Direct Research Journal of Management and Strategic Studies

Vol. 6(1), Pp. 80-85, July 2025,

https://journals.directresearchpublisher.org/index.php/drjmss/index

Research Article
ISSN: 2787-009X

The Prospects of Internet of Things (IoT) in some Selected Academic Libraries in South-South, Nigeria

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ABSTRACT

The study investigated the prospects of internet of things (IoT) in some selected academic libraries in South, South Nigeria. The study adopted a descriptive survey using questionnaire to collect data. The population of the study consists of 78 librarians which were randomly picked from some selected university libraries in Nigeria. A total of the 78 questionnaires were distributed only 69 were retrieved. Descriptive statistics, (mean and percentage) were used for analysis. A mean score of 2.5 and above and a percentage score of 50% were considered for decision making. The study revealed that the effects of internet of things in the academics' libraries under study are online education, abundance information, it increases innovations, it enhances creativity, and global connections through virtual communication. The challenges affecting internet of things in academic libraries in South, South Nigeria are loss of personal information, spread of fake news, internet addiction and time wastage, high cost of procurement of equipment and lack of technical knowhow. The study recommends that Academic library management should agitate for the implementation of Internet of Things in their respective libraries, and the campaign on the awareness of Internet of Things in academic libraries through conference/workshops is crucial.

Key Words: Internet of things, academic libraries, South-South Nigeria.

Article information
Received 2 May 2025;
Accepted 13 June 2025;
Published 15 July 2025
https://doi.org/10.26765/DRJMSS201023945

Citation: Udoh Unwana I., Akal Iniobong M. (2025). The Prospects of Internet of Things (IoT) in Some Selected Academic Libraries in South-South, Nigeria. *Direct Research Journal of Management and Strategic Studies*. Vol. 6(1), Pp. 80-85.

INTRODUCTION

An academic library is a big repository of information and knowledge from all fields of learning created to serve a college or university, to disseminate and store information for the users and it serves the reading and research interests of students, lecturers, and researchers. Academic libraries must determine a focus for collection development since comprehensive collections are not feasible. Students, researchers, and professors all rely on academic libraries, which are located at colleges and universities. Students in every field of study may depend on libraries to find the most relevant and reputable sources of knowledge. Libraries have a large collection of books and magazines to meet the demands of their patron. As an additional resource for those seeking knowledge, publications such as reports and dissertations may be found in addition to books and journals (Evans & Baker, 2011). Libraries provide newspapers, magazines, and booklets that are ready to provide the most up-to-date and

accurate information publicly. However, in the bid to meet up with this fast-changing track, the adoption of internet of things (IoT) into library services is critical.

Internet of Things (IoT) refers to a network of physical devices, like appliances, vehicles, and other objects, embedded with sensors and software that allows them to connect to the internet and exchange data with each other. Internet of things (IoT) describes devices with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internet or other communication networks. Internet of things (IoT) function like smart and living entities by sensing and communicating through embedded devices which interact with sensors (Mfon & Uford, 2022).

Internet of things (IoT) consists of the networks of physical objects, the traditional network of the Internet, and various devices (gateway, border router etc.) that connect these networks (Tkachenko & Brezhniev, 2019). Implementing IoT technology in academic libraries is critical for demonstrating the value and relevance of libraries in a technologically oriented world, as well as for providing the best services to user community. Similarly, it is important to enhance personalized services (Uford, 2018; Akai, 2023), and to build a comfortable learning environment. Rajguru(2019) states that 2020 will be a decade of Internet of things. In consonance to this view, Pujar and Satyanarayana (2015) observed that in recent times the internet has taken a leap forward from internet of communication to internet of things. Making it possible to connect objects and transfer data with or without human intervention to enhance academic libraries services. The internet of communication with some form of human intervention has advanced the course of communication and improved services in academic libraries. It is in light of these numerous achievements that this study on the prospects of internet of things (IoT) in some selected academic libraries in South, South Nigeria is imperative.

Statement of the problem

Libraries may be greatly impacted by the Internet of Things (IoT) through process automation, improved resource management, and user experience. Self-check-in/check-out, intelligent querying, smart inventory systems, and user activity tracking are all possible with IoT devices. Additionally, this technology may enhance energy efficiency, streamline building management, and user-services for library users. Internet of things IoT is the most essential and comprehensive technology since it links many items over the internet. It allows smart devices with software, electronics, sensors, and other hardware to collect and exchange data to make independent decisions with or without human intervention using internet connectivity. The emergence of the Internet of Things (IoT) presents libraries with unprecedented opportunities to enhance their operations, services, and user experiences.

