



Integrating Innovative Technologies for Information Service Delivery among Military Tertiary Institution Librarians in Kaduna State, Nigeria

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Abstract

This study focused on Adoption of Innovative Technologies for Information Service Delivery by Library Staff in Military Tertiary Institution Libraries in Kaduna State, Nigeria. It is set to achieve 2 objectives among which are to find out types of innovative technologies military tertiary institution will adopt, to find out the types of information service that can be rendered with innovative technologies, Quantitative research methodology and a cross-sectional Survey research design were adopted. The study covers the staff of 3 Military Higher Institutions Libraries with a total of 102 professionals and paraprofessional staff. Using Census sampling technique data was collected through questionnaires. One hundred 102 copies of the questionnaire were distributed to the respondents. The study found out that; Blockchain Technology, AI, VR, AR, and IoT are the potential tools for improving information service delivery, in Military Tertiary Institution Libraries in Kaduna State, Nigeria, it also found out that Cloud-Based Library Services and Database Management are potential services for efficient information service delivery. The study concluded the adoption of innovative technologies for information service delivery by library staff in military tertiary institution libraries is crucial for modernizing library operations and aligning with the rapidly evolving digital landscape. The study recommended that the Librarians of Military Tertiary Institution Libraries in Kaduna State, Nigeria in collaboration with the commandant should prioritize the adoption of blockchain technology. Also study recommended that this technology will provide a secure and transparent method for managing library operations, protecting sensitive user information, and ensuring the integrity of data related to resource management and also recommended that the Librarians of Military Tertiary Institution Libraries in Kaduna State, Nigeria with the help of the commandant should address the significant challenges associated with the adoption of innovative technologies for effective information service delivery

Keywords: Adoption, Innovative Technology, Information Service Delivery, Military Tertiary Institution

Introduction

The integration of innovative technologies has transformed information service delivery, changing how information is accessed, managed, and shared. Adoption of these technologies by information professionals is critical for enhancing service efficiency, meeting user needs, and improving overall satisfaction. Adoption represents the initial step toward understanding, evaluating, and embracing innovations, enabling professionals to leverage new tools effectively (OECD, 2018). Innovative technologies encompass advanced solutions that improve task execution, service delivery, and resource management. In libraries, technologies such as library management systems, artificial intelligence (AI), mobile applications, the Internet of Things (IoT), and immersive tools like virtual and augmented reality (VR/AR) facilitate efficient operations, remote access, and engaging learning experiences (Michael & Stephens, 2021; Kumar & Sharma, 2020). Mobile applications and social media further enhance communication and outreach, broadening the reach of library services. By adopting these innovations, libraries can provide inclusive, interactive, and user-centered services, contributing to both academic success and broader social development. This study therefore investigates the adoption of innovative technologies for information service delivery by library staff in military tertiary institution libraries in Kaduna State, Nigeria, and explores their potential positive impact on service provision.



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Statement of the Problem

Innovative technologies play vital role in transforming service delivery within libraries, revolutionizing how information is accessed, stored, and disseminated. AI-driven recommendation systems help patrons discover relevant materials based on their preferences and previous searches, significantly improving the user experience. Virtual assistants provide immediate assistance to users, offering real time support and guidance, thereby enhancing customer service. Similarly, the utilization of innovative technologies like augmented reality (AR) and virtual reality (VR) has the potential to revolutionize learning experiences within libraries. By embracing these innovations, libraries will evolve into dynamic spaces that foster engagement, learning, and collaboration, and catering for the diverse needs of their patrons in the digital age. Studies by Michael & Stephens (2021) emphasized the importance of innovative technologies to create engaging and interactive experiences for library patrons. They highlight the role of librarians as facilitators of technology rich learning environments. Despite the benefits of innovative technologies in libraries, the researchers, observed that Military tertiary institution libraries in Kaduna state are yet to adopt and use innovative technologies for information service delivery which consequently has resulted to many challenges in information service delivery of the libraries. The consequence of not addressing these problem could lead to significant challenges for example, students may face difficulties accessing resources efficiently, which could hinder their academic progress and put them at a disadvantage compared to peers at more technologically advanced institutions. Also, staff members would likely experience increased workloads due to the lack of automation, leading to inefficiencies, potential errors, and reduced job satisfaction. Besides, management might struggle with operational inefficiencies, making it difficult to manage resources effectively, which could damage the library's reputation and limit opportunities for growth and partnerships, and the library could become less effective, negatively impacting all stakeholders involved.

Objectives of the Study

The following research objectives are set to be achieved by the study

1. To find out types of innovative technologies that Staff of Military tertiary Institution Libraries could adopt of for information service delivery.
2. To find out the types of service that could be rendered with innovative technologies for information service delivery by Staff of Military Tertiary Libraries in Kaduna State Nigeria.

