DETERMINANTS AND BARRIERS OF EMERGING TECHNOLOGIES UTILIZATION FOR SCHOLARLY COMMUNICATION AMONG LIBRARY AND INFORMATION SCIENCE PROFESSIONALS OF FEDERAL UNIVERSITIES IN NORTH-EAST NIGERIA

BY
Philip Gana Malgwi*,
Department of Library and Information Science,
University of Maiduguri – Borno State
Corresponding Author: philmalgwi@gmail.com

Emmanuel M.K. Dawha,
Department of Library and Information Science,
University of Maiduguri – Borno State
Email: emmanueldawha@gmail.com
&
Samaila Inuwa,
Department of Library and Information Science,
University of Maiduguri – Borno State
Email: inuwasamaila24@gmail.com
&
Talatu Rabasa
Department of Library and Information Science,
University of Maiduguri – Borno State
Email: talaturabasa1@gmail.com

Abstract
This study investigated the determinants and barriers to the utilization of emerging technologies for scholarly communication among Library and Information Science (LIS) professionals in Federal Universities in North-East Nigeria. A descriptive survey design was adopted, and data were collected using a structured questionnaire administered to 270 respondents across three selected federal universities. A total of 263 responses were returned and analyzed using descriptive statistics, including frequency counts, percentages, mean, and standard deviation. Findings revealed that key barriers to the adoption of emerging technologies include limited financial resources, inadequate digital infrastructure, insufficient training opportunities, and lack of institutional support. Similarly, factors such as availability of technological infrastructure, perceived usefulness, digital literacy, and institutional support were identified as significant determinants of utilization. The study recommends that Federal Universities in North East Nigeria should secure increased financial support and establish partnerships with technology providers and research

institutions to enhance access to essential digital tools. Furthermore, university management should invest in technical upgrades and capacity-building initiatives to improve the adequacy and use of emerging technologies for scholarly communication among LIS professionals in the region.

Keywords: Barriers, Utilization, Emerging Technologies, Scholarly Communication, Library and Information Science, Nigeria

Introduction

Emerging Technologies (ETs) are innovations that are currently developing and evolving or will be developed over the next few years and which will substantially alter the business and social environment. Some tangible examples of ET are Artificial Intelligence (AI), Machine Learning, Blockchain Technology, Internet of Things (IoT), Quantum Computing, Augmented Reality (AR) and Virtual Reality (VR), 3D Printing, Cloud Computing, Open Access and Open Science Platforms, Big Data Analytics. These innovative tools now enable researchers to communicate their findings more effectively and develop new forms of scholarly communication that are more accessible and inclusive. They improve research processes by enhancing collaboration and effective and efficient management and sharing of research-related data.

The emergence of ChatGPT, a state-of-the-art AI language model, has been credited with accelerating scientific production and improving collaboration in academic writing (Mubin et al., 2024). It is clear from scientometric assessments that ChatGPT has increased scientific production, as evidenced by the 1298 documents that have contributed to the conversation (Mubin et al., 2024). Scholars have used ChatGPT to collaborate on research projects, conduct literature reviews, and enforce correct citation guidelines. This has improved the effectiveness and inventiveness of information gathering and sharing (Flaherty & Yurch, 2024). Despite concerns about its errors and limits, academics consistently take a positive approach towards ChatGPT and have acknowledged its ability to improve academic development (Hu, Xu, Yao, & Zhang, 2024). Despite these concerns, ChatGPT's ability to generate human-like language has also been acknowledged in scholarly writing for academic writing and medical applications (Fang, Chen, & Wang, 2024).

Social media is another form of emerging technology which has been very significant in scholarly communication according to some studies (Ugwu, Ugwuanyi, Mbajiorgu, & Nnadi, 2021; Gaur & Gupta, 2021; Al-Aufi & Fulton, 2014). Social media is widely utilized in research communication, as learners frequently use WhatsApp for academic conversations and information exchange (Hapsari et. al 2023). Furthermore, social media sites like Twitter are advised for use "in clinical practice, education, and scholarship since they facilitate the sharing of research findings and increase exposure within academia (Yessirkepov, Zimba, & Gasparyan, 2021). Academics are increasingly using popular social media sites like Facebook and Twitter to improve interaction, exposure, and cooperation among scientists (Martin Gomez & Bartolome Muñoz de Luna, 2024). In addition, scholarly social networking sites such as Mendeley, Academia.edu and ResearchGate are gaining popularity among scholars as a means of exchanging research papers, establishing connections with colleagues, and boosting the exposure of scholarly work (Uppal, 2022).

