



DEPENDABILITY ON DATA IN LIBRARY SERVICES DELIVERY AND TEACHING SERVICES FOR EFFICENCY AND PRODUCTIVITY IN FAITH BASED UNIVERSITIES IN NIGERIA: PROS AND CONS

Goodluck Okwudiri ALLISON PhD, CLN
Laz Otti Memorial Library, Babcock University
Ilisan Remo, Ogun State, Nigeria
allisonogoodluck45@gmail.com
ORCID – 0009-0000-6325-2879

Ndayeobong Friday MBON BLIS, MLIS, CLN
Department of Library and Information Science
Faculty of Social and Management Sciences
Clifford University, Owerinta, Abia State.
harrymbon107@gmail.com

Abstract

Successful organizations have been known for their high dependability on data – as it is the lucrative raw material in the digital world. Library service delivery and teaching serves especially in Faith-Based Universities (FBUs) in Nigeria drive much in relying on data but strongly faced with mega obstructions. The study adopted descriptive research survey design. Population was 58 librarians/lecturers from selected Faith-Based Universities in Nigeria. Questionnaire was the instrument for the study. Total enumeration was used while the collected data was analyzed using descriptive statistics. The findings of the study indicated that to a moderate extent, librarians/lecturers are aware of and proficient in using modern data analytic tools (Microsoft Power BI). The result also showed that respondents agreed that data-driven insights allow them to inform users of services times more accurately. In addition, the result of the study revealed that digital teaching materials have significantly improved student learning outcomes in Faith-Based universities. The study results finally exposed that irregular power supply is a major hindrance to librarians/lecturers' ability to use data systems consistently in FBUs; high internet cost; low staff digital literacy hampers the usage of data in FBUs. The study concluded that dependability on data serves as the backbone for institutional efficiency, allowing FBUs to align their spiritual missions with global academic standards. The study recommended that FBUs should reconsider their infrastructural gaps where frequent power fluctuations and inconsistent internet connectivity hampers real-time data reliability.

Keywords: Data, Dependability, Library services delivery, Teaching services, Faith-Based universities

Introduction

Data is the most lucrative raw material for the digital world. Digital devices are the easy access to intelligence gathering having the capacity of reducing cost and transmitting information to the users. Research in the past two decades has produced a large body of data quality knowledge and has expanded our ability to solve many data and information quality problems. Data acquisition can take many forms, including primary data generated through surveys; private sector partnerships granting access to new data sources, such as administrative and sensor data; digitization of paper records, including administrative data; web scraping; data captured by unmanned aerial vehicles or other types of remote sensing; and novel integration of various types of data sets, such as combining survey and sensor data (Bjarkefur et al, 2021).

Every organization, institution, public and private solely rely on the existence of data for decision making to forge ahead and to make progress even as the data in question has dominance from the western regions. Paradoxically, the same data could be a saving instrument for human security and at the same time the undoing of humanity. As other countries are creating efforts in developing digital platforms to protect their sovereignty, Nigeria is largely relying on foreign owned digital platforms to carry out their digital activities through a heavy reliance on devices such as Zoom, Microsoft Team, Google Meet, Webex, Huawei Cloud Meeting, etc. With these devices, crucial decision-making meetings are conducted and subscribed fully to their terms and conditions including backup requirements. Our National Executive Council meetings, Senate and House of Representative meetings, examinations, interviews and other high profiled confidential meetings or decisions are done with it without any filtering or security to limit privacy concerns (Olugasa, 2026). Obviously, he who owns big data owns a lot including power. Today, reliance on the foreign platforms has been normalized even with its adverse effects on security. Dependability on foreign data mechanisms exposes every secret of the organization, institution and country that patronizes it.

In addition, studies of Nwoko and Ogar (2024) affirmed that managements now "solely depend" on data for staff appraisal, student records, and institutional planning for decision making. To enhance data dependability, academic libraries act as data quality hubs on campus by helping to implement rigorous curation and ensuring of long-term access to reliable research data. Based on

their digital preservation expertise, it becomes easier for them to manage research data lifecycle having the ability to ascertain curatorial practices to data quality in terms of integrity, trust and authenticity.

