara State", Nigeria the study employed descriptive survey method. The data that was gathered was evaluated and shown using mean (\bar{x}), simple percentages, and frequency. The results showed that librarians are aware of Dynamed and chatbots. According to the research participants, AI is a good thing for librarians, can one day replace human librarians, and can be implemented in university libraries. In addition, the results showed that respondents thought AI is useful for university libraries since it helps with patron-tailored item recommendations, which in turn helps librarians save time by reducing manual and repetitive duties and makes it easier to find new information.

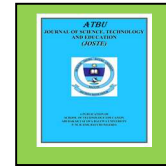
Abayomi *et al.* (2021) research sought to analyse the level of awareness and perception of artificial intelligence in the management of Nigerian university libraries. The research takes the form of a survey and employs both qualitative and quantitative approaches. The study population consisted of 80 academic librarians from eight university libraries around the country. The survey found that academic librarians are aware of the usage of artificial intelligence (AI) technologies in library operations. However, the most major barrier to embracing new technologies is the fear of losing their jobs. This is despite the fact that they understand that modern technology will allow for efficient user delight. In a similar study carried out by Subaveerapandiyam, Sunanthini and Anees (2023) studied the awareness and perception of artificial intelligence by librarians in Zambia. They found that LIS professionals were aware of the skills required to adopt AI technologies, hence their eager and prepared to take the leading roles.

Corresponding author: Loveth Ogoegbunam Ekwueme

✉ lovethoe@gmail.com

National Open University of Nigeria (NOUN), Abuja, Nigeria.

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Saibakumo (2021) carried out research on the “Awareness and acceptance of emerging technologies for extended information service delivery in academic libraries in Nigeria to discover that librarian’s level of awareness about the emerging technologies are found useful in academic libraries, which led to a progressive adoption and use of those emerging technologies. He also emphasized that among the listed emerging technologies, such as big data, cloud computing, the Internet of Things, artificial intelligence, and block chain among others are in the process of being adopted or fully adopted. More so Eiriemiokhale and Abdulakeen (2023) opined that findings of researchers have shown that the adoption of technologies and artificial intelligence in libraries and information centres are based on the awareness and perceptions of the LIS professionals, the awareness will lead to adoption, which will automatically affect positively their delivery services and hitch-free dissemination of information to users. The findings of Masenya and Chisita (2022) asserts that awareness of modern technologies that evolve through the 5th IR, such as internet of Thing (IOT), blockchain, cloud computing, brought about transformation in the way libraries deliver services and are providing them with opportunities to extend their relevance in the digital era. These technologies enhance and revolutionise information service delivery in libraries and how they interact with each other for a successful outcome.

In spite of these digital transformation and innovations that gave rise to new modes of organizing, processing and accessing information resources in the academic libraries, it still seems to be an imposing thing to librarians, not accommodating it wholly into their culture of usage. Several studies have highlighted the lack of awareness and understanding of emerging technologies among librarians. In a finding of Liman and Aliyu (2023), it was found that a significant percentage of librarians were unfamiliar with concepts like blockchain, machine learning, and augmented reality. This lack of awareness can hinder the adoption and implementation of these technologies in libraries, limiting such

potentials to enhance services. Collaboration can play a vital role in addressing the non-awareness issue, if librarians can foster in engaging with professional organizations, attending conferences, and participating in online communities, so as to strengthen their knowledge of some certain available concepts and technologies.

Noaman, Khan, Abrar., Ali, Alvi & Saleem (2022) carried out an investigation titled challenges of integration of heterogenous internet of things. According to the investigation, there are billions of connected objects in academic libraries that are diverse in character as a result of the internet of things (IOT). Heterogeneity in format, data, communication, and interoperability are a few of the variations in libraries.

Skills and competencies librarians need to effectively implement the 5th Industrial Revolution for improving diversity and inclusive services in open and distance learning

The incorporation of cutting-edge technology like big data analytics, artificial intelligence, and the Internet of Things into a variety of industries, including libraries and education, is what defines the Fifth Industrial Revolution (5IR) (Villar *et al.* 2023). By adjusting to technological changes and making sure that varied and inclusive services are offered to all users, especially those in open and distance learning environments, librarians play a critical part in this transition.

