

EFFECTS OF ICT INTEGRATION ON RESEARCH PRODUCTIVITY OF ACADEMIC LIBRARIANS IN FEDERAL UNIVERSITIES IN NORTH-CENTRAL NIGERIA

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Abstract

This study examined the effect of Information and Communication Technology (ICT) integration on the research productivity of academic librarians in federal universities in North-Central Nigeria. The study was motivated by the increasing role of digital technologies in scholarly communication, information access, and research dissemination within higher education institutions. A correlational survey design was adopted for the study. Data were collected from academic librarians in selected federal universities in the region using a structured questionnaire, and 106 valid responses were analyzed. Descriptive statistics and Chi-square analysis were used for data analysis. The findings revealed that ICT integration among academic librarians was generally moderate to high, especially in the use of computers, internet access, electronic journals, and online databases for research purposes. The study also found that ICT integration positively influenced research productivity by improving research quality, increasing output, enhancing access to global scholarly resources, reducing time spent on research tasks, and improving the dissemination of research findings. However, advanced digital applications such as collaborative research platforms and virtual reference services were less utilized. Major barriers identified included inadequate ICT infrastructure, poor internet connectivity, insufficient training opportunities, weak institutional support, and limited access to current research databases. The Chi-square result showed a statistically significant relationship between ICT integration and research productivity ($\chi^2 = 24.53$, $p < .05$). The study concludes that ICT integration significantly enhances the research productivity of academic librarians and recommends sustained investment in ICT infrastructure, digital capacity building, and institutional support mechanisms.

Keywords: ICT integration, research productivity, academic librarians, federal universities, North-Central Nigeria, academic libraries

Introduction

The academic library has undergone significant transformation over the past few decades as a result of advances in Information and Communication Technology (ICT). The traditional library, which primarily managed print collections and provided conventional reference services, has evolved into a technology-driven information environment that supports digital scholarship, knowledge organization, research support, and electronic information services. This transformation has also expanded the responsibilities of academic librarians, requiring them to function not only as information professionals but also as active contributors to research and scholarly communication (Ifijeh & Yusuf, 2020).

The increasing adoption of ICT in higher education has made digital technologies indispensable to academic library operations. Academic librarians now depend on computers, internet services, electronic databases, online public access catalogues (OPACs), institutional repositories, digital libraries, and other electronic platforms to provide information services and support research activities. These technologies have improved access to scholarly information, facilitated collaboration among researchers, and enhanced the dissemination of research findings, thereby strengthening the role of librarians within the academic community (Singh & Margam, 2022).

Research productivity has become an important indicator of academic performance among university librarians. In Nigerian universities, librarians are increasingly expected

to complement their professional responsibilities with scholarly activities such as publishing journal articles, presenting conference papers, participating in collaborative research, and contributing to knowledge generation. Consequently, improving research productivity has become a major concern for universities, library administrators, and policymakers seeking to strengthen institutional research output (Iwu-James et al., 2024).

CT integration is widely regarded as one of the major factors capable of improving research productivity. Through access to current scholarly literature, electronic databases, data analysis software, citation management tools, collaborative research platforms, and online publishing systems, ICT has the potential to improve the quality, efficiency, visibility, and dissemination of research. However, the benefits of ICT depend largely on the availability of adequate infrastructure, technical competence, institutional support, and opportunities for continuous professional development. Where these conditions are lacking, the contribution of ICT to research productivity may be considerably reduced (Olayemi & Tijani, 2022).

Although Nigerian universities have continued to invest in ICT infrastructure and digital library services, the level of ICT integration remains uneven across institutions. Many academic libraries still experience challenges such as inadequate ICT facilities, unstable internet connectivity, and limited access to current electronic databases, insufficient technical support, inadequate staff training, and inconsistent institutional investment. These constraints may affect the extent to which academic librarians are able

to utilize ICT effectively for research activities, particularly in federal universities located in North-Central Nigeria.

Existing studies have examined ICT adoption, digital library services, and information service delivery within academic libraries. However, relatively few studies have specifically investigated the effect of ICT integration on the research productivity of academic librarians in federal universities in North-Central Nigeria. As a result, there is limited empirical evidence on whether increased ICT integration translates into improved research productivity within the study area. This gap in the literature creates the need for further investigation.