Literature Review

Libraries play a critical role in facilitating access to information to support teaching, learning, and research. In the digital age, the adoption of innovative technologies has become essential for enhancing library operations and responding to the evolving needs of users (Bello, 2021; Aina, 2014). Studies indicate that innovative technologies have expanded the scope of library services beyond traditional physical spaces, enabling more flexible, user-centered, and technology-driven service delivery (Chowdhury, 2018). The scope of technology adoption in libraries covers key functional areas such as digitization, digital preservation, institutional repositories, online databases, and automated library systems (Chowdhury, 2018; Issa, Amusan, & Daura, 2018). These technologies improve access to scholarly content, support long-term preservation, and enhance the visibility of institutional research outputs. Empirical studies in Nigeria and other developing contexts report that digital technologies significantly improve access to information resources and promote scholarly communication, although adoption levels vary across institutions (Onuoha, 2019; Adebayo & Oladipo, 2021). Libraries are undergoing significant transformation driven by innovative technologies that extend beyond basic automation to include the redesign of workflows, services, and user engagement strategies (Chowdhury, 2018; Hider & Tan, 2019). Innovative technologies, including artificial intelligence, mobile computing, cloud services, RFID, and the Internet of Things, are increasingly used to enhance circulation, security, personalization, and operational efficiency (Kumar & Sharma, 2020; Michael & Stephens, 2021). These tools enable libraries to position themselves as digital knowledge hubs and learning commons. Information service delivery refers to the processes through which libraries provide timely, relevant, and value-added services to users. The literature consistently shows that innovative technologies enhance service delivery by improving speed, accuracy, accessibility, and user engagement (Rowley, 2011; Kumar & Sharma, 2020). Technology-enabled services such as online reference, mobile access, and automated circulation systems support remote and flexible service provision (Onuoha, 2019; Issa et al., 2018). However, several studies emphasize that effective technology adoption is shaped by organizational and human factors, including staff ICT competence, management support, funding, and institutional policies (Aina, 2014;



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Olatokun & Inegbedion, 2015). In developing countries, these constraints continue to limit the full realization of technology benefits in libraries (Adebayo & Oladipo, 2021). The literature therefore highlights the need for context-specific studies, particularly in specialized settings such as military tertiary institution libraries, where empirical evidence remains limited.

Methodology

Quantitative research methodology was used to conduct this study. Quantitative research methods are used in research studies to collect and analyze numerical data in order to identify patterns or trends. These methods are useful for studying small and large sample sizes, as they allow researchers to make inferences about a population based on a representative sample. Cross sectional survey research design was used for this study. The design was used in this research because it allows for the collection of data from a sample of individuals at a single point in time, The population of the study consists of 102 library staff which are 58 professional librarians and 44 para professional’s library staff of the selected military tertiary institution libraries which are; Nigerian Defense Academy library Kaduna, Institute Library, Air force Institute of Technology Kaduna and Ejiga library, Armed Forces Command and Staff College Jaji. In this study 102 librarians were used as sample size this census sampling technique was used for the research.

The instrument used to collect data for this study is a self-developed questionnaire, a split half method of reliability test was used where ten questionnaires were divide into two halves of five, and both parts were given the instrument at the same time. Then, the scores from both part of the test were correlated. The reliability factor is determined using Cronbach’s alpha reliability test for the instrument which is considered reliable when the value is 0.5 and above and the reliability coefficient of the instrument for this study was 0.832, A letter of introduction was collected from the Department, introducing the researchers for data collection on Adoption of Innovative Technologies for Information Service Delivery by Staff of Military Tertiary Institution Libraries in Kaduna State. The letter was submitted to each of the Institution librarians. Descriptive statistics was used to analyze the data collected from the research questions. Frequency count and percentage was also used to analyze research questions the benchmark is 50% and above using SPSS version 26.

Response Rate

Out of the 102 copies of the questionnaire were administered to the respondents and a total of 94 (92.2 %) copies were retrieved and duly completed and found usable for analysis. The high response rate is attributed to the fact that the respondents were duly followed up and given up to four weeks within which to complete and return the questionnaire.

Table 1: Response Rate

S/N	Name of Libraries	Copies of questionnaires distributed	of Copies of questionnaires returned	of Percentage of questionnaires
1	Nigerian Defense Academy Library Kaduna	34	30	29.4%
2	Institute Library, Air force Institute of Technology Kaduna	44	42	41.2%
3	Ejiga Library Armed Forces Command and Staff College Jaji	24	22	21.6%
	Total	102	94	92.2%

Source: Field Survey, 2024

Research objective 1:

Types of Innovative Technologies Military Tertiary Institution Libraries could adopt for Information Service Delivery by Library Staff in Kaduna State, Nigeria.