Digital literacy, or the capacity to use digital tools and technology for information management and service delivery, is one of the core competencies for librarians in the 5IR (Jyotsna & Madhu 2021). To satisfy the varied demands of users in open and distance learning contexts, librarians must be adept at leveraging digital resources, databases, and information systems. To facilitate evidence-based decision-making and improve service inclusiveness, librarians should also be skilled in data management, which includes data collecting, analysis, and visualization (Thiruppathi, 2024).

Corresponding author: Loveth Ogoegbunam Ekwueme
✉ lovethoe@gmail.com

National Open University of Nigeria (NOUN), Abuja, Nigeria.

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To accommodate a variety of learning needs, librarians should also be knowledgeable in information retrieval to obtain and distribute material from a variety of sources, including online databases and digital repositories (Bokoh *et al.* 2023). To promote accessibility and diversity, librarians must integrate digital catalogs, e-books, and online learning platforms into their services.

To cooperate with other individuals and organizations to share resources and expertise, librarians need to have strong networking and collaboration abilities. This will improve the overall diversity and inclusiveness of library services (Chisita *et al.* 2019). Librarians must exhibit flexibility and a dedication to continuous education to stay up to date with the latest technology developments and the changing needs of their users.

For librarians working in open and remote learning contexts, the Fifth Industrial Revolution offers both opportunities and challenges. Librarians may effectively implement the 5IR to improve diversity and inclusive services by obtaining the requisite skills and competencies. This will guarantee that all users have fair access to information and resources (Nurminen & Koponen 2020). According to Ziatdinov *et al.* (2024), the Fifth Industrial Revolution (5th IR) is characterized by the integration of advanced technologies such as big data analytics, artificial intelligence, and the Internet of Things across various industries, including libraries and education. Librarians play a crucial role in this transition by adapting to technological advancements and ensuring that diverse and inclusive services are provided to all users, particularly those in open and distance learning environments.

The perceptions of librarians regarding the role of 5th Industrial Revolution technologies in enhancing diversity and inclusive library services in open and distance learning

Librarians' perspectives on integrating Industrial Revolution technologies into their services shape how they approach and adapt to these systems. Ibinaiye and Jiyane (2021) emphasize the potential of 5th IR wireless

communications to improve service delivery for information specialists, suggesting that leveraging wireless technologies can strengthen the role of data science in supporting data librarianship.

In contrast to the concern that technology might replace librarians, Apriliyanti and Ilham (2022) argue that librarians will remain crucial, even as library users interact with robots under librarian control. However, a study by Abayomi *et al.* (2020) on AI's perception and awareness in managing university libraries in Nigeria revealed that librarians perceive AI as a potential threat to their jobs, seeing it as computer programs mimicking human intelligence. Despite these concerns, librarians generally agree that AI can drive innovation, boost productivity, automate services, and enhance access to library information. Similarly, library professionals in Indian libraries anticipate that AI implementation will improve various aspects of library functions, such as information retrieval, inclusiveness, user engagement, decision-making support, efficiency, and resource management (Subaveerapandiyar & Gozali, 2024).

Wood and David (2018) discovered that librarians believe supercomputing will not replace their roles but rather increase the demand for more librarians and transform librarianship. Despite these positive perspectives, some respondents were unaware of developments such as the interactive talking library robot Xiaotu at the University of Beijing, indicating potential gaps in their awareness of AI advancements in libraries. Additionally, the New Media Consortium suggests that AI's use in libraries can reduce the burden on librarians, allowing them to focus on teaching and enhancing research efforts.

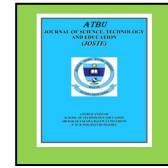
The Fifth Industrial Revolution, characterized by the use of artificial intelligence and robotics, is poised to revolutionize how humans work (Muir, 2018). *Ali et al.* (2022) underscore that the critical transformation in artificial intelligence under the fifth industrial revolution will shift tasks from humans to machines capable of independent thinking, learning, evaluation, and decision-making. However, questions arise regarding responsibility for AI's actions and the control and governance of

Corresponding author: Loveth Ogoegbunam Ekwueme

✉ lovethoe@gmail.com

National Open University of Nigeria (NOUN), Abuja, Nigeria.

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its behavior, along with issues of data privacy and ownership.