The Internet of Things (IoT) is a growing transformation in the field of the Internet, driven by advancements made in sensor networks, mobile devices, wireless communications, networking, and cloud technologies. At its core, the Internet of Things refers to a network of interconnected devices, sensors, and systems that collect, exchange, and analyze data to enable intelligent decision-making and automation. IoT technology enables objects to communicate and collaborate seamlessly, creating a pervasive environment of interconnectedness and real-time data exchange. In the context of libraries, IoT holds the potential to revolutionize various aspects of library operations and services. When implemented in academic libraries it will be a convenient access from anywhere in the globe, since the Internet offers fast links to all of the library's websites, each of which is devoted to a particular subject. The range of items that libraries may provide to their user has increased with the advent of digital resources including e-books, online databases, and digital archives. Beyond the physical confines of library buildings, this change might improve information access and serve a wider audience. Academic libraries can get this project implemented by informing the university, State government and Federal Government on the importance and relevant of internet of things to library users and the university community at large. Despite the fact that IoT has several advantages for libraries, there are a number of obstacles and disadvantages that should be taken into account when putting this technology into practice. Implementing IoT infrastructure has huge financial ramifications since it frequently necessitates large expenditures in connection, hardware, software, and continuing maintenance. These upfront expenses might be a significant obstacle for libraries with tight budgets. Additionally, there may be difficulties with IoT system integration and interoperability. Assuring smooth integration can be difficult and time-consuming since these systems frequently incorporate several devices and technologies from several manufacturers. Libraries may have trouble managing a broad IoT environment and run into compatibility problems. Another crucial area is technical talent, as maintaining and deploying IoT infrastructure calls for certain knowledge and abilities, hence the need for this study.

Research Questions

The following research questions were formulated to guide the study:

1. What are the prospects of internets of things in academic libraries if implemented in South, South Nigeria?

2. What are challenges affecting the implementation of internet of things in academic libraries in South, South Nigeria?

Literature review

In order to establish a firm frame work for the study, the researcher examined different research works on the prospects and challenges of implementing internet of things in academic libraries.

Prospects of Internet of Things (IOT) in Academic Libraries

Pajo and Rauch (2019) provide a perceptive examination of the uses of IoT in libraries and the corresponding concerns about data privacy. The statement underscores the need of libraries finding a balance between using the advantages of IoT and protecting the privacy of its patrons. This resource is very important for librarians, academics, and policymakers who are interested in comprehending the practical consequences of adopting IoT in libraries and the necessary steps to safeguard data privacy (Akai & Udonte, 2021). Makwana (2021) has investigated how and how much the Internet of Things (IoT) is utilized in library activities and how it helps users access library services. Researcher considers how it may be beneficial in the library's work and how Dr. Ranganathan's five rules can be productive nowadays. Internet of things (IoT) is a new revolution of the Internet that is rapidly gathering momentum driven by the advancements in sensor networks, mobile devices, wireless communications, networking and cloud technologies (Bahga & Madisetti, 2014). They are interrelated networks that allow devices to receive and send data with each other via Internet.

Internet of things (IoT) is defined as “a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual ‘Things’ have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network” (Kranenburg, 2008; Uford et al., 2022).Xu et al. (2022) stated that RFID and WSN are the foundational technologies of Internet of things (IoT) and service-oriented architecture as a key technology in integrating heterogeneous systems or devices that can be applied to support Internet of things (IoT). The identification and tracking technologies, communication technologies, networking technologies and service management form the four-layer architecture of Internet of things (IoT) (Liang, 2019). The application of Internet of things (IoT) extends to a wide range of domains including homes, cities, environment, energy systems, retail, logistics, industry, agriculture, health etc.

The researchers are concentrating on the application of Internet of things (IoT) in libraries. It is an area that can make drastic changes in services as well as management of libraries. The application of Internet of things (IoT) in libraries saves time of the patron and provides a digital view of physical items for finding location of things (Gupta and Singh, 2018).

Libraries have a close relationship with the IoT as it allows for more efficient management and operation of library systems. By using IoT, libraries can provide users with a comprehensive range of reading services, such as self-checkout and self-return of books and materials, long-term storage, and research on reading habits. The adoption of IoT technology has significantly transformed the way libraries operate and provide services, resulting in improved resource management and increased effectiveness (Ehsanian, Tahmasebi Limooni, & Ghiasi, 2022). Xu (2022) proposed a solution to establish a smart library at a university by implementing an IoT-based lending system, a book sorting system, a self-service system, and a text recommendation. Such a system can improve library management efficiency, borrowing rates, and reduce the cost of day-to-day library maintenance. With the implementation of AI and IoT, the smart lending service is more realistic and tangible than traditional human-based librarianship. As such, the smart library paradigm has brought significant advances in service and is an important development for library resource management (Bi et al., 2022).

