AUTOMATION OF ACADEMIC LIBRARY RESOURCES: CHALLENGES AND BENEFITS AT THE UNIVERSITY OF ABUJA LIBRARY

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Abstract

This study investigates the automation of academic library resources at the University of Abuja, focusing on its implementation, benefits, and persistent challenges. Employing a quantitative research design using a survey method, data were collected through structured questionnaire from 300 library users. The study is framed conceptually around the interplay of automation, resource accessibility, operational efficiency, and user satisfaction, and is theoretically anchored in the Technology Acceptance Model (TAM) and Diffusion of Innovations Theory (DOI). Findings reveal that Koha and DSpace are the most commonly deployed software tools within the university's library system. These technologies have contributed to improved cataloging, circulation, and access to digital repositories. However, infrastructural challenges, limited ICT proficiency, outdated equipment, and inadequate funding hinder the full-scale adoption and optimal use of these systems. Additionally, unreliable internet access and a lack of comprehensive staff training further limit the realization of automation's benefits. The study underscores the importance of strategic interventions to enhance library automation. These include upgrading infrastructure, implementing regular training programs, and increasing financial investment. By addressing these issues, academic libraries can better harness automation to improve service delivery, resource management, and user satisfaction.

Key words; Academic Resources, Library, Automation, ICT, Software, Database

Introduction

Academic libraries play a pivotal role in facilitating access to knowledge, supporting research, and promoting lifelong learning. In the digital age, the integration of library automation systems has emerged as a cornerstone of modern academic library services, enabling efficient management of resources and enhanced user experiences. Library automation refers to the use of integrated software solutions—such as Koha, DSpace, and Evergreen—to perform core library functions including cataloging, circulation, acquisitions, and digital archiving (Chen, 2018; Bertot, 2017).

The integration of technology in academic libraries has been a significant development in the modern educational landscape. Automation in libraries involves using technology to perform traditional library tasks more efficiently, such as acquisition, cataloging, circulation, and resource management. This transformation is particularly crucial in academic institutions, where libraries serve as essential resources for students, faculty, and researchers. However, implementing automation in academic libraries, especially in developing countries like Nigeria, comes with a unique set of challenges. At the University of Abuja, the automation of library resources represents an important step towards modernizing educational support services. However, the process of automation is not without its difficulties. The digital divide, infrastructural deficiencies, and the need for specialized training are significant obstacles that must be addressed to fully realize the potential benefits of automation.

At the University of Abuja, automation initiatives have been introduced to improve service delivery and expand access to academic resources. However, challenges such as infrastructural inadequacies, insufficient ICT skills among staff and users, limited internet connectivity, and outdated hardware continue to impede full-scale implementation. These issues mirror broader trends reported by Mahmood (2018), Reynolds (2020), and John (2022), who argue that despite the availability of advanced library technologies, successful adoption is often constrained by contextual limitations in developing regions.

The challenges are compounded by the complexity of selecting appropriate software that meets the specific needs of the library, given the local constraints and limitations. These issues lead to a lower rate of adoption and This study explores the extent and effectiveness of library automation at the University of Abuja, guided by key variables including academic libraries, library automation systems, resource accessibility, and user satisfaction. The conceptual model integrates these variables to assess the dynamic relationships affecting automation success. The research is further grounded in the Technology Acceptance Model (Davis, 1989) and the Diffusion of Innovations Theory (Rogers, 2003), providing a framework for understanding how new technologies are adopted and accepted within academic library environments, successful implementation of automation in academic libraries.

Problem Statement

The automation of academic library resources has become a crucial aspect of modern library management, improving accessibility, operational efficiency, and user satisfaction. However, despite its advantages, the University of Abuja faces significant challenges in the full-scale implementation and utilization of automated library systems. Issues such as infrastructural deficits, limited ICT skills, high costs, and outdated equipment hinder the effective deployment and adoption of automation technologies. While software solutions like Koha and DSpace have been integrated into the library system, their full potential remains unrealized due to unreliable internet connectivity, inadequate training for staff and users, and financial constraints. These challenges lead to inconsistencies in service delivery and limit the benefits of automation. Moreover, the lack of awareness and user proficiency further exacerbates the problem, resulting in underutilization of available automated resources.