The rapid technological advancements of the Fifth Industrial Revolution pose ethical challenges, including a loss of confidence in technology, data privacy concerns, and issues of trust due to data manipulation (World Economic Forum, 2016). Payton et al. suggest that due to the extensive data collection and analysis in the Fifth Industrial Revolution, robust data protection mechanisms and privacy regulation are essential. To balance technological innovation, policymakers, businesses, and individuals should adopt strong cybersecurity measures to safeguard their data (Ali et al., 2022).

METHODOLOGY

The study area covered all the librarians in National Open University of Nigeria. The population for the study is sixty (60) librarians from the National Open University of Nigeria. The entire population was used for the study due to its manageable size.

The Google Form questionnaire was used for the collection of data. The Google Form questionnaire was sent to all the librarians' email and WhatsApp group account. Forty-four (44) out of sixty (60) respondents filled the form correctly and submitted.

The study utilized Statistical Packages for Social Sciences (SPSS) to analyze the

responses, which were coded in a spreadsheet. The data was organized in tables based on the questionnaire and analyzed using Simple percentage (%), Mean (x) scores, and Standard Deviation (SD). Analysis values were assigned to the four response categories, and the mean was interpreted in line with the 4-point scale ranging from (4) highest to (1) the lowest. In decision making, the lower limit of the high degree response category, which was 2.50, was used as a cutoff. Any item with a mean response of 2.50 and above was accepted as an influencing factor. Linear regression was used in testing the hypotheses, and the results were based on a P-value of 0.05 benchmark. Where the level of significance is above 0.05, it means that there is no significant relationship between the variables.

RESULTS

Awareness, Perception, and Skills of Librarians for the Implementation of 5th IR in Academic Libraries: Open and Distant Learning

Research Question 1: To what extent are librarians in open and distance learning institutions aware of the technologies associated with the 5th Industrial Revolution?

Table 1: Extent of Awareness of the 5th Industrial Revolution Technologies among Librarians in Open and Distance Learning.

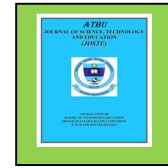
Items	Mean	SD	Remarks
I am aware of 5th Industrial Revolution Technologies	3.67	.640	Agreed
Internet of Things (IoT) helps machines and equipment connect and collaborate better.	3.69	.468	Agreed
I am aware of Robot machine	3.58	.543	Agreed
Robotics is enabling machines that perform various tasks faster, more accurately, and more efficiently.	3.80	.405	Agreed
I am aware of smart machines	3.60	.539	Agreed
I'm aware of Artificial Intelligence (AI)	3.58	.499	Agreed
Artificial intelligence is a natural language processing that allows robots decide, solve, and learn.	3.62	.490	Agreed
I'm aware of Machine learning and Deep Learning	3.49	.695	Agreed
I am aware of Augmented Reality (AR), Virtual Reality (VR) and Additive Manufacturing (3D printing)	3.04	1.107	Agreed

Corresponding author: Loveth Ogoegbunam Ekwueme

✉ lovethoe@gmail.com

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Librarians in Open and Distance Learning exhibit a high level of awareness of 5th Industrial Revolution Technologies, with a mean awareness score of 3.67 and a standard deviation of 0.640mthis is line with the view of Abayomi *et al.* (2021), Subaveerapandiyan, Sunanthini and Anees (2023) that found out that academic librarians are aware of the usage of artificial intelligence (AI) technologies in library operations. Among the specific technologies, librarians are most aware of robotics, with a mean score of 3.80, followed by IoT (Mean = 3.69) and smart machines (Mean = 3.60). The least known technologies are AR, VR, and 3D printing, with a mean score of 3.04, indicating a lower level of awareness compared to other technologies. While age, gender, and length of service do not significantly affect awareness, professional rank and qualification play significant roles, with higher ranks and qualifications associated with greater awareness. This suggests that professional

development and training initiatives focusing on these technologies could benefit all librarians, regardless of demographic factors.

The librarians are positive about the potential of 5th Industrial Revolution Technologies to improve diversity and inclusiveness in library services, with a mean perception score of 3.15 and a standard deviation of 0.608. This is in tandem with the views of Subaveerapandiyan & Gozali (2024) and Chisita *et al.* (2019) which stated that library professionals in Indian libraries anticipate that AI implementation will improve various aspects of library functions, such as information retrieval, inclusiveness, user engagement, decision-making support, efficiency, and resource management.

