

## **Perception and Adoption of Open Source Software among Librarians in Academic Libraries in Adamawa State**

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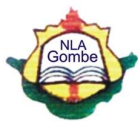
### **Abstract**

*The study investigated librarians' perceptions and adoption of open-source software (OSS) and the factors motivating its adoption in academic libraries in Adamawa State. The objectives are to assess librarians' attitudes towards OSS sustainability, identify challenges in its use, and examine strategies for its effective implementation. Utilizing a descriptive research design, data were collected through questionnaires administered to 103 librarians across six academic libraries of Modibbo Adama University, Yola, Adamawa State University, The Federal Polytechnic Mubi, Adamawa State Polytechnic Yola, Federal College of Education Yola, and College of Education Hong, all located in Adamawa State. Findings revealed that librarians generally hold positive perceptions of OSS, recognizing its flexibility, cost-effectiveness, and adaptability to meet library needs. However, challenges such as the need for technical expertise and support were identified as barriers to effective adoption. Also, the level of motivation moderately influenced the adoption of OSS in the studied academic libraries. The study concluded that fostering a supportive environment and providing necessary training can enhance the implementation of OSS, ultimately improving library operations and services. Recommendations include developing targeted training programs, encouraging community involvement in OSS development, and establishing support networks to address technical challenges.*

**Keywords:** Open Source Software, Perception, Adoption and Academic Libraries

### **Introduction**

The advent of open-source software (OSS) has transformed the technological landscape globally, particularly in academic libraries, which play a crucial role in supporting teaching, learning, and research. These libraries are increasingly adopting OSS to manage their collections and facilitate access to resources more efficiently. In Nigeria, particularly in Adamawa State, institutions such as Modibbo Adama University, Yola, Adamawa State University, The Federal Polytechnic Mubi, Adamawa State Polytechnic Yola, Federal College of Education Yola, and College of Education Hong are beginning to recognize the potential of OSS to enhance their operational efficiency. These libraries, often constrained by limited budgets, find open-source tools attractive for improving resource management and delivering more effective services to users.



In many developing regions, including Adamawa State, the high cost of proprietary software presents a significant challenge for academic libraries. Financial limitations make the adoption of OSS an appealing alternative. Open-source solutions, such as Koha, a widely used library management system, offer flexibility, local adaptability, and substantial cost savings all crucial factors in resource-limited environments (Oladokun & Kolawole, 2019; Igbinovia & Adebayo, 2021). For example, the libraries at Modibbo Adama University, Yola and Adamawa State University could benefit greatly from adopting such software, as it allows them to automate services without the financial burden associated with proprietary systems.

This study focuses on understanding the perceptions of librarians in academic libraries across Adamawa State regarding OSS. Librarian perceptions are a critical factor influencing the adoption rate of OSS. By examining how librarians in universities and polytechnics perceive the benefits, challenges, and usability of OSS, this research aims to uncover the motivations driving adoption. Additionally, understanding how librarians at Federal College of Education Yola and College of Education Hong engage with OSS will provide valuable insights into the specific challenges and opportunities within the local context.

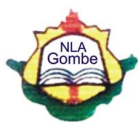
Given the financial and operational constraints faced by academic libraries in Adamawa State, this study will explore the extent to which OSS's flexibility, low cost, and lack of licensing restrictions have been embraced. It will also assess how OSS adoption impacts library services, contributing to more efficient resource management and automation. For institutions like The Federal Polytechnic Mubi and Adamawa State Polytechnic Yola, which aim to remain relevant in an increasingly digital environment, OSS adoption is likely to play a key role in their future development (Okoye & Uchechukwu, 2023).

Therefore, this research provides a focused examination of the perceptions and adoption of OSS among librarians in Adamawa State. By specifically considering academic libraries within this region, the study highlights the practical implications of OSS adoption and its potential benefits for improving library operations and user experiences across these institutions.

### **Statement of the Problem**

The integration of open-source software (OSS) in academic libraries offers a cost-effective solution to the challenges posed by expensive proprietary systems, especially in developing regions like Adamawa State. Academic libraries play a crucial role in supporting teaching, learning, and research, and OSS provides flexibility and efficiency in managing library operations. However, the success of OSS adoption largely depends on librarians' perceptions and their willingness to embrace these tools, which can significantly influence the software's effectiveness and sustainability.