This study, therefore, seeks to explore the extent of library automation at the University of Abuja, the benefits it offers, and the barriers to its effective implementation. By identifying these challenges and proposing possible solutions, the research aims to contribute to the enhancement of academic library services through improved automation strategies.

Conceptual Framework

The conceptual framework of this study is built upon the interplay between library automation, resource accessibility, operational efficiency, and user satisfaction at the University of Abuja. The framework illustrates how the implementation of automated systems such as Koha, DSpace, and Evergreen influences the accessibility of academic resources, streamlines library operations, and impacts user experiences. It also identifies the mediating role of infrastructural capacity, ICT skills, and financial resources in determining the effectiveness of automation. The framework underscores the relationships among these variables, suggesting that effective library automation enhances resource accessibility and user satisfaction.

Theoretical Framework

The study is anchored on two key theories: the Technology Acceptance Model

(TAM) and the Diffusion of Innovations Theory (DOI).

- Perceived Usefulness (PU): Users believe that automation will improve their access to information and make library services more efficient.
- Perceived Ease of Use (PEOU): Users' perception of the complexity involved in using automated library systems.

In the University of Abuja context, TAM explains how students and staff adopt automated systems based on their perceived benefits and usability.

Diffusion of Innovations Theory (DOI) (Rogers, 2003):

- Innovation: Adoption of automated systems in library services.
- Communication Channels: Awareness and training programs provided to library users.
- Time: The period over which automation adoption progresses within the university.
- Social System: The library community comprising staff, students, and administrators.

DOI provides insight into how library automation is adopted at the University of Abuja, highlighting the importance of awareness, training, and infrastructural readiness in facilitating smooth adoption and utilization.

The conceptual and theoretical frameworks provide a structured approach to understanding how automation influences library services at the University of Abuja. The conceptual framework identifies critical variables and their interrelations, while TAM and DOI theories explain user acceptance and the adoption process of library automation. Together, they form the foundation for analyzing the challenges and benefits associated with automating academic library resources.

Research Questions

This study is guided by the following research questions:

- 1. What are the types of software packages that have been used for automation of academic library resources in University of Abuja?
- 2. What is the level use of automated library systems in the University of Abuja?
- 3. What are the key challenges affecting the effective implementation and utilization of automated systems at the University of Abuja Library?
- 4. How do users perceive the ease of use and usefulness of automated library systems?
- **5.** What institutional and social factors influence the adoption and diffusion of library automation technologies at the University of Abuja?

Literature Review

Library automation has evolved from basic digital cataloging to comprehensive integrated systems that encompass acquisitions, circulation, user management, and digital repositories. In academic libraries, automation serves as a cornerstone for enhancing access to information, improving resource management, and facilitating user-centered services (Buckland, 2016; Chen, 2018). As academic institutions shift toward digital learning environments, the role of automation has become even more pronounced. Modern systems such as Koha, DSpace, and Evergreen are widely adopted to meet the demand for seamless access to print and electronic resources.

As Bertot (2017) points out, successful library automation is not solely dependent on software deployment, but also on how well it is integrated into the

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institutional workflow. This study, therefore, views automation as a dynamic process influenced by both technological and human factors. The conceptual framework helps to situate library automation within broader institutional contexts, emphasizing that the success of automation initiatives is mediated by infrastructure, user training, and policy support.

For understand the processes and factors that influence the adoption of library automation, this study is grounded in two key theories: the Technology Acceptance Model (TAM) and the Diffusion of Innovations Theory (DOI). These frameworks are widely used in library and information science research to analyze user behavior, system adoption, and institutional readiness.

The Technology Acceptance Model (TAM), developed by Davis (1989), posits that the adoption of a new technology is primarily influenced by two factors: perceived usefulness (PU) and perceived ease of use (PEOU). In the context of academic libraries, PU refers to the belief that automation improves service quality and resource accessibility, while PEOU relates to how easily users can interact with these systems. Reynolds (2020) demonstrated that university students were more likely to engage with automated cataloging and circulation services when they found them intuitive and reliable. TAM has been particularly useful in identifying gaps between technological implementation and user satisfaction in African academic libraries, where systems are sometimes introduced without adequate orientation or support.