H0₁: There will be no relative effects of demographic variable on librarians' awareness of the 5th Industrial Revolution Technologies in Open and Distance Learning

Table 2: Relative effects of demographic variables on librarians' awareness of the 5th Industrial Revolution Technologies in Open and Distance Learning

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.584	.319		11.223	.000
Age Range	-.041	.100	-.070	-.414	.681
Gender	-.260	.130	-.276	-1.991	.053
Rank	-.327	.098	-.844	-3.330	.002
Year of Service	.111	.097	.215	1.145	.259
Qualification	.518	.178	.690	2.918	.006

The table above shows the relative effects of demographic variables on librarians' awareness of 5th Industrial Revolution technologies in open and distance learning. Age ($\beta = -0.70$, $t = 10.414$, $P > 0.05$), Gender ($\beta = 0.276$, $t = -1.991$, $P > 0.05$), Rank ($\beta = -0.844$, $t = -3.330$, $P < 0.05$), length of services ($\beta = 0.215$, $t = 1.145$, $P > 0.05$), and Qualification ($\beta = 0.690$, $t = 2.918$, $P < 0.05$), therefore rank and qualification were found to be significant determinants of librarians

awareness of the 5th Industrial Revolution Technologies while age, gender, and length of service were not significant.

Research Questions 2: What are the perceptions of librarians regarding the role of 5th Industrial Revolution technologies in enhancing diversity and inclusive library services in open and distance learning?

Corresponding author: Loveth Ogoegbunam Ekwueme
lovethoe@gmail.com
 National Open University of Nigeria (NOUN), Abuja, Nigeria.
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Table 3: The perceptions of librarians regarding the role of 5th Industrial Revolution technologies in enhancing diversity and inclusive library services in open and distance learning

Items	Mean	SD	
I am excited that the potentials of the 5th Industrial Revolution Technology will transform and improve diversity and inclusive Library Services in Open and Distance Learning.	3.51	.506	Agreed
The 5th Industrial Revolution Technology will bring ethical challenges such as data privacy because it can be manipulated to serve the interests of specific parties.	3.38	.535	Agreed
I do not have the skills to use AI tools, chatbots, and other virtual assistants in libraries present in the 4th IR hence cannot operate the 5th IR for library services.	2.42	.965	Disagreed
5th IR may bring about trust deficit and loss of confidence in technology because there may be existence of privacy violation.	2.51	1.079	Agreed
5th IR will improve diversity and inclusive library services in open and distance learning through provision of individualised learning materials	3.53	.625	Agreed
Artificial intelligence and robotics will enhance the efficiency and streamline the delivery of routine library services to users.	3.51	.661	Agreed
With the advent of the 5th Industrial Revolution, library users may become less reliant on seeking information assistance from librarians.	3.07	1.031	Agreed
AI in 5th IR may automate tasks, reducing librarian roles to machines.	3.31	.793	Agreed
Implementing 5th IR technologies in libraries may concentrate wealth/power, affecting diversity and inclusivity.	2.98	.917	Agreed
Librarians and information experts can apply the 5th IR wireless communications to interact with their clientele to enhance diversity and inclusive library services.	3.33	.798	Agreed

The perception that these technologies will enhance services through individualized learning materials is particularly strong (Mean = 3.53). However, there are concerns about the skills needed to operate these technologies effectively. The lowest agreement is with the statement that librarians do not have the skills to use AI tools, chatbots, and other virtual assistants present in the 4th IR, hence cannot operate the 5th IR for library services, with a mean score of 2.42. Again, while age, gender, and length of

service do not significantly influence perceptions, professional rank and qualification play a significant role. This highlights the importance of targeted training programs to address skills gaps and enhance positive perceptions.

H0₂: There will be no relative effects of demographic variable on librarians' perceptions regarding the role of 5th Industrial Revolution technologies in enhancing diversity and inclusive library services in open and distance learning?