Despite the benefits of OSS, there is a lack of comprehensive understanding of librarians' attitudes towards its adoption and the factors driving their motivation to use it. Additionally, challenges such as technical expertise and ongoing support are barriers to successful OSS implementation, which may hinder library automation and service improvement. This study seeks to explore librarians' perceptions and motivations for adopting OSS in Adamawa State's academic libraries, offering insights that can guide strategies to enhance the software's effectiveness and long-term sustainability.



### **Objectives of the Study**

1. To examine the perception of librarians on open source software in academic libraries in Adamawa state.
2. To ascertain factors motivating adopting open source software by librarians in academic libraries in Adamawa state.

### **Hypotheses**

H01: There is no significant difference in the perceptions of librarians regarding the effectiveness and viability of open-source software in academic libraries in Adamawa State.

H02: The level of motivation among librarians is significantly related to the rate of adoption of open-source software in academic libraries in Adamawa State

### **Literature**

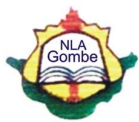
#### ***Open-source software (OSS)***

Open-source software (OSS) refers to computer programs whose source code is made publicly accessible, enabling users to utilize the software in its original form or to modify it according to their specific needs (Mohamed & Khair, 2023). This collaborative approach fosters an environment of innovation and creativity, as developers and users can contribute to the software's evolution, share improvements, and create derivative works. One of the defining characteristics of OSS is that it typically does not incur any licensing fees, making it an attractive option for individuals and organizations with limited budgets (Adeniran & Afolabi, 2022). The versatility of OSS is evident in its wide range of applications across various domains. For instance, in office automation, popular OSS options such as LibreOffice and Apache OpenOffice provide users with robust alternatives to proprietary office suites, facilitating tasks like word processing, spreadsheet management, and presentation creation. In the realm of web design, tools like WordPress and Joomla! empower users to create and manage websites easily, offering extensive customization options without the financial burden of licensing costs.

#### ***Effectiveness and Viability of Open-Source Software in Academic Libraries***

Open-source software (OSS) has become an effective solution for academic libraries aiming to enhance operational efficiency while reducing costs. OSS provides flexible, customizable software tools that meet the diverse needs of libraries, from managing catalogue systems to facilitating digital resource sharing. Tools such as Koha, an open-source integrated library system, have been widely adopted due to their effectiveness in automating library functions like circulation and cataloguing (Chakraborty, 2022). This flexibility allows libraries to modify the software to suit specific institutional needs, ensuring it remains adaptable to evolving technological trends.

The viability of OSS in academic libraries is further supported by its cost-effectiveness. Unlike proprietary software, OSS eliminates licensing fees, making it a sustainable option, particularly for institutions with limited budgets (Igbinoia & Adebayo, 2021). Beyond cost savings, OSS also fosters community-based support networks, where librarians and developers collaborate to maintain and update the software. This collective effort ensures continuous improvements and solutions to technical challenges, further enhancing the long-term viability of OSS in academic settings (Mohamed & Khair, 2023).



However, while OSS offers substantial benefits, challenges related to its implementation and maintenance remain. Academic libraries may encounter issues such as the need for technical expertise and consistent training to fully utilize OSS tools. Additionally, concerns about integration with existing systems and the availability of long-term technical support can impact its viability (Igbinovia& Adebayo, 2021). Despite these challenges, OSS continues to demonstrate its potential to transform academic libraries by offering a sustainable, collaborative, and cost-efficient alternative to proprietary systems.