In their 2014 study, Al-Aufi & Fulton examined the influence of social networking platforms on the unstructured scholarly conduct among "academics in the humanities and social sciences through a web-based survey linked "to Sultan Qaboos University's humanities and social science" departments in a quantitative investigation. To improve the relevance of the information that was gathered, descriptive interpretations of the data was carried out and presented in tables. The overall results showed that social networking platforms are increasingly being used for casual scholarly discussion. The influence of social networking platforms on informally intellectual communication patterns is thought to be beneficial. However, over a third of those surveyed said they have never utilised social media platforms for casual academic discussion. The researchers asserts that a thorough understanding of the "potential of social networking tools on informal scholarly communication in the humanities and social sciences" may be gained from empirical research. Additional investigation through interdisciplinary research and qualitative studies may improve our comprehension of the ways in which these instruments impact patterns of scholarly communication.

From the study of Akparobore and Omosekejimi (2020), some of the challenges that could hinder the access to emerging technologies (like institutional repository) for scholarly communication include lack of awareness as indicated by 87% of the respondents, 70% of them affirmed that the fear of copyrights infringement as barriers to using institutional repository for scholarly communication, and fear of not been able to publish work deposited in the institutional repository in peer-reviewed journals were considered as barriers by 56% of the respondents. Also, difficulty in using institutional repository was considered a barrier by 31% of the respondents. These myriads of issues serve as barriers to the access and use of emerging technologies like institutional repository for scholarly communication.

The user experience and accessibility of emerging technologies play a critical role in their adoption within scholarly communication. Tenopir et al. (2021) mention that technologies that offer intuitive interfaces, user-friendly features, and seamless integration into existing workflows are more likely to be embraced by LIS professionals. Additionally, accessibility considerations, such as ensuring that tools are inclusive and usable for individuals with diverse needs, influence the decision to adopt particular technologies (Cothran, et al., 2015). Bwalya and Akakandelwa (2021) argue that the emphasis on collaboration and interdisciplinary initiatives within the scholarly community influences the adoption of emerging technologies. Tools that facilitate collaboration, whether through virtual research environments, collaborative writing platforms, or shared data repositories, are increasingly valued. LIS professionals engaged in collaborative projects often seek technologies that enhance communication and coordination among team members with diverse expertise (Cromqwll, 2015).

Research Questions
1. What are the barriers to accessing emerging technologies for scholarly communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria?

2. What are the factors that influence the utilization of emerging technologies for scholarly communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria?

Methodology

This study adopted a descriptive survey research design, which is appropriate for gathering standardized data from a large and diverse group of respondents. The target population consisted of 263 Library and Information Science professionals, specifically academic librarians and lecturers, drawn from three federal universities in North-East Nigeria: Abubakar Tafawa Balewa University Bauchi, Modibbo Adama University Yola, and the University of Maiduguri. These universities were selected due to their well-established LIS departments and extensive library systems, which are expected to host a significant number of qualified professionals relevant to the study. A self-developed, closed-ended structured questionnaire was used as the instrument for data collection. The questionnaire underwent expert validation to ensure its content reflected the objectives of the study, and preliminary reliability testing was conducted to confirm its suitability for the study. Data collected were analysed using both descriptive statistics such as frequency distributions, percentages, means, and standard deviations. All statistical analyses were conducted using SPSS.

Discussion of Results

Research Question 1: What are the Barriers to Accessing Emerging Technologies for Scholarly Communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria?

The researcher sought to determine the Barriers to Accessing Emerging Technologies for Scholarly Communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria. Responses from the respondents were collected, analysed and presented in Table 1.

Table 1:
Barriers to accessing emerging technologies for scholarly communication among LIS Professionals (N=263).