Table 4: Relative effects of demographic variables on librarians' perceptions regarding the role of 5th Industrial Revolution technologies

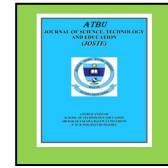
	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	3.508	.315		11.138	.000
Age Range	-.064	.098	-.110	-.647	.522
Gender	-.236	.129	-.256	-1.839	.074
Rank	-.307	.097	-.806	-3.171	.003

Corresponding author: Loveth Ogoegbunam Ekwueme

✉ lovethoe@gmail.com

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Length of Service	.044	.096	.087	.463	.646
Qualification	.524	.175	.710	2.994	.005

The table above shows the relative effects of demographic variables on librarians' awareness of 5th Industrial Revolution technologies in open and distance learning. Age ($\beta = -0.110$, $t = -0.647$, $P > 0.05$), gender ($\beta = -0.276$, $t = -1.839$, $P > 0.05$), rank ($\beta = -0.806$, $t = -3.171$, $P < 0.05$), length of services ($\beta = 0.087$, $t = 0.463$, $P > 0.05$), and qualification ($\beta = 0.710$, $t = 2.994$, $P < 0.05$), therefore rank and qualification were found to be significant determinants of

librarians awareness of the 5th Industrial Revolution Technologies while age, gender, and length of service were not significant.

Research Questions 3: What are the skills and competencies librarians need to effectively implement the 5th Industrial Revolution for improving diversity and inclusive services in open and distance learning?

Table 5: Skills and competencies librarians need to effectively implement the 5th Industrial Revolution for improving diversity and inclusive services in open and distance learning.

Items	Mean	SD	Remarks
I have an understanding of emerging technologies.	3.38	.535	Agreed
I possess the ability to evaluate and select appropriate technologies for the 5th IR.	2.98	.690	Agreed
I possess the ability to integrate technology in providing diverse and inclusive library services.	3.33	.522	Agreed
I can adapt to technological changes and user diversity.	3.44	.725	Agreed
I am flexible and can adapt to changing technologies and learning environments.	3.64	.484	Agreed
I am proficient in using technology to provide accessible and equitable library services.	3.40	.539	Agreed
I believe that providing inclusive library services is crucial for achieving sustainable development goals (education for all).	3.58	.499	Agreed
I have proficiency in using emerging technologies such as artificial intelligence, machine learning, big data analytics, and blockchain to enhance inclusive library services	3.00	.798	Agreed
I am confident in my ability to navigate and evaluate digital information resources.	3.36	.484	Agreed

The Librarians generally believe they possess the skills and competencies needed to implement the 5th Industrial Revolution for improving diversity and inclusive services, with a mean skills and competencies score of 3.29 and a standard deviation of 0.478. They feel most confident in their ability to adapt to changing technologies and learning environments (Mean = 3.64). The finding corroborates with the view of Thirupathi (2024) that librarians should also be skilled in data management, which includes data collecting, analysis, and visualization to facilitate evidence-based decision-making and improve

service inclusiveness. However, there is a perceived lack of ability to evaluate and select appropriate technologies for the 5th IR, with a mean score of 2.98. Similar to awareness and perceptions, age, gender, and length of service do not significantly impact skills and competencies, while professional rank and qualification are significant determinants.

H0₃: There will be no relative effects of demographic variable on librarians' skills and competencies need to effectively implement the 5th Industrial Revolution for improving diversity

Corresponding author: Loveth Ogoegbunam Ekwueme
 ✉ lovethoe@gmail.com
 National Open University of Nigeria (NOUN), Abuja, Nigeria.
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and inclusive services in open and distance learning?

Table: Relative effects of demographic variables on librarians' skills and competencies need to effectively implement the 5th Industrial Revolution.

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	3.439	.365		9.435	.000
Age Range	-.108	.114	-.179	-.950	.348
Gender	-.188	.149	-.195	-1.267	.213
Rank	-.156	.112	-.392	-1.393	.171
Length of Service	.067	.111	.126	.603	.550
Qualification	.261	.203	.338	1.290	.205

The table above shows the relative effects of demographic variables on librarians' awareness of 5th Industrial Revolution technologies in open and distance learning. Age ($\beta = -0.179$, $t = -0.980$, $P > 0.05$), gender ($\beta = -0.195$, $t = -1.267$, $P > 0.05$), rank ($\beta = -0.392$, $t = -1.393$, $P > 0.05$), length of services ($\beta = 0.126$, $t = 0.603$, $P > 0.05$), and qualification ($\beta = 0.338$, $t = 1.290$, $P > 0.05$), were found not to be significant determinants of librarians' skills and competencies needed to effectively implement the 5th Industrial Revolution.