Challenges of implementing internet of things in academic libraries

The deployment of the Internet of Things (IoT) necessitates a significant financial investment to purchase all the equipment required for this new technology. As a result, it is best to draft an implementation budget before taking any further action. Librarians often have no trouble coming up with this type of strategy or coming up with original, imaginative ideas (Akpan-Atata et al., 2015; Akai et al., 2019). But frequently, they are unable to secure decision-makers' and stakeholders' consent to put their ideas into practice. One of the possible causes of such suggestions' rejection is a lack of expertise in persuading decision-makers of the value and advantages of novel concepts. However, the financial standing of an organization, particularly in the private sector, prevents decision makers from supporting these novel concepts. This is due to the fact that the majority of IoT implementations need significant financial outlays for device acquisition, setup, and ongoing maintenance (Bansal et al., 2018).

One of the main concerns while using IoT is privacy and security. Connectivity, communication, and data transmission between items are necessary for IoT operation. Consequently, a patron of an IoT-enabled

Table 2: Prospects of internet of things in academic libraries in South, South Nigeria

S/N	Items Statements	A	SA	D	SA	-X	Remarks
1	Online Education	25	33	11	0	3.2	Accepted
2	Abundance of information	29	37	1	2	3.3	Accepted
3	It increases innovations	33	23	5	8	3.1	Accepted
4	It enhances creativity	34	21	7	7	3.1	Accepted
5	Global connections through virtual communication	21	22	12	14	2.7	Accepted

library must enable mobile connectivity. This connectivity is regarded as a privacy violation as it gives library employees access to the contents on the patron's mobile device (Welbourne et al., 2009). It's intriguing to learn that the threat posed by hackers is a worldwide occurrence that compromises security in libraries as well as other IoT-enabled service providers, including financial, healthcare, and commercial organizations (Stolpe, 2016; Shim et al., 2017). Regretfully, the threat posed by hackers is predicted to grow as IoT devices get smarter, complicated, and advanced (Makori, 2017). Inaccuracy and system failure may also be exceedingly expensive, both monetarily and physically. For example, providing traffic, health care, and feeding systems with erroneous instructions might result in numerous fatalities. As a result, IoT consistency, conformance, and dependability across mobile networks and through to remote control devices are now of greater interest to technology professionals (Abo-Seada, 2019).

METHODOLOGY

The study adopted a descriptive survey using questionnaire to collect data, as recommended by (Etim & Uford, 2019). The population of the study consists of 78 librarians which were randomly picked from some selected university libraries in Nigeria. The librarians were selected from the study based on those that have complex knowledge of Information and Technology in libraries. A total of 78questionnaires were distributed only 69 were retrieved and used for this study. Descriptive statistics, (mean and percentage) were used for analysis. A mean score of 2.5 and above and a percentage score of 50% were considered for decision making.

Population of the study

Table 1: Selected University libraries in Nigeria and Population of librarians

S/N	Selected University libraries in Nigeria	Population of librarians
1	Enugu State university Library	19
2	Nnamdi Azikiwe University Library	23
3	Lagos State University Library	16
4	Abia State University Uturu	11
	Total	69

Table 1 above depict the population of the study which was randomly picked in the following order: Enugu State University Library (19), Nnamdi Azikiwe University Library (23), Lagos State University Library (16) and Abia State University Uturu (11) respectively. The librarians selected were ICT based librarians who were able to give a positive response on the the prospects of internets of things in academic libraries if implemented in and the challenges affecting the implementation of internet of things in academic libraries in South, South Nigeria. The descriptive research method is suitable for the study because it is a fact finding in nature.

The prospects of internet of things in academic libraries in South, South Nigeria

Table 2 depict the prospects of internet of things in the academic libraries under study in the following order: Online education (3.2), abundance information (3.3), it increases innovations (3.1), it enhances creativity (3.1), and global connections through virtual communication (2.7) respectively. This is in line with Pujar and Satyanarayana (2015) when they observed that in recent times the internet has taken a leap forward from internet of communication to internet of things. Making it possible to connect objects and transfer data with or without human intervention to enhance academic libraries services.