Barriers to Accessing Emerging Technologies	Frequency	Percentage (%)
Limited Financial Resources	237	90
Inadequate Infrastructure	225	86
Poor Digital Skills	149	57
Technophobia	49	19
Lack of Technical Support	179	68
Limited Access to Training Programs	184	70
Data Security Concerns	57	22

Absence of Standardization	32	12
Limited Awareness and Access to Resources	129	49
Intellectual Property Concerns	50	21
Cultural and Institutional Barriers	134	51

Source: *Field Survey, 2024*

Decision Rule: Percentage (% ≥ 50%)

Table 2 presented the barriers to accessing emerging technologies for scholarly communication among Library and Information Science (LIS) professionals in Federal Universities in North-East Nigeria are predominantly financial and infrastructural. Table 1 indicates that the most significant barriers to accessing emerging technologies for scholarly communication among Library and Information Science professionals in Federal Universities in North-East Nigeria are limited financial resources, reported by 237 (90%) of the respondents and inadequate infrastructure as indicated by 225 (86%) respondents; Other notable barriers include lack of technical support 179 (68%), limited access to training programs, 184 (70%), poor digital skills 149 (57%), cultural and institutional barriers 134 (51%) mentioned, limited awareness and access to resources 129 (49%). Other barriers include technophobia 49 (19%), data security concerns 57 (22%), intellectual property concerns 50 (21%), absence of standardization 32 (12%) and absence of standardization 32 (12%).

These findings suggest that financial constraints and inadequate infrastructure are the primary obstacles hindering the adoption of emerging technologies in these institutions. The high percentage of respondents reporting limited financial resources and inadequate infrastructure indicates that addressing these issues is crucial for enhancing the integration of emerging technologies into scholarly communication practices. It is worthy of note that the significant number of respondents citing lack of technical support and limited access to training programs highlights the need for capacity-building initiatives to improve digital skills and provide necessary support for technology adoption. Cultural and institutional barriers, along with limited awareness and access to resources, further emphasize the importance of fostering a supportive environment and promoting awareness to facilitate the effective use of emerging technologies in academic settings. These factors may be less prevalent but are still important. These minor barriers are often due to personal attitudes, perceived risks, and the lack of standardised protocols. he graphical presentation of the data is presented thus.
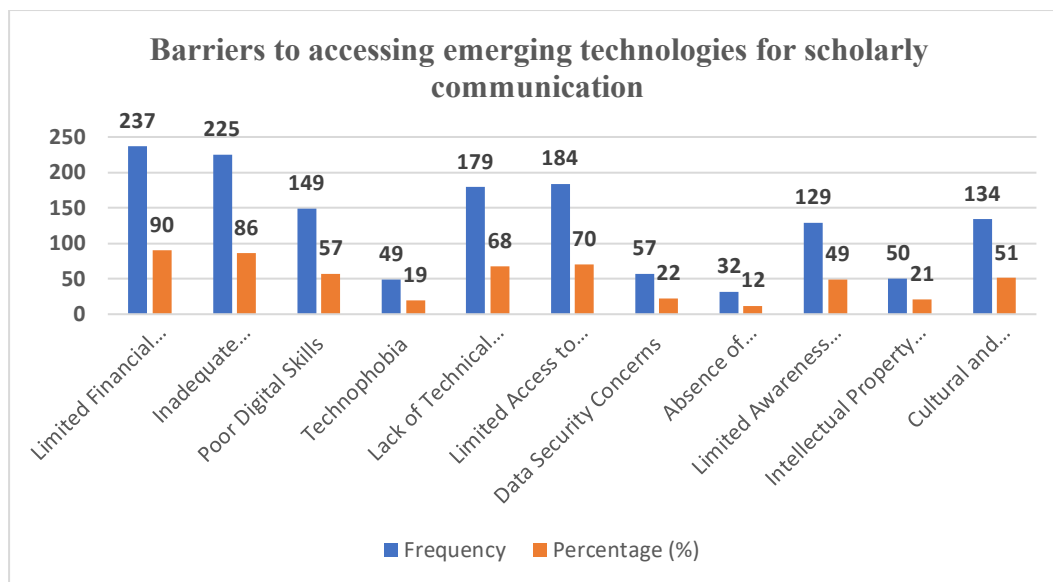
Fig. 1: Barriers to accessing emerging technologies for scholarly communication.

Research Question 2: What are the Factors that Influence the Utilization of Emerging Technologies for Scholarly Communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria?

The researcher sought to determine the Factors that Influence the Utilization of Emerging Technologies for Scholarly Communication among Library and Information Science Professionals of Federal Universities in North-East Nigeria. Responses from the respondents were collected, analysed and presented in Table 2.

Table 2:

Factors that influence the utilization of emerging technologies for scholarly communication among LIS Professionals (N=263).