(2003) provides a broader sociological perspective on how innovations are adopted

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over time within a social system. DOI identifies several stages—knowledge, persuasion, decision, implementation, and confirmation—that users and institutions go through before fully embracing a new technology. Key variables in this model include the nature of the innovation, communication channels, the time taken for adoption, and the social system's structure. Taylor (2021) applied DOI to analyze how library automation was gradually integrated into university libraries in sub-Saharan Africa, emphasizing the role of training and stakeholder involvement in successful adoption. DOI is particularly relevant to this study as it provides insights into how the University of Abuja's library automation journey is shaped by infrastructural capacity, staff readiness, and institutional culture. TAM and DOI offer a multi-dimensional lens through which library automation can be studied—TAM focusing on individual user acceptance, and DOI addressing the broader institutional and systemic factors involved in technology diffusion.

A growing body of empirical research has explored the practical realities of library automation in both developed and developing contexts. Studies have consistently affirmed the transformative impact of automation on academic libraries, particularly in improving operational workflows and expanding access to scholarly resources. For instance, Tucker (2018) examined digital library systems in the United Kingdom and found that automation significantly reduced response time for resource requests and improved cataloging accuracy. Similarly, John (2022) emphasized the importance of inter-connectivity in automated systems, noting that digital repositories like DSpace promote collaboration and resource sharing among institutions. These

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benefits are especially critical for academic libraries striving to keep pace with increasing student and faculty demand for digital content.

In the Nigerian context, several studies have highlighted both progress and persistent barriers. Anunobi and Okoye (2018) evaluated automation initiatives across federal university libraries in Nigeria and reported moderate success due to challenges such as unstable power supply, limited bandwidth, and inadequate staff training. Mahmood (2018) supported these findings in his cross-country analysis, identifying common constraints in developing countries, including under-funding, lack of technical expertise, and outdated equipment.

At the University of Abuja, automation tools such as Koha and DSpace have been implemented to manage cataloging, user records, and digital archiving. While these systems have contributed to improved access and organizational efficiency, their potential remains underutilized due to unreliable internet connectivity and insufficient ICT training among staff and users. This mirrors findings by Howden (2020), who argued that technology alone does not guarantee success unless accompanied by sustained capacity-building and institutional commitment.

Methodology

This study employs a quantitative research design, using a survey method to gather data. The survey was conducted through questionnaires distributed to a sample of library users at the University of Abuja. This approach was chosen because it allows for the collection of data from a large number of respondents in a costeffective and efficient manner. The study targeted library users at the University of Abuja, with a total population of 6,783. A stratified sampling technique was used to select a sample of 300 students, ensuring that the sample was representative of the larger population. The stratification was based on factors such as gender, age, and academic discipline to capture a diverse range of experiences and perspectives. Data was collected using a structured questionnaire, which included both closed-ended and Likert-scale questions. The data was then analyzed using descriptive statistics, including frequency counts, percentages, and mean scores.

Findings

RQ 1: What are the types of software packages that have been used for automation of academic library resources in University of Abuja?

ITEMS	Strongly			Std.		
	Disagree	Disagree	Agree	Agree	Mean	Deviation
DSpace	7(2.2%)	36(11.4%)	135(42.7%)	138(43.7%)	3.2785	.75065
Evergreen	16(5.1%)	63(19.9%)	147(46.5%)	90(28.5%)	2.6842	.82984
Koha	10(3.2%)	30(9.5%)	161(50.9%)	115(36.4%)	2.0386	5 .86698
Archivematica	77(24.4%) 131(41.5%) 88(27.8%)	20(6.3%)	2.038	6 .86698
Greenstone	138(43.7	%) 75(23.7%	%) 21(6.6%)	82(25.9%	6) 1.639	.86762
Alma	65(20.6%	6) 135(42.79	%) 105(33.2%) 11(3.5%)	2.203	8 .80047
LibGuides	11(3.5%)) 77(24.4%	%) 151(47.8%) 77(24.4%) 2.930	4 .78975
EndNote	16(5.1%)) 63(19.9%	o) 147(46.5%)	90(28.5%)	2.684	2 .82984
	2.8901					