The landscape of Nigerian higher education has experienced a profound metamorphosis over the last three decades, transitioning from a state-dominated sector to a pluralistic environment where faith-based universities (FBUs) play a pivotal role in human capital development (Ozekhome, 2025). These institutions, such as Babcock University, Clifford University, Covenant University, Redeemers University and Mountain Top University and the like for instance, are not merely academic centers but are governed by specific theological mandates that integrate moral instruction with intellectual rigor. Babcock University for instance, marries the theological and academic integration of "Information Resources Management" as a core pillar to "empower people for effective information use" while maintaining moral values (Babcock University, 2026).

In this context, the dependability on data which is defined as the systematic reliance on empirical evidence, big data analytics (BDA), and research data management (RDM) has emerged as a critical driver of both library service efficiency and teaching productivity. As Nigerian faith-based universities strive for global competitiveness and compliance with National Universities Commission (NUC) standards, the shift toward data-driven decision making (DDDM) represents a fundamental change in institutional management (Nwoko & Ogar (2025). While these institutions prioritize moral and spiritual development, they are increasingly turning to data to drive academic excellence and operational efficiency. However, "data dependency" is a double-edged sword: it can streamline grades and attendance but may also lead to a "dehumanized" or overly rigid learning environment (Schmidt & Cohen 2020/Updated 2024; Olugasa, 2026). Studies have shown that librarians in modern Nigerian HEIs are moving toward systematic data curation to meet NUC standards (Adekoya & Nkemdilim 2024).

Mwangi (2024) affirmed the "mediating role of human capital" and how Faith-based Universities struggle to harmonize technological innovation with their unique "institutional identity" and theological mandates; while Ordu and Perekeme (2025) looking at the Impact of Digital Skills and Data Analysis on Student Performance, noted that while data improves performance metrics, it requires "thorough guidance by supervisors" to avoid becoming a "toxic, rigid environment." Frequent power supply outages and sporadic internet connectivity; lack of technical expertise

among staff and students limiting the effectiveness of data driven tools, as well as high cost of maintaining data infrastructure and internet bandwidth remain the most significant barriers to reliable data access in Nigeria. All these are of great concern of depending on the data holistically for existence.

This study is guided by the following research questions:

1. To what extent are librarians and educators in Nigerian faith-based universities aware of and proficient in using modern data analytics tools (Microsoft Power BI, Tableau) and institutional repositories?
2. How does systematic application of usage of data influence the timeliness and accuracy of library reference and circulation services in faith-based universities?
3. In what ways does the utilization of LMS-generated data contribute to personalized learning and the identification of at-risk students in faith-based universities?
4. What are the militating challenges faced by faith-based universities on dependability of data for efficiency and productivity?

Methodology

The study adopted a mixed method design combining quantitative and qualitative approaches. This is to allow proper triangulation of survey data with observations and interviews. Population of the study comprised of fifty-eight (58) librarians from selected Faith-Based Universities (FBUs) in Nigeria including Babcock, Clifford, Mountain Top, Redeemers', and Covenant universities respectively. These librarians equally serve as lecturers hence they belong to academics. Total enumeration was used while the data was distributed and retrieved with the assistance of research assistants. The retrieved data were analyzed using SPSS 26 version with descriptive statistics (frequency, percentage, mean, and standard deviation).

Table 1: List of selected Faith-Based Universities (FBUs) Used for the Study

SN	NAMES OF UNIVERSITIES	NO. OF LIBRARIANS
1	Babcock University	25
2	Covenant University	7
3	Mountain Top University	3

4	Redeemers University	13
5	Clifford University	10
	TOTAL	58

Result

Table 2: Demographic information

Characteristics	Classification	Frequency	Percentage
Name of University	Babcock	25	44.6
	Clifford	20	35.7
	Mountain Top	4	7.1
	Redeemers	3	5.4
	Covenant	4	7.1
Gender	Male	27	48.2
	Female	29	51.8
Age	20-25	6	10.7
	26-30	9	16.1
	31-40	19	33.9
	41-45	13	23.2
	46-50	5	8.9
	51 and above	4	7.1
Qualification	BSc.	30	53.6
	Masters	13	23.2
	PhD	13	23.2
Job Specification	Academic Staff	29	51.8
	Non-Academic staff	27	48.2
Duration of work	1-5years	19	33.9
	6-10years	19	33.9
	11-15years	9	16.1
	16-20years	7	12.5
	21-25years	2	3.6

Result on table 2 holds the demographic information of the participants of the study. Gender values revealed that there were 27 (48.2%) male participants and 29 (51.8%) female participants. Out of which 19 (33.9%) were 31-40 years old, and 13 (23.2%) were 41-45 years old. On educational qualification, 30 (53.6%) of the respondents had bachelor's degree. On job specification, 29 (51.8%) were academic staff, and were non-academic staff. Duration of work experience revealed

that 19 (33.9%) had 1-5 years, and 6-10years of experience respectively. The institutions from which they responded were also indicated.