Factors Influencing Utilization of Emerging Technologies for Scholarly Communication	Frequency	Percentage (%)
Availability of Technological Infrastructure	233	89
Level of Digital Literacy	208	79
Lack of Training and Professional Development Opportunities	200	76
Extent of Institutional Support	174	66
Perceived Usefulness of the Emerging Technologies	234	89

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Willingness to Accept Innovation	169	64
Motivation to Accept Technology	164	62
Technophobia	49	19
Data Security and Privacy Concerns	84	32
Availability of Collaboration and Networking Platform	212	81
Budget Constraint	235	89
Limited Time	124	47
Many Workloads	174	66
Policy and Governance Issues	99	38

Source: *Field Survey, 2024*

Decision Rule: Percentage (% ≥ 50%)
Table 2 indicates that the factors influencing the utilization of emerging technologies for scholarly communication among Library and Information Science professionals in Federal Universities in North-East Nigeria are primarily related to the availability of technological infrastructure, digital literacy, and institutional support. The most significant factors include the availability of technological infrastructure 233 (89%) and the perceived usefulness of the emerging technologies 234 (89%) Other key factors include the level of digital literacy 208 (79%), the availability of collaboration and networking platforms 212 (81%), and budget constraints 235 (89%). Other factors that influence utilization are the lack of training and professional development opportunities 200 (76%), the extent of institutional support 174 (66%), willingness to accept innovation 169 (64%), and motivation to accept technology 164 (62%). These results emphasize the importance of technical readiness, the capacity of the workforce, and institutional backing in fostering the effective adoption of emerging technologies.

However, barriers such as technophobia 49 (19%), data security and privacy concerns 84 (32%), limited time 124 (47%), many workloads 174 (66%), and policy and governance issues 99 (38%) appear to play a lesser but still significant role in limiting the utilization of emerging technologies. These factors underscore the need for initiatives aimed at reducing resistance to new technologies, enhancing security measures, and ensuring that there are clear policies to support their integration.

This implies that the utilization of emerging technologies is strongly influenced by factors such as infrastructure, digital literacy, institutional support, and perceived usefulness. Proffering lasting solutions to the barriers related to time, workloads, and policy could further enhance the adoption and integration of these emerging technologies into scholarly communication practices of LIS professionals in North-East Nigeria.
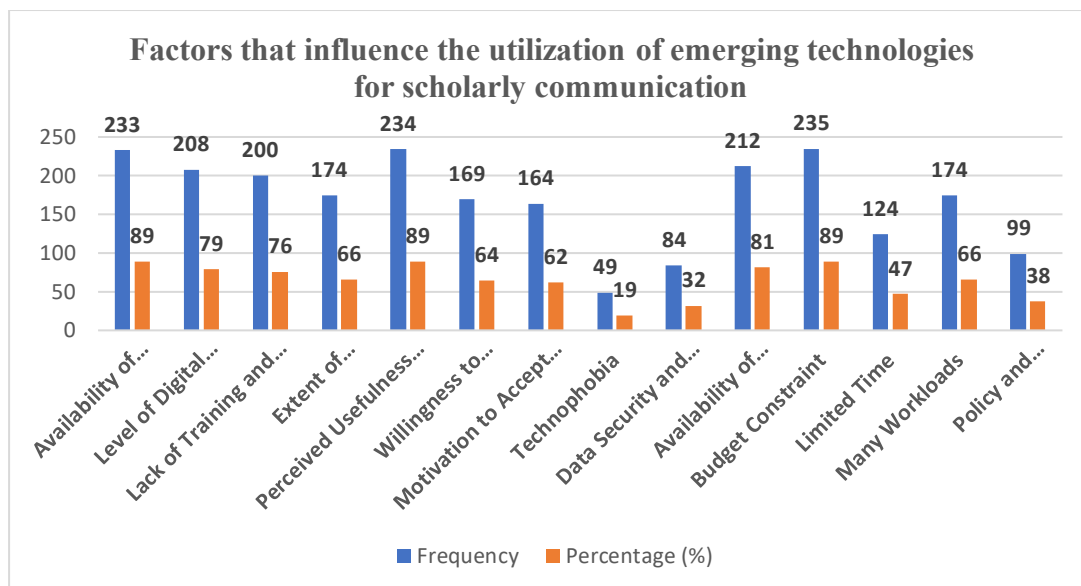
Fig 2: *Factors that influence the utilization of emerging technologies for scholarly communication.*