In order to examine the adoption on types of innovative technologies for information service delivery by library staff of military tertiary institution libraries in Kaduna State, Nigeria, a comprehensive list of possible technologies was presented to the respondents. Respondents were encouraged to select as many technologies which they are aware of and beneficial for enhancing information services. The findings are presented in Table 2.



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S/N	Types of Innovative Technologies	NDA LIBRARY (F %)	AFIT LIBRARY (F %)	EAFSC LIBRARY (F %)	TOTAL (F %)
1.	(Radio Frequency Identification) RFID	20 (32.8%)	25 (41.0%)	16 (26.2%)	61 (66%)
2.	Virtual reality (VR) & Augmented reality (AR)	30 (37.5%)	25 (31.2%)	25 (31.2%)	80 (87%)
3.	Mobile Application Technology	7 (36.8%)	6 (31.6%)	6 (31.6%)	19 (21%)
4.	Artificial intelligence (AI) & Chatbot	25 (36.2%)	22 (31.9%)	22 (31.9%)	69 (75%)
5.	Block chain Technology	30 (34.9%)	28 (32.6%)	28 (32.6%)	86 (93%)
6.	Big Data Analytics & User profiling	15 (35.7%)	14 (33.3%)	13 (31.0%)	42 (45%)
7.	Internet of Things and Sensors	28 (34.1%)	27 (32.9%)	27 (32.9%)	82 (89%)
8.	Online Communities & Social media Technology	20 (39.2%)	16 (31.4%)	15 (29.4%)	51 (55%)
9.	Gamification & Interactive Learning Platform	24 (35.3%)	22 (32.4%)	22 (32.4%)	68 (73%)
10.	Assistive Technology for Accessibility	16 (35.6%)	15 (33.3%)	14 (31.1%)	45 (48%)
11.	Robotics & Automaton Systems	18 (34.6%)	17 (32.7%)	17 (32.7%)	52 (56%)
12.	Makerspace and 3D Painting	7 (41.2%)	6 (35.3%)	4 (23.5%)	17 (18%)

Source: Field Survey, 2024.

Key : (F %) : Frequency and Percentage NDA: Nigerian Defence Academy Library, AFIT: Air force Institute of Technology library, EAFSC: Ejiga Library Armed Forces Command and Staff College Jaji.

Discussions

Data on innovative technologies for information service delivery in military tertiary institution libraries in Kaduna State reveal clear institutional priorities. Blockchain technology recorded the highest level of awareness, indicating strong consensus on its relevance for secure, transparent, and accountable information management. This reflects the central importance of data protection and information integrity within military academic environments.

Virtual Reality (VR) and Augmented Reality (AR) also demonstrated high awareness, suggesting growing recognition of immersive technologies as tools for enhancing learning, user engagement, and interactive information access. Their consistent acceptance across institutions indicates a shared institutional orientation toward technology-driven educational innovation. In contrast, makerspace and 3D printing technologies recorded the lowest level of awareness, reflecting limited emphasis on hands-on and creative technologies. This suggests that military tertiary institution libraries prioritize innovations with direct relevance to security, instructional delivery, and operational efficiency over those focused on experiential learning and prototyping. These findings align with existing studies that highlight blockchain's role in secure resource management (O'Byrne, 2020) and the capacity of VR/AR to enhance learning and user experience (Radu, 2014; Billingham, Clark, & Lee, 2015), while indicating that makerspace-oriented innovations (Moorefield-Lang, 2015) remain underdeveloped in military library contexts.

Research objective 2: Types of Services Rendered with Innovative Technologies for Information Service Delivery by Library Staff of Military Tertiary Institution Libraries in Kaduna State, Nigeria.

To explore the types of services that can be enhanced through using innovative technologies in military tertiary institution libraries in Kaduna State, Nigeria, a detailed analysis was conducted in Table 3.

S/N	Types of Services that could be Rendered with Innovative Technologies	NDA LIBRARY (F %)	AFIT LIBRARY (F %)	EAFSC LIBRARY (F %)	TOTAL (F %)
1.	Digital Reference Service	30 (34.5%)	29 (33.3%)	28 (32.2%)	87 (94%)
2.	Digital archiving and preservation service	16 (35.6%)	15 (33.3%)	14 (31.1%)	45 (48%)
3.	Database Management Service	30 (34.1%)	29 (33.0%)	29 (33.0%)	88 (95%)
4.	Cloud Base Library Service	30 (33.7%)	30 (33.7%)	29 (32.6%)	89 (96%)
5.	Online Public Access Catalog Service	8 (38.1%)	7 (33.3%)	6 (28.6%)	21 (22%)
6.	E- Learning Support Service	30 (35.3%)	28 (32.9%)	27 (31.8%)	85 (92%)
7.	Data Analysis Service	9 (37.5%)	8 (33.3%)	7 (29.2%)	24 (26%)
8.	Current Awareness Service	28 (39.4%)	24 (33.8%)	19 (26.8%)	71 (77%)
9.	Translation and Interpretation Service	26 (35.1%)	25 (33.8%)	23 (31.1%)	74 (80%)
10.	Consortium Service	25 (36.8%)	24 (35.3%)	19 (27.9%)	68 (73%)
11.	Checking and Discharging Service	20 (40.8%)	16 (32.7%)	13 (26.5%)	49 (53%)