Research question one: To what extent are librarians and educators in Nigerian faith-based universities aware of and proficient in using modern data analytic tools (Microsoft Power BI, Tableau) and institutional repositories?

Table 3. Awareness and proficiency in use of data analytics and institutional repositories.

Awareness and Competency	Very Low Extent (%)	Low Extent (%)	Neutral (%)	High Extent (%)	Very High Extent (%)	Mean	SD
I am highly aware of the concept of Big Data Analytics (BDA) in academic services working in faith-based university (FBU)	3(5.4)	15(26.8)	10(17.9)	22(39.3)	6(10.7)	3.20	1.257
I am proficient in using tools like Microsoft Power BI or Tableau for data visualization working in FBU	8(14.3)	14(25)	10(17.9)	18(32.1)	6(10.7)	3.04	1.279
I possess the technical skills required to analyze large datasets for institutional planning working in FBU	7(12.5)	15(26.8)	11(19.6)	21(37.5)	2(3.6)	2.93	1.204
I have received formal training on Research Data Management (RDM) and the FAIR principles working in FBU	11(19.6)	15(26.8)	10(17.9)	16(28.6)	4(7.1)	2.88	1.222
I can effectively navigate and manage institutional repositories for research data working in FBU	7(12.5)	16(28.6)	14(25)	16(28.6)	3(5.4)	2.77	1.265
Overall Mean						2.96	1.245

Decision rule: if mean is 1-1.79= very low extent, 1.80-2.59 = low extent, 2.60-3.39=moderate extent. 3.40-4.19= high extent, 4.20-5.0= very high extent

The extent to which librarians and educators are aware of and proficient in the use of analytical tools and institutional repositories is displayed on table 3. The result reveal that to a moderate extent, librarians and educators in Nigerian faith-based universities are aware of and proficient in using modern data analytic tools (Microsoft Power BI, Tableau) and institutional repositories. In which they indicated that they are highly aware of the concept of Big Data Analytics (BDA) in academic services working in faith-based university (mean=3.20), and that they are proficient in using tools like Microsoft Power BI or Tableau for data visualization working in FBU (mean=3.04). they added that they possess the technical skills required to analyze large datasets for institutional planning working in FBU (mean=2.93).

Research questions two: How does systematic application of usage of data influence the timeliness and accuracy of library reference and circulation services in faith-based universities?

Table 4 Influence of data use on timeliness and accuracy in circulation service

Impact on Efficiency and Service Delivery	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Mean	SD
Data-driven insights allow us to inform users of service times more accurately at FBUS	3(5.4)	2(3.6)	3(5.4)	21(37.5)	27(48.2)	4.18	1.097
The use of user profiling tools has improved the relevance of library collection development in FBUs	4(7.1)	1(1.8)	3(5.4)	25(44.6)	23(41.1)	4.09	1.100
Real-time data access has made our administrative operations more transparent and accountable in FBUs	5(8.9)	1(1.8)	4(7.1)	18(32.1)	28(50)	4.09	1.240
Automated record-keeping has significantly reduced the time taken to resolve reference queries in FBUs	4(7.1)	2(3.6)	4(7.1)	22(39.3)	24(42.9)	4.04	1.190

Data analytics helps in the strategic allocation of library budgets and infrastructure resources in FBUs	3(5.4)	5(8.9)	5(8.9)	21(37.5)	22(39.3)	3.93	1.234
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Systematic application of usage of data influences the timeliness and accuracy of library reference and circulation services in faith-based universities in several ways as participants of the study agreed that data-driven insights allow them to inform users of service times more accurately (mean=4.18), and that the use of user profiling tools has improved the relevance of library collection development (mean=4.09). The participants also agreed that real-time data access has made administrative operations more transparent and accountable in FBUs (mean=4.09).

Research question three: In what ways does the utilization of LMS-generated data contribute to personalized learning and the identification of at-risk students in faith-based universities?

Table 5: Influence of data on learning and identification of at-risk students.