### ***Factors Motivating the Use of Open-Source Software in Libraries***

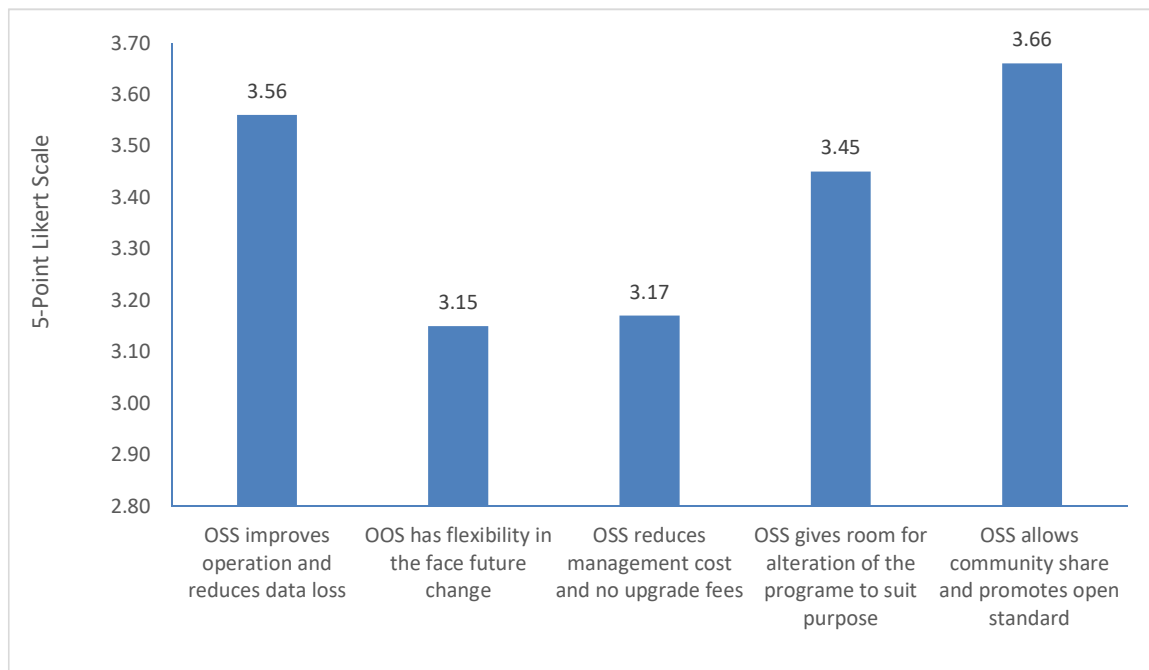
One of the primary factors motivating the adoption of open-source software (OSS) in libraries is its cost-effectiveness. OSS eliminates the need for expensive licensing fees associated with proprietary software, making it an attractive option for libraries operating on tight budgets, particularly in developing countries (Igbinovia& Adebayo, 2021). This financial advantage allows libraries to allocate their resources toward other critical services, such as expanding collections or improving user facilities, while still benefiting from robust software systems that support library operations. Another motivating factor is the flexibility and customizability of OSS. Unlike proprietary software, OSS offers libraries the ability to modify and adapt the software to meet specific institutional needs. This flexibility enables libraries to create tailored solutions that address unique challenges, such as local language integration or specialized cataloging systems (Adeniran & Afolabi, 2022). Furthermore, OSS encourages libraries to participate in global communities of developers and users, fostering collaboration and continuous improvement of the software. The collaborative nature of OSS also drives its adoption in libraries. Librarians and IT professionals can engage with a global community of contributors to resolve technical issues, share updates, and contribute to the software's development (Mohamed &Khair, 2023).

### ***Methodology***

This study adopts a descriptive research design, which Onohwakpor (2018) emphasizes as suitable for capturing a snapshot of specific phenomena at a given time. A questionnaire will serve as the primary tool for data collection, guiding the effort to generate relevant information for the study. The research focuses on selected academic libraries in Adamawa State, Nigeria, which is located in the north eastern part of the country, bordering Cameroon. Adamawa shares borders with Gombe State, Borno State, and Taraba State. The State capital is Yola. The study's population consists of 103 librarians from six academic libraries across Adamawa State, covering both federal and state institutions. The libraries involved in this study are those of Modibbo Adama University, Yola, Adamawa State University, The Federal Polytechnic Mubi, Adamawa State Polytechnic Yola, Federal College of Education Yola, and College of Education Hong, all located in Adamawa State. Given the manageable size of the population, a census sampling method was used, meaning all 103 librarians were included in the study. Mohamed and Khair (2023) describe census sampling as an effective method for collecting data from an entire population. The study used structured questionnaire design on 4 Points Likert scale as instrument for data collection, personally administered to the respondents. Data were analysed using descriptive tool such as weighted mean for research question, while Analysis of Variance (ANOVA) and linear regression were used to test the first and second hypotheses respectively at 0.05 significance level.