Against this background, this study examined the effect of ICT integration on the research productivity of academic librarians in federal universities in North-Central Nigeria. Specifically, the study sought to determine the extent of ICT integration in librarians' research activities, examine its effect on research productivity, and identify the challenges affecting its effective utilization. The findings provide empirical evidence that may assist university management, library administrators, and policymakers in developing strategies to strengthen ICT integration and improve research productivity among academic librarians.

Research Questions

The study sought to answer the following research questions:

1. To what extent is ICT integrated into the research activities of academic librarians in federal universities in North-Central Nigeria?
2. What is the effect of ICT integration on the research productivity of academic librarians in federal universities in North-Central Nigeria?
3. What challenges affect ICT integration for research productivity among academic librarians in federal universities in North-Central Nigeria?

Research Hypothesis

The following null hypothesis guided the study:

H₀: There is no significant relationship between ICT integration and the research productivity of academic librarians in federal universities in North-Central Nigeria.

Literature Review

This study is based on the Technology Acceptance Model (TAM) developed by Davis (1989). The model explains that people are more likely to use a technology if they believe it is useful and easy to use. In the context of this study, academic librarians are more likely to use ICT tools for research when they believe those tools can improve their work and are easy to operate. The model therefore provides a useful explanation for how ICT integration can influence research productivity among academic librarians.

Review of Related Studies

Previous studies have reported a positive relationship between ICT use and research productivity. Okonkwo and Eze (2021) found that academic librarians who regularly used electronic databases and other digital resources produced more research publications. Similarly, Owolabi and Musa (2021) reported that ICT competence contributed significantly to research performance among university librarians.

Iwu-James et al. (2024) also identified ICT access and digital skills as important factors influencing research productivity among academic librarians. These studies suggest that ICT can support research activities and improve scholarly output.

Research Gap

Although several studies have examined ICT use in academic libraries, fewer studies have focused specifically on how ICT integration affects the research productivity of academic librarians in federal universities in North-Central Nigeria. Most existing studies were conducted in other regions or focused mainly on library service delivery. This study therefore fills this gap by examining the effect of ICT integration on the research productivity of academic librarians in federal universities in North-Central Nigeria.

Methodology

This study adopted a quantitative survey research design to examine the effect of ICT integration on the research productivity of academic librarians in federal universities in North-Central Nigeria. The survey design was considered appropriate because it enabled

the collection of data from a large number of respondents and facilitated the examination of the relationship between ICT integration and research productivity.

The study was conducted in selected federal universities located in North-Central Nigeria. The population consisted of academic librarians working in the university libraries of the selected institutions.

A total of 106 academic librarians participated in the study. Due to the manageable size of the population, all eligible academic librarians were included in the study through a census sampling approach.

Data were collected using a structured questionnaire designed to obtain information on the extent of ICT integration, its effect on research productivity, and the challenges affecting the effective use of ICT for research purposes.

The collected data were analyzed using descriptive and inferential statistics. Frequency counts, percentages, and mean scores were used to answer the research questions, while the Chi-square statistical test was used to test the hypothesis at a 0.05 level of significance.

Results And Discussion

Respondents' Institutional Distribution

Table 1: Distribution of Respondents by Institutional Affiliation (N = 106)

Institution	Frequency	Percentage (%)
University of Abuja	9	8.5
University of Ilorin	18	17.0
Federal University of Technology, Minna	22	20.8
Federal University, Lokoja	9	8.5
Federal University of Agriculture, Makurdi	11	10.4
University of Jos	28	26.4
Federal University, Lafia	9	8.5
Total	106	100.0

Interpretation:

Table 1 shows that the respondents were drawn from seven federal universities in North-Central Nigeria. The highest proportion came from the University of Jos (26.4%), followed by the Federal University of Technology, Minna (20.8%) and the University of Ilorin (17.0%). This reflects a broad institutional spread and supports the representativeness of the study.

Research Question One

What is the extent of ICT integration in the research activities of academic librarians in federal universities in North-Central Nigeria?