Challenges affecting the implementation of internet of things in academic libraries in South, South Nigeria

Table 3: Challenges affecting the implementation of internet of things in academic libraries in South, South Nigeria

S/N	Items Statements	A	SA	D	SA	-X	Remarks
1	Loss of personal information	25	23	11	10	2.9	Accepted
2	Spread of fake news	34	23	2	10	3.1	Accepted
3	Internet addiction and time wastage	41	16	10	2	3.3	Accepted
4	High cost of procurement of equipment	27	25	6	11	2.9	Accepted
5	Lack of technical know how	26	25	7	11	2.9	Accepted

Table 3 shows the challenges affecting the implementation of internet of things in academic libraries in South, South Nigeria as follows: loss of personal information (2.9), spread of fake news (3.1), internet addiction and time wastage (3.3), high cost of procurement of equipment (2.9) and lack of technical knowhow (2.9) respectively.

This implies that for these operations to be successful in academic libraries the library management has to overcome these challenges for effective library service. This is in line with Welbourne et al (2009) when they opined that Privacy and Security is a major concerned in IoT implementation. IoT functionality requires connectivity, communication, and data transfer among objects. Therefore, a visitor to a library equipped with IoT technology need to enable mobile connectivity. This connectivity allows library staff to control the visitor's mobile phone and access the contents which is considered as infringement of privacy.

RESULTS AND DISCUSSION

The study is on the prospects of internet of things (IoT) in some selected academic libraries in South, South Nigeria. Two research questions guided the study. A descriptive survey was used for the study. The results in table 2 revealed that the effects of internet of things in the academic libraries under study areonline education, abundance information, it increases innovations, it enhances creativity, and global connections through virtual communication. The challenges affecting internet of things in academic libraries in South, South Nigeria are loss of personal information, spread of fake news, internet addiction and time wastage, high cost of procurement of equipment and lack of technical knowhow respectively.

CONCLUSION

It was observed from the study that the prospects of Internet of Things in academic libraries in South-South, Nigeria will improve library services drastically if implemented. Also, if the numerous challenges are well tackled, it will bring an improve library services to the academic libraries under study. Internet of things (IoT) allows librarians to handle a greater number of options and challenges than would be feasible without the model. IoT models serve as prerequisite for librarians and guide them in right direction, while incorporating IoT technology into all operations and services. Due to the complex distribution of IoT, general library management models as well as service-oriented models are necessary for libraries to implement IoT. The Internet of Things (IoT) is a technology that connects devices to the internet, collects data, processes it, and automates processes. It offers numerous advantages for libraries, such as efficient inventory management, enhanced patron experience, improved space utilization, remote monitoring, data-driven decision making, streamlined operations, security and safety, and integration with digital resources. However, IoT applications also face some challenges that would inhibit its implementation in academic libraries. In conclusion, the applications of the Internet of Things (IoT) in libraries have the potential to enhance library services and operations greatly. IoT technologies can automate processes, improve resource management, and enable data-driven decision-making. However, it is crucial to priorities data privacy and security in implementing IoT in libraries. Libraries must adopt robust data privacy measures, including secure data transmission, user consent and control, anonymisation, and privacy by design principles. By effectively addressing data privacy concerns, libraries can harness the benefits of IoT while ensuring the protection of patron information and maintaining trust in the library ecosystem.

RECOMMENDATIONS

The study recommends thus

1. Academic library management should agitate for the implementation of Internet of Things in their respective libraries.
2. The campaign on the awareness of Internet of Things in academic libraries through conference/workshops is crucial.

REFERENCE

Abo-Seada, A.A. (2019). The Impact of the Internet of Things on Libraries and Users, *Computers in Libraries*., 39 (1), 18–21.

Akai, I., Akpan-Atata, E., and Udoette, U. (2019). Information brokerage and consultancy: An entrepreneurial approach to information services delivery. In: Umoren, E., and Enang, U. (Eds.). *Trending Technologies in Library and Information Science*. Uyo, Akwa Ibom State: Nigeria Library Association, Akwa Ibom State Chapter. pp.44-74

Akai, I. & Udonte, U. (2021). Information search strategy and retrieval systems in the digital era. In: Akidi, J., Igwe, K., and Ujoumunna, J. (Eds.). *Libraries in the Era of Digital Technologies: Essays in Honour of Professor Amanze O. Unagha.* Lagos, Nigeria: Zeh Communications Ltd. pp.364-378

Akai, I. (2023). Influence of new media on the research output of lecturers in federal universities in South-South Nigeria. An unpublished Ph.D. Thesis, Faculty of Social Sciences, Abia State University, Uturu; Nigeria

Akpan-Atata, E., Akwang, N., & Akai, I. (2015). Accomplishing effective service delivery in academic libraries in Nigeria: The imperatives of IR, FOSS, Google, Wikipedia, Facebook, Twitter and Skype applications. Journal of Educational Research and Reviews, 3(1), pp.1-5

Bahga, S. & Madisetti,O., (2014). Internet of Things: A hands-on approach (p. 11). Atlanta: VP

Bansal, A., Arora, D. & Suri, A. (2018). Internet of Things: Beginning of New Era for Libraries *Library Philosophy and Practice, No. 20181* (e-journal). 1–7.