## Results

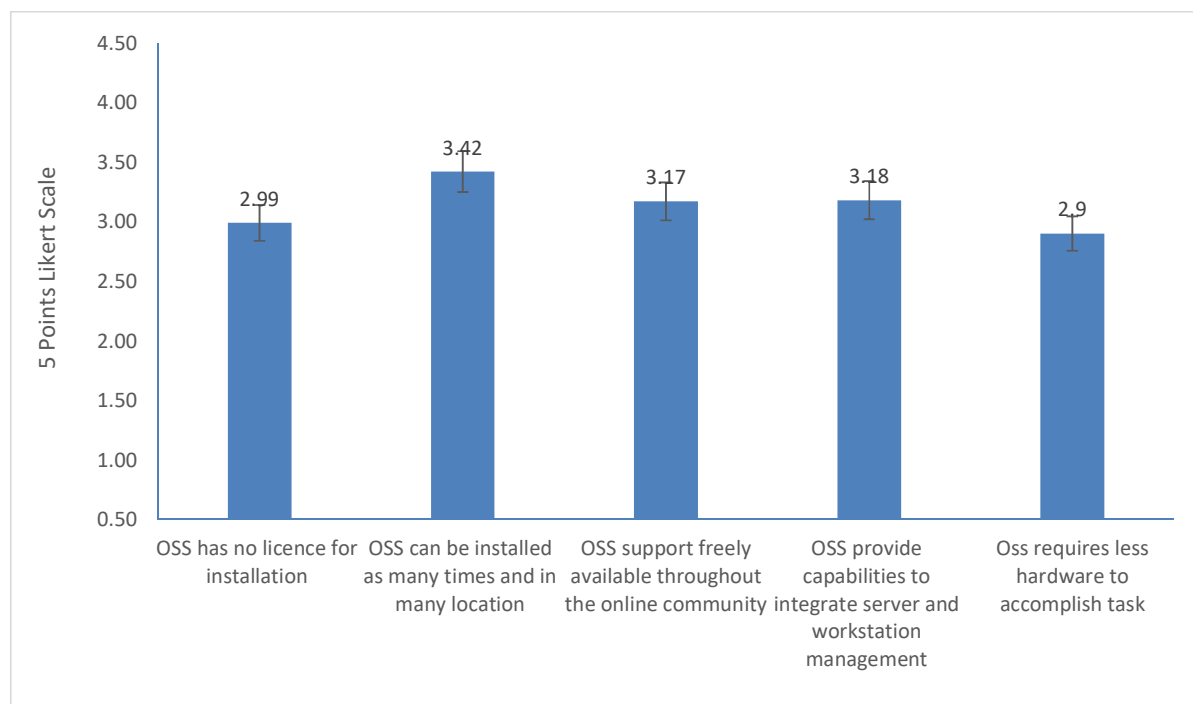
**Research Question 1: What are the perceptions of librarians regarding the effectiveness and viability of open-source software in academic libraries in Adamawa State?**



**Figure 1:** Ration on Perception of Librarians on Open-Source Software in Academic libraries in Adamawa State

Figure 1 present the rating on perception of librarians on Open-Source Software in Academic libraries in Adamawa State. The results show that most Librarians agreed that OSS improves library operation and reduces data loses (Mean = 3.56). Also, librarians strongly agree to the assertion that OSS has flexibility that make it suitable to face future challenge (Mean =3.15). The librarians strongly expressed that OSS reduces management cost due to fact that it requires no fees for upgrade. This fact was reaffirmed by most librarians across institutions in Adamawa State (Mean = 3.17). Likewise, the libertarians expressed strongly that open-source software gives room for alteration of the programe to suit different purposes (Mean =3.45). More so, majority of librarians unanimously agreed to the assertion that open-source software allows community share and promotes open standard (Mean = 3.66). The results general reveal that the sampled librarians across the tertiary institutions in Adamawa State hold agree perception about relevancy of Open-Source software in academic libraries in the state.