The findings of research question seven showed the factors influencing the utilization of emerging technologies for scholarly communication among Library and Information Science (LIS) professionals in Federal Universities in North-East Nigeria. These findings align with existing literature, which underscores the importance of technological infrastructure, digital literacy, institutional support, and perceived usefulness as key determinants of technology adoption (Nicholas et al., 2017; Larson & Murray, 2017). The study reveals that the most significant factor influencing utilization of emerging technologies is the availability of technological infrastructure (89%) which is in consistence with the submission of Owusu-Ansah (2009) and Larson and Murray (2017), who argued that a robust and adaptable technological environment facilitates the seamless integration of new tools, allowing LIS professionals to incorporate emerging technologies into their workflows. Another dominant factor identified is the perceived usefulness of emerging technologies (89%), which suggests that LIS professionals are more likely to adopt technologies they find beneficial in enhancing their scholarly activities. This corroborates the findings of Tennant et al. (2021), who emphasize that technologies offering intuitive interfaces, user-friendly features, and seamless integration into existing workflows are more readily embraced. The study further underscores the significance of digital literacy (79%) in determining the extent of technology utilization. Bawden and Robinson (2016) argue that professionals with strong digital literacy skills are better equipped to explore and integrate emerging technologies, making continuous professional development essential for sustained technology adoption. Institutional support (66%) also emerges as a crucial determinant of technology utilization. This is in line with Nicholas et al. (2017), who assert that organizations prioritizing technology integration, alongside adequate training and funding, foster a conducive environment for LIS professionals to engage with emerging technologies. Institutions with limited support may struggle with adoption, as professionals lack the necessary resources and motivation to

explore new tools. The study also finds that collaboration and networking opportunities (81%) play a key role in technology utilization. This aligns with Cox and Jantti (2015) and Bjork et al. (2014), who argue that the emphasis on collaboration within scholarly communities drives the adoption of technologies that facilitate information sharing and interdisciplinary research. Furthermore, budget constraints (89%) pose a significant barrier, limiting access to advanced technologies and training programs. Cox and Jantti (2015) stress that institutions with substantial financial support have greater flexibility in adopting and experimenting with emerging technologies.

Summary of Findings

1. The barriers to accessing emerging technologies for scholarly communication among Library and Information Science professionals of Federal Universities in North-East Nigeria are limited financial resources, inadequate infrastructure, lack of technical support, limited access to training programs, poor digital skills and cultural/institutional barriers.

2. The factors influencing the utilization of emerging technologies for scholarly communication among Library and Information Science professionals of Federal Universities in North-East Nigeria are the availability of technological infrastructure, level of digital literacy, training and professional development opportunities, extent of institutional support, perceived usefulness of the emerging technologies, willingness to accept innovation, motivation to accept technology, availability of collaboration and networking platforms, budget constraints, and heavy workloads.

Conclusion

In conclusion, the factors that influence the utilization of emerging technologies for scholarly communication among library and information science professionals included financial constraints, inadequate digital infrastructure, insufficient training opportunities, and limited institutional support, all of which hindered the seamless adoption of these technologies for scholarly engagement. These findings underscore the urgent need for increased investment in technological infrastructure, strategic partnerships with technology providers, and capacity-building initiatives to enhance LIS professionals' proficiency and engagement with emerging technologies. Despite its valuable contributions, the study was limited by its focus on federal universities within a single geographical region, thereby warranting future research that incorporates a broader national or cross-regional perspective, alongside qualitative methodologies for deeper insight. Overall, the study affirms the transformative potential of emerging technologies in shaping scholarly communication practices, emphasizing the necessity for concerted efforts by federal universities, policymakers, and stakeholders to address existing technological deficiencies and establish a more resilient, technology-driven academic ecosystem in Nigeria's higher education sector.

Recommendations

Based on the findings of this study, the following were recommended:

1. The Federal Universities in North East Nigeria should advocate and solicit support from stakeholders such as the Nigerian University Commission, Librarians Registration Council of Nigeria, Nigerian Library Association, Non-Governmental Organisations and Private Sectors in addressing these barriers through increasing

financial investment, grants, awards and funding aimed at enhancing infrastructure and technical support and prioritizing capacity-building initiatives to empower Library and Information Science professionals scholarly communications practices in the Federal Universities of North East Nigeria.

2. The Management of Federal Universities in North East Nigeria in collaboration with relevant stakeholders, should develop comprehensive policies and collaborative partnerships that bolster technological infrastructure development, enhance digital literacy skills, and provide robust institutional support for scholarly communications practices among LIS professionals of North East Nigeria to foster effective utilization of emerging technologies.

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