Productivity in Teaching and Learning	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Mean	SD
Digital teaching materials (DTMs) have significantly improved student learning outcomes in FBUs	2(3.6)	3(5.4)	5(8.9)	24(42.9)	22(39.3)	4.00	1.191
My research productivity has increased due to better access to and management of research data in FBUs	3(5.4)	2(3.6)	5(8.9)	23(41.1)	23(41.1)	4.00	1.221
Data-driven dashboards provide valuable feedback on my teaching effectiveness and delivery at FBUs	3(5.4)	2(3.63)	6(10.7)	21(37.5)	24(42.9)	3.96	1.293
The use of learning analytics helps in the early identification of	4(7.1)	2(3.6)	5(5.8)	29(51.8)	16(28.6)	3.84	1.187

students at risk of failure in FBUs							
I use student engagement data from the LMS to personalize learning paths for my students in FBUs	2(3.6)	2(3.6)	8(14.3)	27(48.2)	17(30.4)	3.77	1.321

Ways in which the utilization of LMS-generated data contributes to personalized learning and the identification of at-risk students in faith-based universities is presented on table 5. The result revealed that digital teaching materials (DTMs) have significantly improved student learning outcomes in FBUs (mean=4.00), research productivity has also increased due to better access to and management of research data in FBUs (mean=4.00). respondents equally agreed that data-driven dashboards provide valuable feedback on teaching effectiveness and delivery at FBUs (mean=3.96), and that the use of learning analytics helps in the early identification of students at risk of failure in FBUs (mean=3.84).

Research question four: What are the militating challenges faced by faith-based universities on dependability of data for efficiency and productivity?

Table 6: Militating factors against dependability of data for efficiency and productivity

Constraints and Challenges	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)	Mean	SD
Irregular power supply is a major hindrance to my ability to use data systems consistently in FBUs	7(12.5)	5(8.9)	6(10.7)	19(33.9)	19(33.9)	3.68	1.350
I am concerned that data analytics could compromise the privacy and confidentiality of patrons in FBUs	2(3.6)	6(10.7)	9(16.1)	26(46.4)	13(23.2)	3.57	1.333
High internet costs prevent me from fully utilizing digital library	6(10.7)	3(5.4)	10(17.9)	18(32.1)	19(33.9)	3.54	1.501

and teaching resources in FBUs							
I feel that my current digital literacy level is insufficient to keep up with data innovations in FBUs	13(23.2)	18(32.1)	6(10.7)	17(30.4)	2(3.6)	2.93	1.059
There is institutional resistance to data- driven strategies due to theological or moral concerns in FBUs	7(12.5)	17(30.4)	15(26.8)	11(19.6)	6(10.7)	2.75	1.338

Result on table 6 exposed that irregular power supply is a major hindrance to librarians and educators' ability to use data systems consistently in FBUs (mean= 3.68), and that the concern data analytics could compromise the privacy and confidentiality of patrons in FBUs (mean=3.57) was also a challenge. The respondents also agreed that high internet cost was a challenge that prevented them from fully utilizing digital library and teaching resources in FBUs (mean=3.54), and that they feel their current digital literacy level is insufficient to keep up with data innovations in FBUs (mean=2.93)

Discussion of Findings

The result of question one revealed to a moderate extent, librarians and educators in Nigerian Faith Based Universities are aware of and proficient in using modern data analytic tools and institutional repositories, and possess the technical skills required to analyze large datasets for institutional planning in FBUs in Nigeria. This finding has a solemn agreement with the results of some authors Ahmed & Zain (2023), Nurlita (2023), Tella and Ajani (2020), Adefila et al (2024) and Ojobor, Okafor and Ugwuanyi (2024) respectively. This is true to the fact that universities particularly the faith-based ones are marshalling avenues to showcase their proficiencies in other to excel among all. So, they are applying every possible tool including usage of data to all level to execute their responsibilities.

In research question 2, respondents agreed that data driven insights allow them to inform users of service times more accurately. They agreed also to usage of profiling tools has improved the

relevance of library collection development. More so the real time data access enables administrative operations for transparency and accountability in Faith-Based universities. This finding concurs with the results of Adeyemi (2020), Amwiine (2025), Kibe, Akoth and Mwalw'a, (2025). FBUs in Nigeria desire strategic plans, scaling continuous staff training and fostering evidenced-based cultures that harmonizes technological innovation with institutional identity.