**Research Question 2: What factors motivate librarians in academic libraries in Adamawa State to adopt open-source software?**



**Figure 2:** Perception of Librarians on their Reasons for Adapting Open-source Software in Academic Libraries in Adamawa State

The results on Figure 2 present the perception of librarians on their reasons for adopting open-source software in academic libraries in Adamawa State. The results show that one of the reasons for adoption of OSS is the fact that it has no license for installation. This fact is testified to by most librarians (Mean =2.99). Also, most librarians strongly agreed that OSS can be installed as many times as possible in many locations which influenced its adoption in their institutions (Mean = 3.42). The fact that OSS support freely available throughout the online community was among the reason for its adoption across institution in Adamawa State, as indicated by most librarians (Mean =3.17). Meanwhile, some respondents agreed that OSS provide capabilities to integrate server and workstation management which account for part of their reasons for its adoption in their institutions (Mean =3.18). Also, most respondents strongly agreed that OSS requires less hardware to accomplish task, which influenced its adoption in their academic library (Mean =2.90). Thus, the figure suggests the fact that librarians in the tertiary institutions in Adamawa State have strong reasons for adoption of open-source software in the Academic library.

H01: There is no significant difference in the perceptions of librarians regarding the effectiveness and viability of open-source software in academic libraries in Adamawa State.



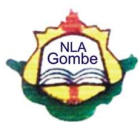


Table 1: ANOVA on Differences in Mean Rating of Perception of Librarians on Reasons for Use Open-source Software in Academic Libraries

Stat	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.266	5	.653	1.654	.153
Within Groups	38.314	97	.395		
Total	41.580	102			

**Source:** Data Analysis (2024)

Results on table 1 present the outcome of analysis of variance of the differences among the mean ratings of librarians about their perception on adoption of OSS in academic library. The result reveal  $F_{\text{ANOVA}}$  value 1.654, at degree of freedoms of 5, 97,  $p\text{-value} > 0.05$ . Since calculated  $p\text{-value}$  (0.153) is greater than hypothetical  $p\text{-value}$  (0.05). This implies that the reasons given by librarians for the adoption of OSS in academic library were not significantly difference. The null hypothesis was retained.

H02: The level of motivation among librarians is significantly related to the rate of adoption of open-source software in academic libraries in Adamawa State

Table 2: Regression Analysis of Effect of Motivation on Rate of Adoption of Open Source Software in Academic libraries of Tertiary Institutions in Adamawa State

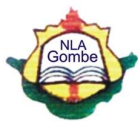
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.517	.202		2.566	.012
1 Motivation	.504	.060	.644	8.454	.000

$R=.644^a$ ; Adjusted  $R^2=.409$ ;  $F=71.468$ ;  $P_{\text{ANOVA}}=0.000$

a. Dependent Variable: Adoption

The results of the regression analysis in Table xxx indicate a strong positive relationship between the level of motivation among librarians and the rate of adoption of open-source software in academic libraries in Adamawa State, as demonstrated by an  $R\text{-value}$  of 0.644. This suggests that higher levels of motivation are associated with increased adoption rates. The Adjusted  $R^2$  value of 0.409 shows that 40.9% of the variance in the adoption of open-source software can be explained by the level of motivation, with the remaining variance attributable to other factors not included in the model. The model is statistically significant, as indicated by the  $F\text{-value}$  of 71.468 and a  $p\text{-value}$  of 0.000, meaning the relationship is unlikely to be due to chance.

The unstandardized coefficient ( $B = 0.504$ ) indicates that for every one-unit increase in librarian motivation, the adoption rate of open-source software increases by 0.504 units. Furthermore, the standardized coefficient ( $Beta = 0.644$ ) reflects a strong influence of



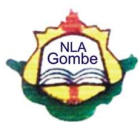
motivation on adoption. The t-value of 8.454 and the p-value of 0.000 show that this effect is statistically significant. The constant value of  $B = 0.517$  suggests that, even with no motivation, the baseline adoption rate is 0.517 units.

## **Discussion**

The findings from this study revealed that librarians hold a positive view of adopting open-source software (OSS) in academic libraries. Specifically, they believe OSS enhances library activities and operations by offering flexibility, lowering management costs, and enabling community sharing. This aligns with Chakraborty (2022), who highlighted the revolutionary impact of OSS on library operations, providing significant advantages. Similarly, Anjaneya and Lalitha (2020) noted that OSS offers key benefits such as flexibility, reduced costs, and fostering community collaboration, contributing to overall efficiency, accessibility, and sustainability in libraries. Bhardwaj and Shukla (2019) emphasized that OSS's flexibility allows libraries to customize the software to meet specific needs, such as integrating local language support or addressing unique operational challenges. Earlier studies by Okoye and Uchechukwu (2023) also highlighted the scalability of OSS, allowing libraries to expand their operations without the need for costly upgrades. Adegboire (2018) noted OSS's ability to integrate with other systems, creating a seamless workflow, while Ukachi, Nwachukwu and Onuoha (2021) found that OSS's interoperability is crucial for managing diverse resources. Financially, Bhardwaj and Shukla (2019) identified the elimination of licensing fees as a significant benefit, reducing the financial burden on libraries. OSS typically incurs lower maintenance costs and allows for more competitive support options. Overall, the findings from this study confirm that OSS enhances library activities by offering flexibility, lowering costs, and fostering collaboration, making it an appealing solution for libraries seeking to improve operational efficiency and sustainability.