Table 2: Level of ICT Integration in Research Productivity of Academic Librarians (N = 106)

S/N	ICT Integration Variables	Very High Extent (4)	High Extent (3)	Low Extent (2)	Very Low Extent (1)	Mean	Interpretation
1	Library provides ICT facilities (computers, internet access)	30 (28.3%)	50 (47.2%)	20 (18.9%)	6 (5.7%)	3.06	High
2	Electronic databases integrated into research support services	25 (23.6%)	45 (42.5%)	25 (23.6%)	11 (10.4%)	2.87	Moderate-High
3	ICT tools used for literature searching and retrieval	28 (26.4%)	40 (37.7%)	28 (26.4%)	10 (9.4%)	2.89	Moderate-High
4	ICT used for access to electronic journals and e-resources	32 (30.2%)	42 (39.6%)	20 (18.9%)	12 (11.3%)	2.96	High
5	ICT skills of library staff utilized to support researchers	20 (18.9%)	38 (35.8%)	28 (26.4%)	20 (18.9%)	2.64	Moderate
6	ICT platforms used for virtual reference services	18 (17.0%)	35 (33.0%)	30 (28.3%)	23 (21.7%)	2.50	Moderate
7	ICT facilities used for research data management and storage	22 (20.8%)	40 (37.7%)	25 (23.6%)	19 (17.9%)	2.64	Moderate
8	ICT supports research dissemination through institutional repositories	25 (23.6%)	38 (35.8%)	30 (28.3%)	13 (12.3%)	2.74	Moderate-High
9	ICT-based user education programs conducted	20 (18.9%)	37 (34.9%)	30 (28.3%)	19 (17.9%)	2.62	Moderate
10	ICT tools support collaborative research activities	15 (14.2%)	35 (33.0%)	32 (30.2%)	24 (22.6%)	2.41	Moderate-Low

Grand Mean = 2.73

Interpretation:

Table 2 reveals that the level of ICT integration in the research activities of academic librarians is generally moderate to high, with a grand mean of 2.73. The most highly rated areas were the provision of ICT facilities (Mean = 3.06) and the use of ICT for access to electronic journals and e-resources (Mean = 2.96). This indicates that basic ICT infrastructure and core digital research tools are relatively available and in use.

However, more advanced dimensions of ICT integration such as collaborative research activities (Mean = 2.41), virtual reference services (Mean = 2.50), and ICT-based user education programmes (Mean = 2.62) recorded lower ratings. This suggests that although ICT is present in many libraries, its integration into more advanced and interactive research-support functions remains less developed.

The finding indicates that ICT integration in the research activities of academic librarians is generally moderate to high. This suggests that federal university libraries in North-Central Nigeria have made considerable progress in adopting digital technologies to support research activities. The high ratings for ICT facilities and access to electronic journals indicate that librarians increasingly operate within digitally enabled research environments. This finding agrees with Ifijeh and Yusuf (2022), who observed that ICT has become central to modern academic library services, and with Singh and Margam (2022), who reported that ICT enhances librarians' participation in research and scholarly communication. However, the relatively lower ratings for collaborative research platforms

and virtual reference services suggest that advanced ICT applications are yet to be fully integrated into research support services.

Research Question Two

What is the effect of ICT integration on the research productivity of academic librarians?

Table 3: Influence of ICT Integration on Research Productivity of Academic Librarians (N = 106)

S/N	Influence of ICT Integration on Research Productivity	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	Mean	Interpretation
21	ICT tools have significantly enhanced the quality of my research work	32 (30.2%)	44 (41.5%)	20 (18.9%)	10 (9.4%)	3.02	High
22	Use of ICT tools has contributed to an increase in my research output	30 (28.3%)	42 (39.6%)	22 (20.8%)	12 (11.3%)	2.94	High
23	ICT tools have facilitated greater collaboration with other researchers	28 (26.4%)	38 (35.8%)	25 (23.6%)	15 (14.2%)	2.83	Moderate-High
24	ICT integration has reduced the time required to complete my research projects	31 (29.2%)	40 (37.7%)	23 (21.7%)	12 (11.3%)	2.94	High
25	Integration of ICT tools motivates me to engage more actively in research activities	29 (27.4%)	41 (38.7%)	24 (22.6%)	12 (11.3%)	2.92	High
26	ICT tools have improved my access to global research networks and resources	33 (31.1%)	43 (40.6%)	20 (18.9%)	10 (9.4%)	3.02	High