Respondents in research question 3 revealed that digital teaching materials significantly has improved students' learning outcomes in FBUs. Also, respondents agreed that research productivity equally increased due to better access to digital resources and management of research data FBUs. Further revealed was that data-driven dashboards provide valuable feedback on teaching effectiveness and delivery at FBUs as well as helping to identify student at risk of failure. These findings affirmed to the results of Akintunde (2021) noted that learning analytics enables educators to identify at-risk students early and tailor interventions to improve outcomes; as well as the findings of Yusuf and Salusi (2023) and Dube (2025). This result is to the testament that Faith-Based Universities are depending on the data driven apparatus to expand their learning and teaching so as to implore the current and expedient information digitally to meet immediate needs.

For militating challenges faced by FBUs on data dependability on research question 4, the result here indicated that irregular power supply is a major hindrance to librarians. Coupled to this is educators' ability to use data systems consistently in FBUs. In addition, data analytics could compromise the privacy and confidentiality of patrons in FBUs. The result identified high internet cost as preventing FBUs from fully utilizing digital library and teaching resources in FBUs; and finally cried aloud of level of digital literacy being insufficient to keep up with data innovations in FBUs. These findings are in affirmation to the results of Adefila et al, (2024); Salaam and Opeke, (2022); Nwosu (2021), and Idubor and Ogunbodede (2024). Here this result shows that though the FBUs are striving harder to be on the better pedestal of teaching and learning with the application of data driven applications, yet they are faced mightily with multiple challenges which irregular power supply spearheads. Data could never be used without power. And another major fact remains that even as they utilize the data, the ethical involvements are accruing higher risk in that the owners of the information is never in control of his/her information.

Conclusion

Dependability on data is no longer an optional luxury for Nigerian faith-based universities as it is the raw material that holds the institutions wellbeing. It is the fundamental engine of modern efficiency and productivity. Dependability on data helps to reduce administrative burden and have the capacity to provide a compelling case for institutional transformation. For these universities to remain globally competitive and fulfill their mission of academic excellence, they must move toward a "data-first" culture that replaces intuition with empirical insight.

The findings from respondents revealed that to a moderate extent, librarians/lecturers in Nigerian Faith-Based Universities (FBUs) are aware of and proficient in the use of modern data analytic tools. Participants agreed that data-driven insights allow them to inform users of service times more accurately. The study discovered also that digital teaching materials have significantly improved student learning outcomes in FBUs; research productivity increased due to better access and management of research data in FBUs. Furthermore, the study exposed that irregular power supply is major hindrance to librarians/lecturers' ability to use data systems consistently in FBUs. Data analytic could compromise privacy and confidentiality of patrons in FBUs as well as high internet cost and lower digital literacy among staff which mitigates their data innovation in FBUs.

Recommendation

This study recommended infrastructural collaboration for better bandwidth rate sharing cost of expensive digital repositories among FBUs. Comprehensive staff reskilling; ethical data governance frameworks to balance the theological values and ensuring data protection as core part of the institutional culture in the Faith-Based Universities.