The findings from this study revealed strong support from librarians for the sustainability of open-source software (OSS) in academic libraries. Librarians view OSS as fostering collective decision-making, supporting various training opportunities, and enabling improved procedures and periodic evaluations. The finding of the study aligns with Anjaneya and Lalitha (2020), who emphasized the role of OSS as a sustainable alternative to proprietary systems in academic libraries. Mohamed and Khair (2023) highlighted that OSS's sustainability is driven by its cost-effectiveness, community-based development, and adaptability, all of which align with academic institutions' commitment to openness and collaboration. Bhardwaj and Shukla (2019) further noted that OSS's flexibility in avoiding vendor lock-in and managing costs makes it a long-term sustainable choice for libraries. Additionally, the study by Adeniran and Afolabi (2022) emphasized the importance of extensive community support and documentation in ensuring OSS remains viable in academic settings. The decentralized nature of OSS development reduces the risk of obsolescence, allowing the software to be continuously updated by the community. Payne (2022) highlighted that OSS's adaptability and customization are key factors in its sustainability, as libraries can tailor solutions to meet specific needs. Okoye and Uchechukwu (2023) reinforced that OSS aligns with academic values such as openness, transparency, and collaboration, further supporting its sustainability within the academic ecosystem. By adopting OSS, libraries not only enhance their operations but also contribute to the larger movement toward open access and knowledge sharing.





The findings of this analysis underscore the critical role of librarian motivation in the adoption of open-source software (OSS) in academic libraries in Adamawa State. The significant positive relationship identified suggests that motivated librarians are more likely to embrace OSS solutions, leading to improved library services and resource management. With motivation explaining 40.9% of the variation in OSS adoption levels, it becomes evident that fostering an environment that enhances librarian motivation is pivotal. This could involve providing professional development opportunities, recognizing achievements, and promoting a culture of innovation within libraries (Oladokun & Kolawole, 2019; Okoye & Uchechukwu, 2023). Ultimately, addressing motivational factors may not only increase OSS adoption rates but also enhance the overall effectiveness and efficiency of academic libraries in the region.

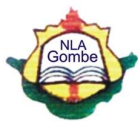
### **Conclusion**

The findings of this study demonstrate a strong, positive perception among librarians in Adamawa State regarding the adoption and sustainability of open-source software (OSS) in academic libraries. Librarians recognize the significant advantages that OSS offers, including flexibility, cost-effectiveness, and the potential for customization to meet institutional needs. This positive perception is further supported by the view that OSS enhances library activities by reducing management costs, improving service delivery, and fostering collaboration within the library community.

Furthermore, the study highlighted that the sustainability of OSS is rooted in its alignment with academic values of openness, collaboration, and knowledge sharing. OSS enables academic libraries to maintain operational efficiency while avoiding the constraints and high costs associated with proprietary systems. The community-driven nature of OSS ensures continuous updates and support, reducing the risk of software obsolescence and ensuring long-term viability. Based on these findings, it is recommended that academic libraries in Adamawa State continue to embrace OSS, with a focus on training and collaboration to maximize its benefits. By fostering a culture of innovation and collective decision-making, libraries can enhance their services, promote sustainability, and remain adaptable in an evolving digital landscape.

### **Recommendations**

1. Academic libraries in Adamawa State should implement regular training programs to ensure librarians have a positive perception of open-source software (OSS), which will influence its adoption and maximize its benefits in enhancing library operations and resource management.
2. Academic libraries in tertiary institutions in Adamawa State should intensify their focus on various motivational factors, such as cost savings, flexibility, and enhanced collaboration opportunities, that can improve the adoption of open-source software (OSS) among librarians.



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