Bi, S., C. Wang, J. Zhang, W. Huang, B. Wu, Y. Gong, & W. Ni. (2022). A survey on artificial intelligence aided internet-of-things technologies in emerging smart libraries." *Sensors* 22 (8): 2991.

Ehsanian, G. A., Tahmasebi Limooni, S., & Ghiasi, M. (2022). Discovering the fundamental strategic indicators of the use of Internet of Things in libraries: A grounded theory study. *Journal of Information Science*.

Etim, G. S., & Uford, I. C. (2019). Measuring the Contributions of Sources of Employee-Based Brand Equity to the Market Performance of Deposit Money Banks in Nigeria. *Business and Management Studies*, *5*(2), 21-33.

Evans, A. & Baker, K.(2011).Information literacy and information skills instruction: Applying research to practice in the school library media center. 2nd ed. London: Libraries Unlimited, 227p

Gupta, H. & Singh,L. (2018).Use of internet of things (iot) applications in modern library activities and services. *Library Philosophy and*

Practice (e-journal). 6693
Kranenburg, J. (2008).Internet of Things: Beginning of New Era for. Library Philosophy and Practice, 1-7.
Liang, L.(2019). Prospects and challenges of internet of things application in library services. *Library Hi Tech News*, 38(5), 1-4.
Makori, E.O. (2017). Promoting innovation and application of internet of things in academic and research information organizations, *Library Review*, 66 (8), 655–678.
Makwana, J. (2021). Internet of Things Based Book Tracking System for Smart Library. International *Journal of Computer Science and Mobile Computing*, 9(7), 12-18
Mfon, A. A., & Uford, I. C. (2024). Controlled Communications and Consumers' Responses in the Telecommunications Industries in South-South Geo-Political Zone. In *Chapter Nineteen: 1st International Conference: Innovative Management Systems for Sustainable Development in 21st Century* (pp. 8-10).
Pajo,M. and Rauch,N. (2019).Internet of Things and Libraries: An Empirical Study of Selected Educational Institutions in United Arab Emirates. *Libr. Philos. Pract*., 2020, 3912, 1–8
Pujar, S. M. & Satyanarayana, K. V. (2015). Internet of things and libraries. *Annals of Library and Informa tion Studies,* 62, 186-190
Rajguru.D.(2019). The research of the library services based on internet of things. Advances in Social Science, Education and Humanities Research. New York: Atlantics Press.
Shim, J.P., Avital, M., Dennis, A.R., Sheng, O., Rossi, M., Sørensen, C. & French, A.M. (2017), "Internet of Things: Opportunities and Challenges to Business, Society, and IS Research", *International Conference on Information Systems (38),* Association
Stolpe, M. (2016). The Internet of Things: Opportunities and Challenges for Distributed Data Analysis, *ACM SIGKDD Explorations Newsletter*, 18 (1), 15–34.
Tkachenko & Brezhniev, (2019). Internet of Things (IOT) and library services. *Library Hi Tech News,* 39(9), 18-22.
Uford, I. C., Charles, I. I., & Etuk, A. J. (2022). Effectiveness of E-marketing platforms and consumer buying behaviour of Akwa Ibom State University students towards selected online products. *AKSU Journal of Management Sciences*, *7*(1), 1-28.
Uford, I. C. (2018). Electronic banking application and Sterling Bank customers' adoption: issues, challenges and benefits. *Business & Social Sciences Journal*, *3*(2), 1-12.
Welbourne, E., Battle, L., Cole, G., Gould, K., Rector, K., Raymer, S. & Balazinska, M. (2009), "Building the Internet of Things Using RFID, *IEEE Internet Computing,* 13 (3), 48–55
Xu, K. (2022). The application of Internet of Things in the university library. In 2016 7th International Conference on Education, Management, Computer and Medicine (EMCM 2016) (pp. 24-27). Atlantis Press.