S/N	Influence of ICT Integration on Research Productivity	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	Mean	Interpretation
27	ICT tools have strengthened my ability to analyze and interpret research data effectively	30 (28.3%)	41 (38.7%)	22 (20.8%)	13 (12.3%)	2.91	High
28	ICT integration has enhanced the visibility and dissemination of my research output	31 (29.2%)	39 (36.8%)	23 (21.7%)	13 (12.3%)	2.91	High
29	ICT tools have made it easier to organize and manage research information efficiently	28 (26.4%)	40 (37.7%)	24 (22.6%)	14 (13.2%)	2.88	Moderate-High
30	Use of ICT tools has improved the accuracy and reliability of my research findings	32 (30.2%)	41 (38.7%)	21 (19.8%)	12 (11.3%)	2.99	High

Grand Mean = 2.94

Table 3 shows that ICT integration has a strong positive effect on the research productivity of academic librarians, with a grand mean of 2.94. Respondents strongly agreed that ICT tools had enhanced research quality (Mean = 3.02) and improved access to global research networks and resources (Mean = 3.02). ICT also contributed to increased research output, reduced the time needed to complete research projects, and improved the accuracy and reliability of research findings.

Although respondents generally acknowledged that ICT supported collaboration and information management, these areas recorded slightly lower means than the others. This suggests that while ICT is already recognized as a major driver of research productivity, there is still room to deepen its use for collaborative and organizational aspects of scholarly work.

The findings show that ICT integration has a strong positive effect on the research productivity of academic librarians. Respondents agreed that ICT improves research quality, increases research output, enhances access to global scholarly resources, and reduces the time required to complete research projects. This finding supports Okonkwo and Eze (2021) and Owolabi and Musa (2021), who found that ICT enhances the efficiency, quality, and dissemination of scholarly research. The result further demonstrates that ICT is an important driver of research productivity among academic librarians.

Research Question Three

What challenges affect ICT integration for research productivity among academic librarians?

Table 4: Challenges Affecting ICT Integration and Research Productivity (N = 106)

S/N	Challenges Affecting ICT Integration	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	Mean	Interpretation
41	Inadequate ICT infrastructure limits my research	34 (32.1%)	44 (41.5%)	18 (17.0%)	10 (9.4%)	3.02	High

S/N	Challenges Affecting ICT Integration	Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)	Mean	Interpretation
	productivity						
42	Lack of training opportunities reduces my ICT competence	30 (28.3%)	43 (40.6%)	20 (18.9%)	13 (12.3%)	2.93	High
43	Insufficient institutional support affects my use of ICT tools	32 (30.2%)	41 (38.7%)	21 (19.8%)	12 (11.3%)	2.92	High
44	Personal interest and motivation influence my ICT use	25 (23.6%)	40 (37.7%)	26 (24.5%)	15 (14.2%)	2.71	Moderate-High
45	Heavy workload and time constraints hinder my effective use of ICT	29 (27.4%)	38 (35.8%)	24 (22.6%)	15 (14.2%)	2.76	Moderate-High
46	Limited access to current research databases affects my research productivity	31 (29.2%)	39 (36.8%)	22 (20.8%)	14 (13.2%)	2.86	High
47	Lack of peer collaboration opportunities hinders my ICT usage	24 (22.6%)	37 (34.9%)	27 (25.5%)	18 (17.0%)	2.64	Moderate
48	Limited availability of up-to-date software tools affects research quality	30 (28.3%)	40 (37.7%)	23 (21.7%)	13 (12.3%)	2.90	High
49	Organizational policies and bureaucracy restrict my effective use of ICT	28 (26.4%)	39 (36.8%)	24 (22.6%)	15 (14.2%)	2.85	Moderate-High
50	Inadequate technical support from the institution affects my ability to use ICT efficiently	32 (30.2%)	41 (38.7%)	21 (19.8%)	12 (11.3%)	2.92	High

Grand Mean = 2.85

Table 4 indicates that academic librarians face several significant barriers to effective ICT integration for research productivity, with a grand mean of 2.85. The most serious challenge was inadequate ICT infrastructure (Mean = 3.02), followed by lack of training opportunities (Mean = 2.93), insufficient institutional support (Mean = 2.92), and inadequate technical support (Mean = 2.92).