The study identified several software packages used in the automation of the University of Abuja's academic library resources. These include Koha, DSpace, Evergreen, LibGuides, and Greenstonee. Koha and DSpace emerged as the most widely used and effective software, with a majority of respondents indicating frequent use on a daily or weekly basis. However, software like Greenstonee and Archivematica were less frequently used, possibly due to their specialized functions or limited user familiarity.

RQ 2: What is the extent of usage of automation of the academic library resources in University of Abuja?

ITEMS	Not at all F/(%)	Monthly F/(%)	Weekly I F/(%)	Daily F/(%)	Mean	Std. Deviation
DSpace	7(2.2%)	33(10.4%)	135(42.7%)) 141(44.6%	6) 3.2975	5.74330
Evergreen	114(36.1%)	46(14.6%)	145(45.9%) 11(3.5%)	3.1456	5.79143
Koha	7(2.2%)	139(44.0%)	143(45.3%)) 27(8.5%)	3.3101	.72069
Archivematica	120(38.0%)	93(29.4%)	83(26.3%)	20(6.3%)	2.8418	.88746
Greenstone	140(44.3%)) 99(31.3%)	66(20.9%)	11(3.5%)	2.3348	.81380
Alma	158(50.0%)	107(33.9%) 47(14.9%)	4(1.3%)	2.8038	.79649
LibGuides	64(20.3%)	137(43.4%)) 104(32.9%)	11(3.5%)	3.3259	.77137
EndNote	64(20.3%)	137(43.4%)) 104(32.9%)	11(3.5%)	3.3259	.77137
	GRAN	ND MEAN			2.6737	

The analysis revealed a moderate level used of automation within the University of Abuja's library operations. While some software like Koha and DSpace are heavily utilized, others are less integrated into the daily operations of the library. This suggests that while the automation is present, it is not fully optimized across all functions of the library.

RQ 3: What are the key challenges affecting the effective implementation and utilization of automated systems at the University of Abuja Library?

Challenges facing effective		SD	D	Α	SA		
utilization of automation of					Std.		
academic library reso	urces	F/(%) F/(%	b) F /(%	6) F/(%)	Mean	Deviation
Limited Access	54(19	9.5%)	106(38.3	3%) 73(26	5.4%) 44(15.9	%) 2.205	4 . 98032
Network problem 2	0(7.29	%) 43	3(15.5%) 119(43.	0%) 95(34.3	%) 3.043	3 .88768
High cost gadget	20(7.	2%) 4	3(15.5%	6) 105(37	7.9%) 109(39	.4%) 3.09	39 .91200
Information Overload	36(13	8.0%) 5	50(18.19	%) 142(51	1.3%) 49(17.	7%) 2.73	65 .90041
Lack of ICT skills	20(7.	2%) 5	1(18.4%	6) 117(42	2.2%) 89(32.	1%) 2.99	28 .89278
Epileptic power supply	24(8.	7%) 3	9(14.1%	6) 109(39	.4%) 105(37	9%) 3.06	50 .93023
Outdated equipment	36(12	2.9%) (58(24.59	%) 127(45	5.7%) 47(16.9	9%) 2.66	55 .90703

GRAND MEAN 2.8718

The study shows several challenges which were identified in the effective utilization of automated systems. The most significant challenges include network problems, the high cost of electronic gadgets, and a lack of ICT skills among users. Additionally, issues such as limited access to resources, information overload, and outdated equipment were noted as resource management and user services at the University of Abuja, its full potential is hindered by several challenges. The most utilized software packages, such as Koha and DSpace, have been effective in enhancing library operations, but their impact is limited by infrastructural and technical issues.