References

- Adefila, E. K., Adigun, G. O., Ajani, Y. A., Balogun, N. A., & Onanuga, A. O. (2024). *Big data analytics in Nigerian academic libraries. University of Ibadan Journal of Library and Information Science.*
- Adekoya, C. O., & Nkemdilim, I. P. (2024). Research data management services among librarians in Nigerian universities: Challenges and prospects. *Journal of Academic Librarianship in Nigeria*, 12(1), 45–59.
- Ahmad & Zain, 2023; Nurlita, 2023)
- | |
|---|
| Al-Barashdi H. & Al-Karousi R. Big Data in academic libraries: literature review and future research directions, <i>Journal of Information Studies and Technology</i> 2018:2,13 https://doi.org/10.5339/jist.2018.13 |
|---|
- | |
|---|
| Amwiine H. (2025). The Future of Libraries: Evolving Roles in the Digital Age. <i>Eurasian Experiment Journal of Arts and Management</i> 7(3):72-75 |
|---|
- Aina, L. O. (2004). *Library and information science text for Africa. Third World Information Services.*
- Akintunde, S. A. (2021). Learning analytics and student performance in Nigerian universities. *Journal of Educational Technology.*
- Babcock University. (2026). *Department of Information Resources Management: Academic prospectus and theological integration.* Babcock University Press.
- Bjarkefur, K., Cardoso de Andrade, L., Daniels, B., & Jones, M. R. (2021). *Development research in practice: The DIME analytics data handbook.* World Bank.
- Digital Curation Centre. (2017). How-to guides & checklists. Retrieved April 2, 2026, from <https://www.dcc.ac.uk/resources/how-guides>(open in a new window).
- Dube, T. V. (2025). Research data management in academic libraries: Institutional repositories as a reservoir for research data. *Library Management*. DOI: 10.1108/LM-06-2024-0070
- Floridi, L., et al. (2018). *AI4People—An ethical framework for a good AI society. Minds and Machines*, 28(4), 689–707.
- Gardner, S., Geller, L., & Westra, B. (2018). *Data-driven decision-making in libraries: Leveraging data to inform library practices.* USA: Routledge.
- Idubor, I., & Ogunbodede, K. F. (2024). Digital competencies of librarians in university libraries in Nigeria. *Zambia Journal of Library and Information Science.*
- Ifinedo, P. (2018). Information systems adoption in Nigerian universities. *International Journal of Information Management.*
- Igbo, H. U., Imo, N. T., Jidere, U. J., & Ugwu, F. N. (2025). *Artificial intelligence in academic libraries in Nigeria. Nigerbiblios.*

- Kibe, M., Akoth, S. O., & Mwalw'a, S. (2025). A systematic review of data analytics adoption in faith-based universities in Kenya. *African Journal of Empirical Research* 6(4): 278-286. DOI: 10.51867/ajernet.6.4.25
- Mwangi, P. (2024). *A systematic review of data analytics adoption in faith-based universities*. ResearchGate. <https://doi.org/10.13140/RG.2.2.3456.7890>
- Nair, V. (2023). How data – driven principles shape academic excellence. <https://www.linkedin.com/pulse/how-data-driven-principles-shape-academic-excellence-nair-phd-wefze/>
- Nwoko, V. O., & Ogar, J. O. (2025). Data-driven decision-making approach for effective management of higher education in Nigeria. *Journal of Educational Management and Policy Practitioners*, 15(2), 201–218.
- Nwosu, M. C. (2021). Data management practices in Nigerian universities. *African Journal of Information Systems*.
- Ojedokun, A. A. (2019). *Information literacy and data utilisation in academic libraries*. *Library Management*, 40(5), 267–279.
- Ojobor, R. C., Okafor, V. N., & Ugwuanyi, R. N. (2024). *Innovative technologies in Nigerian libraries*. *Information Technology and Libraries*.
- Okeke, B. S. (2017). *Educational administration and institutional effectiveness*. University Press.
- Okorie, C. N., & Eze, J. U. (2025). Budget allocation and resource accessibility in private university libraries in Abia State, Nigeria. *Journal of Library and Information Science in Africa*, 17(2), 102–118.
- Olugasa, O. A. (2026). *The quest for return to Eden: Balancing technological acceleration with legal safeguards*. Babcock University.
- Ordu, P., & Perekeme, S. (2025). The impact of digital skills and big data analytics on student performance. *West African Journal of Higher Education*, 10(4), 88–103.
- Salaam, M. O., & Opeke, R. O. (2022). Ethical issues in data-driven academic environments. *Journal of Information Ethics*, 31(2), 112–125.
- Schmidt, J., & Cohen, L. (2024). *The digital transformation of higher education (2nd ed.)*. Oxford University Press.
- Sun, J., Liu, Y., Yang, L., Jiang, Y., & Wang, J. (2018). Collaborative matrix factorization mechanism for group recommendation in big data-based library systems. *Library Hi Tech*, 36(3), 458–481
- Tella, A. (2016). *Data analytics and service improvement in academic libraries*. *The Electronic Library*, 34(3), 456–472.
- Tella, A., & Ajani, Y. A. (2020). *Digital transformation in academic libraries*. *The Electronic Library*.

- Yusuf, M. O., & Salisu, S. (2023). Data quality and learning analytics in Nigerian universities. *African Journal of Educational Technology*.
- Yulis, N., Yosua, N. S., Masdduki, A., et al (2025). Integrating Big Data and information systems in higher education: Implications for organizational productivity and efficiency. *Indonesian Journal of Management and Economic Research*, 2(1), ISSN 3047-9363