CONCLUSION AND RECOMMENDATION

Librarians in Open and Distance Learning demonstrate a strong awareness of 5th Industrial Revolution (5th IR) Technologies and generally hold positive perceptions regarding their potential to enhance diversity and inclusiveness in library services. While they believe they possess the necessary skills and competencies, there are areas for improvement, particularly in evaluating and selecting appropriate technologies. Tailored professional development and training programs focusing on less familiar technologies could further enhance their ability to implement the 5th Industrial Revolution effectively and inclusively. Recommendations based on these findings include:

The management of academic libraries should proactively train their librarians in Artificial Intelligence (AI) to enhance their expertise and

enable them to effectively integrate 5th IR into library services.

Collaboration between the management of academic libraries in Open and Distance Learning institutions and internet service providers is crucial for the effective adoption of 5th IR in service delivery. Establishing reliable and robust internet connectivity infrastructure will facilitate the seamless adoption of 5th IR in academic libraries.

Increased support from government and funding agencies for Open and Distance Learning (ODL) libraries is recommended. Adequate financial backing will empower academic libraries to invest in the necessary infrastructure for the successful integration of 5th IR.

The management of academic libraries in Open and Distance Learning should prioritize stable power supply by providing alternative sources such as solar energy. This is essential for ensuring the consistent availability of power needed to support the adoption of 5th IR in library operations.

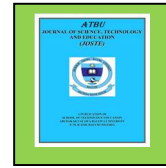
REFERENCES

- Abayomi, O. K., Adenekan, F. N., Abayomi, A., Olateju, Ajayi, T. A., & Aderonke, A. O. (2021). Awareness and Perception of Artificial Intelligence in the Management of University Libraries in Nigeria. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*, 1–16. <https://doi.org/10.1080/1072303x.2021.1918602>

Corresponding author: Loveth Ogoegbunam Ekwueme
✉ lovethoe@gmail.com

National Open University of Nigeria (NOUN), Abuja, Nigeria.

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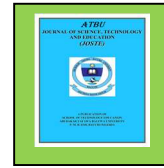
- Aderonumu, G. A. (2021). ICT and sustainability in the industry. Paper presented at the 2nd International Conference on ICT for National Development and Its Sustainability, organized by the Faculty of Information and Communication Sciences, University of Ilorin at the Main Auditorium of the University of Ilorin on March 3.
- Adetayo, A. J. (2023). Artificial intelligence chatbots in academic libraries: The rise of ChatGPT. *Library Hi Tech News*, 40(3), 18–21. <https://doi.org/10.1108/LHTN-01-2023-0007>
- Ajani, Y. A., Tella, A., Salawu, K. Y., & Abdullahi, F. (2022). Perspectives of Librarians on Awareness and Readiness of Academic Libraries to Integrate Artificial Intelligence for Library Operations and Services in Nigeria. *Internet Reference Services Quarterly*, 1–18. <https://doi.org/10.1080/10875301.2022.2086196>
- Ali, S. H., Ayad, H., & Al Rubaie, M. T. (2022). Fifth Industrial Revolution (New Perspectives). *International Journal of Business, Management, and Economics*, 3(3), 196-212. DOI: <https://doi.org/10.47747/ijbme.v3i3.694>
- Bokoh, M. A., Ajiboye, B. A., & Bello, M. M. (2023). Use of Library Resources and Services as Correlates of Research Activities among Postgraduate Students in Southwest Federal Universities, Nigeria. *Library Philosophy and Practice (e-journal)*, 1-40. https://digitalcommons.unl.edu/libphilprac/7680?utm_source=digitalcommons.unl.edu%2Flibphilprac%2F7680&utm_medium=PDF&utm_campaign=PDFCoverPages
- Chisita, C. T., Shoko, M., & Ngoaketse, J. (2019). Media, Libraries, and Archives: Unearthing the Missing Link in Zimbabwe. In *Cooperation and Collaboration Initiatives for Libraries and Related Institutions* (pp. 243-272). <https://doi.org/10.4018/978-1-7998-0043-9.ch013>
- Eiriemiokhale, K. A., & Sulyman, A. S. (2023). Awareness and Perceptions of Artificial Intelligence among Librarians in University Libraries in Kwara State, Nigeria. *Indonesian Journal of Librarianship*, 4(2), 107-118. DOI: <https://doi.org/10.33701/ijolib.v4i2.3364>
- Jyotsna, R., & Madhu, P. (2021). Digital literacy competency among library users of the central university of Jharkhand: a study. *Library Philosophy and Practice (e-journal)*, 1-12. https://digitalcommons.unl.edu/libphilprac/6444?utm_source=digitalcommons.unl.edu%2Flibphilprac%2F6444&utm_medium=PDF&utm_campaign=PDFCoverPages
- Liman, Y. A., & Aliyu, M. M. (2023). Digital transformation and innovation of academic libraries: a content analysis. *Samaru Journal of Information Studies*, 23(1). <https://www.ajol.info/index.php/sjis/article/view/252140>
- Masenya, T. M., & Chisita, C. T. (2022). Futurizing library services in a technology-driven dispensation: Reflections on selected academic libraries in Zimbabwe and South Africa. <https://www.researchgate.net/publication/361513459>
- Mourtzis, D. (2021). Towards the 5th Industrial Revolution: A literature review and a framework for Process Optimization Based on Big Data Analytics and Semantics. *Journal of Machine Engineering*, 5. <https://doi.org/10.36897/jme/141834>
- Noaman, M., Khan, M. S., Abrar, M. F., Ali, S., Alvi, A., & Saleem, M. A. (2022). Challenges in integration of heterogeneous internet of things. *Scientific Programming*, 2022. <https://www.hindawi.com/journals/sp/2022/8626882/>