Source: Field Survey, 2024



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Key: (F %): Frequency and Percentage **NDA:** Nigerian Defence Academy Library, **AFIT:** Air force Institute of Technology library, **EAFSC:** Ejiga Library Armed Forces Command

Findings on the types of services enhanced through innovative technologies in military tertiary institution libraries in Kaduna State indicate a strong institutional focus on services that improve accessibility, efficiency, and digital service delivery. Cloud-based library services recorded the highest level of adoption, reflecting widespread institutional commitment to scalable and flexible digital infrastructure. This highlights the strategic importance of cloud technologies in supporting resource sharing, collaboration, and efficient library management within military academic environments.

Digital reference services and database management services also recorded very high levels of adoption, underscoring their central role in supporting timely user support and effective organization and retrieval of information resources. The strong adoption of these services suggests that military tertiary institution libraries prioritize technologies that directly enhance service responsiveness and operational effectiveness. E-learning support services similarly demonstrated high adoption, reflecting the increasing integration of library services into digital learning environments. This aligns with the growing demand for technology-enabled instructional support within higher education and military training contexts. In contrast, services such as Online Public Access Catalog (OPAC) and data analysis services recorded relatively low levels of adoption. This suggests a strategic shift away from traditional or stand-alone systems toward more integrated and advanced digital platforms. The lower emphasis on these services indicates that institutional priorities favor technologies perceived to offer greater immediate operational and instructional value. These findings are consistent with prior studies that emphasize the role of cloud computing in enabling flexible, cost-effective, and scalable library services (Rieke & Jones, 2019; Khan & Bhatti, 2017). Overall, the results demonstrate that military tertiary institution libraries are increasingly adopting innovative technologies to support core service areas, while selectively deprioritizing traditional systems that may be viewed as less aligned with evolving digital service expectations. The strong preference for cloud-based library services highlights the increasing need for flexible, scalable, and collaborative digital infrastructures in military libraries. Given the unique nature of military institutions, where security and accessibility must be carefully balanced, the widespread recognition of cloud solutions points to their potential in enhancing operational efficiency. This aligns with the assertion by Khan & Bhatti (2017) that cloud computing not only improves resource accessibility but also fosters cost efficiency and seamless information management. The study highlights the growing importance of innovative technologies in shaping the future of military tertiary institution libraries. The potential of cloud computing, digital reference services, and database management suggests a clear demand for technologies that enhance accessibility, collaboration, and efficiency. However, the lower emphasis on OPAC services indicates a need for strategic evaluation of traditional systems in favor of more advanced solutions. These insights emphasize the necessity for military libraries to continuously assess and integrate emerging technologies that align with their operational needs and user expectations. By doing so, they can ensure that their services remain relevant, efficient, and responsive to the evolving information landscape.

Conclusion

Adoption of innovative technologies for service delivery by staff of military tertiary institution libraries is essential for modernizing library operations, enhancing security, improving resource accessibility, and fostering collaboration. Technologies such as blockchain, cloud-based platforms, the Internet of Things (IoT), and artificial intelligence (AI) have the potential to revolutionize how library resources are managed, accessed, and utilized. These technologies enhance the security and integrity of data, improve remote accessibility, streamline resource sharing, and offer new opportunities for user engagement through interactive and immersive tools. Military tertiary institution libraries can transform into modern hubs of knowledge that are not only efficient and secure but also responsive to the needs of their users. This transformation will support educational and research activities more effectively, enable real-time access to information, and foster an environment conducive to learning and collaboration. The future of military higher institution libraries lies in their ability to adapt and evolve, ensuring that they continue to serve as vital information resources in an increasingly digital worlds

Recommendations

Based on the finding of the study, the following recommendations are provided

1. In light of the importance of innovative technologies for enhancing information service delivery, it is recommended that the Librarians of Military Tertiary Institution Libraries in Kaduna State, Nigeria in collaboration of the commandants and management based on adoption level of these technologies should include technologies like



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- blockchain technology. This technology will provide a secure and transparent method for managing library transactions, protecting sensitive user information, and ensuring the integrity of data related to resource management.
2. Considering the potential of innovative technologies to transform information service delivery, it is recommended that the Librarians of Military Tertiary Institution Libraries in Kaduna State, Nigeria and the commandants should focus on implementing a range of technology driven services. Establishing digital reference services will enable users to access expert assistance remotely, while Cloud-based library services should be implemented to facilitate seamless resource access and improve collaboration.

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