These findings suggest that the research benefits of ICT are constrained not merely by awareness or willingness, but by institutional and infrastructural limitations. Although some challenges such as personal motivation and peer collaboration were rated moderate, the overall pattern shows that stronger administrative, technical, and infrastructural support is required to maximize ICT-enabled research productivity.

The findings reveal that inadequate ICT infrastructure, insufficient institutional support, inadequate technical support, and limited training opportunities remain major barriers to ICT integration for research productivity. These challenges suggest that although ICT facilities are available in many institutions, institutional constraints continue to limit their effective utilization. This finding is consistent with Olayemi and Tijani (2022), who identified infrastructural deficiencies and inadequate institutional support as major obstacles to ICT adoption in Nigerian academic libraries.

Test of Hypothesis

Hypothesis One

H₀: There is no significant relationship between ICT integration and the research productivity of academic librarians in federal university libraries in North-Central Nigeria.

Table 5

Chi-Square Analysis of the Relationship Between ICT Integration and Research Productivity

Hypothesis / Variables	Observed χ^2	df	Critical χ^2 ($\alpha = 0.05$)	p-value	Decision	Interpretation
ICT Integration and Research Productivity	24.53	9	16.92	0.003	Reject H ₀	Significant relationship exists

Table 5 shows that the calculated Chi-square value for ICT integration and research productivity is 24.53, which is greater than the critical value of 16.92 at 9 degrees of freedom. The associated p-value of 0.003 is lower than the 0.05 level of significance.

The null hypothesis was therefore rejected. This means that there is a statistically significant relationship between ICT integration and the research productivity of academic librarians in federal universities in North-Central Nigeria. In practical terms, this implies that improved ICT integration is associated with higher research productivity among academic librarians.

Discussion

The Chi-square analysis revealed a statistically significant relationship between ICT

integration and research productivity among academic librarians. This finding confirms that improved ICT integration is associated with higher research productivity and reinforces the importance of investing in digital infrastructure and ICT capacity building within university libraries. The result supports earlier studies that identified ICT as a key determinant of research performance among academic librarians.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Federal universities should strengthen ICT infrastructure by providing reliable internet connectivity, modern computer systems, stable digital platforms, and access to current electronic information resources.
2. Regular ICT training and professional development programmes should be organized to improve academic librarians' competencies in using digital research tools, including citation management software, data analysis tools, collaborative research platforms, and online publishing systems.
3. University management should provide stronger institutional support through research grants, subscriptions to current academic databases, conference sponsorship, and policies that encourage scholarly publishing among academic librarians.
4. Academic libraries should promote the adoption of advanced ICT applications, such as institutional repositories, virtual reference services, collaborative research

platforms, and digital scholarly communication systems, to enhance research visibility and productivity.

5. Universities should provide adequate technical support by ensuring the availability of qualified ICT personnel to maintain systems and promptly resolve technical challenges affecting research activities.
6. Library administrators should integrate ICT into research support strategies to encourage advanced use of digital technologies and improve the research productivity of academic librarians in federal universities in North-Central Nigeria.

Conclusion

This study concludes that ICT integration has a significant positive effect on the research productivity of academic librarians in federal universities in North-Central Nigeria. The findings demonstrate that academic librarians who have access to and make use of ICT tools are better able to conduct, organize, and disseminate research effectively. ICT was found to enhance research quality, increase output, improve access to scholarly resources, reduce time spent on research tasks, and strengthen the visibility of scholarly work.

At the same time, the study concludes that the full benefits of ICT integration are constrained by several structural and institutional barriers. Inadequate infrastructure, insufficient training, limited access to current databases, poor technical support, and weak institutional backing continue to hinder the effective use of ICT for research purposes.

Consequently, while ICT has proven to be a major determinant of research productivity, its

effectiveness depends on the extent to which universities create supportive digital and organizational environments.

Overall, the study affirms that strengthening ICT integration in federal university libraries is essential not only for improving service delivery, but also for enhancing the scholarly contribution and academic relevance of librarians in higher education institutions.

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