Corresponding author: Loveth Ogoegbunam Ekwueme

✉ lovethoe@gmail.com

National Open University of Nigeria (NOUN), Abuja, Nigeria.

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- Nurminen, M., & Koponen, M. (2020). Machine Translation and Fair Access to Information. *Translation Spaces*, 9, 150–169. <https://doi.org/10.1075/ts.00025.nur>
- Owolabi, K. A., Fauziyah, N. A., Adeleke, O. A., Taiwo, A. A., & Adesina, O. A. (2021). Awareness and Perception of Artificial Intelligence in the Management of University Libraries in Nigeria. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*. <https://doi.org/10.1080/1072303X.2021.1918602>
- Payton, T., & Claypoole, T. (2023). *Privacy in the Age of Big Data: Recognizing Threats, Defending Your Rights, and Protecting Your Family*. Rowman & Littlefield: Lanham, ML, USA.
- Saibakumo, W. T. (2021). Awareness and acceptance of emerging technologies for extended information service delivery in academic libraries in Nigeria. *Library Philosophy and Practice (ejournal)*, 5266. <https://digitalcommons.unl.edu/libphilprac/5266>
- Subaveerapandiyan, A. (2023). Application of Artificial Intelligence (AI) In Libraries and Its Impact on Library Operations Review. *Library Philosophy and Practice (e-journal)*, 7828. <https://digitalcommons.unl.edu/libphilprac/7828>
- Thirupathi, K. (2024). Librarian's role in the digital age: reimagining the profession in the era of information abundance. *International Journal of Library and Information Science (IJLIS)*, 13(1), 1–9. <https://iaeme.com/Home/issue/IJLIS?Volume=13&Issue=1>
- Valette, E., Bril El-Haouzi, H., & Demesure, G. (2023). Industry 5.0 and its technologies: A systematic literature review upon the human place into IoT- and CPS-based industrial systems. *Computers & Industrial Engineering*, 184, 109426. <https://doi.org/10.1016/j.cie.2023.109426>
- Villar, A., Paladini, S., & Buckley, O. (2023). *Towards Supply Chain 5.0: Redesigning Supply Chains as Resilient, Sustainable, and Human-Centric Systems in a Post-pandemic World*. *Oper. Res. Forum* 4, 60. <https://doi.org/10.1007/s43069-023-00234-3>
- Wood, B. A., & David, J. E. (2018). Librarians' perceptions of artificial intelligence and its potential impact on the profession. *Computers in Libraries*, 38(1), 2018.
- Ziatdinov, R., Atteraya, M. S., & Nabiye, R. (2024). The Fifth Industrial Revolution as a transformative Step towards Society 5.0. *Societies*, 14(2), 1-19. <https://doi.org/10.3390/soc14020019>

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✉ lovethoe@gmail.com

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