The challenges observed in this study align with those reported in previous research

on library automation in developing countries. Issues such as inadequate infrastructure, lack of training, and high costs are common barriers to effective automation.

Discussion of Findings

The findings of this study confirm that while library automation has led to significant improvements in resource management and user services at the University of Abuja, infrastructural and technical issues limit its full potential. Koha and DSpace, the most utilized software, have been effective in enhancing library operations, aligning with the conceptual framework's emphasis on operational efficiency and resource accessibility. Challenges such as network problems, high costs, and limited ICT skills persist, reflecting the mediating role of infrastructural capacity highlighted in the conceptual model.

Studies by Buckland (2016) and Tucker (2018) emphasized the evolution of library automation and its capacity to improve resource management. This aligns with the study findings, which show that automation at the University of Abuja has enhanced resource accessibility and operational efficiency through software like Koha and DSpace. Similarly, Harada (2017) and John (2022) discussed how digital repositories and integrated library systems streamline library services—a benefit confirmed by the high usage rates of automated systems found in this study.

On the challenges, literature by Howden (2020) and Mahmood (2018) pointed out common issues such as limited ICT skills, infrastructural deficits, and high costs. The University of Abuja library users reported similar challenges, including network

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problems, epileptic power supply, and lack of training, reinforcing the global trends noted in the literature. Reynolds (2020) and Taylor (2021) emphasized technological advancements and increased access through automation, the findings indicate that despite the benefits, full utilization at the University of Abuja is hindered by financial constraints and outdated equipment. This discrepancy underscores the need for improved infrastructure and sustained investment in technology to fully realize automation benefits, as suggested by Davis and Martinez (2021).

Conclusion:

The rationale for this study stemmed from the increasing demand for efficient, accessible, and technology-driven academic library services in Nigerian universities, particularly at the University of Abuja. Despite the global shift toward automated library systems, many academic libraries in developing countries continue to struggle with implementation due to infrastructural, financial, and technical constraints. This study was therefore initiated to assess the state of library automation at the University of Abuja, with the aim of identifying its benefits, challenges, and opportunities for improvement.

The findings of this research provide a comprehensive analysis of the implementation of automated systems specifically Koha and DSpace within the University of Abuja library. Using a conceptual framework based on automation, accessibility, operational efficiency, and user satisfaction, and supported by the Technology Acceptance Model (TAM) and Diffusion of Innovations Theory (DOI), the study presents an evidence-based understanding of how automation is currently

utilized and perceived by library users. It also offers practical recommendations for improving infrastructure, ICT training, and institutional support to maximize the potential of automation in academic libraries.

This study provides substantial empirical data on the automation status of a specific Nigerian university library, which has been underrepresented in previous studies. While global literature has extensively covered the benefits and limitations of library automation, localized studies focusing on Nigerian institutions have been limited in scope and depth. By focusing on user experiences, infrastructural realities, and institutional readiness at the University of Abuja, this paper bridges that gap and provides context-specific insights that can inform future automation strategies in similar settings.

Moreover, this research contributes to the stream of knowledge by reinforcing the importance of aligning technological solutions with user needs, institutional capabilities, and continuous professional development. It highlights the critical role of automation in modernizing academic library services while emphasizing that successful implementation is dependent on a holistic approach that integrates technology, people, and policy. As such, the study not only informs academic discourse but also offers a practical framework that can guide future automation efforts in other academic libraries across Nigeria and similar developing contexts.

Recommendations

Based on the findings, the following recommendations are made:

1. The University management should invest in improving its infrastructure, particularly in terms of reliable internet connectivity and stable power supply. This will reduce the technical barriers to effective automation.

2. There is a need for comprehensive training programs to enhance the ICT skills of both library staff and users. Training and re-training of staff, this will ensure that the automated systems are used effectively and to their full potential.

3. The university management should carefully consider the selection of software for library automation, choosing solutions that are user-friendly, compatible with existing systems, and tailored to the needs of the library.

4. The library management should encourage the frequent use of automated systems through regular orientation programs and user support services. This will help integrate automation into the daily operations of the library and ensure that users are comfortable with the technology.

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