

THE PLACE OF INTERNET OF THINGS (IOT) IN SOME SELECTED ACADEMIC LIBRARIES IN SOUTH-SOUTH, NIGERIA

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Abstract

The study investigated the place of Internet of Things (IOT) in some selected academic libraries in South-South, Nigeria. The study adopted the descriptive survey design. The population of the study consists of 113 recruited librarians in all the federal universities libraries in South-South Nigeria. A self constructed questionnaire was used for the study. A total of 113 copies of the questionnaire were distributed and 95 copies were retrieved using descriptive statistics mean and percentage mean score of 2.5 and above and percentage score of 50% were considered as acceptable. The study revealed that the benefits of Internet of Things (IOT) in some selected academic libraries in South South, Nigeria is in the following order: It increases efficiency, It increase productivity, it is easy to access, enhance library service, and it enhances job performance. The study also affirmed the challenges of implementing Internet of Things (IOT) in some selected academic libraries in South South, Nigeria as complexity, privacy concerns, inadequate training for librarians, security risk and unreliable power supply. The study recommends that library management should integrate internet of things in their respective libraries to enhance their job performance and since the project is capital intensive, library management through the university management should seek for adequate funding from the State and Federal Government.

Keywords: Internet of Things (IOT), Academic Libraries, South-South, Nigeria

Introduction

The primary responsibility of every academic library is to serve the information needs of its parent institution, thus the faculty, staff, students, and its immediate environment. According to Anyanwu (2016), academic libraries are those found in higher education institutions such as universities, polytechnics, colleges of education, and other tertiary institutions. Reitz (2004) views the academic library as an essential component of a college or other post-secondary

educational institutions, administered to meet the information needs of her students, faculty members, and staff. Academic libraries provide research materials and cater to the curriculum and recreational needs of the users. The rise of information technology, the internet, and numerous search engines has made it easier for others to question the value of libraries and the library profession. Krolak (2006) asserts that finding, utilizing, and interpreting information that open doors to future opportunities and lifelong learning, literacy enrichment, informed citizenship, leisure, creative imagination, research, critical thinking, and empowerment in an increasingly complex world are all made possible by libraries. According to Stojanovski and Papić (2012), it is imperative that all academic libraries adopt the Internet of Things to streamline their service delivery. The integration of IoT technology has the potential to enhance library services by automating various activities such as self-check-in and check-out, stock verification, monitoring of user activities, access control, theft control, and information analysis and management.

IOT refers to an ecosystem in which application and services are driven by data collected from devices that sense and interface with the physical world. Devices and objects connected to the internet of things share communication connections, either directly or through local or wide area networks (OECD, 2016). In a number of sectors, including libraries, the Internet of Things (IoT) has shown great promise as a transformative technology. An outline of IoT applications in libraries emphasizes how crucial data privacy concerns are to the adoption of IoT. IoT is being used more and more by libraries to improve user experiences and operations. The fundamental tenet of the internet of things (IoT) concept is that it is a model that takes into account the

ubiquitous presence of various objects and things in the environment that communicate through wired and wireless connections with distinct addressing schemes and collaborate to develop new applications or services aimed at a shared objective. According to the IoT's main concept, commonplace items become intelligent and recognized by making or permitting context-related judgments and communicating personal information. It is in the light of these benefits that made this topic the place of Internet of Things (IOT) in some selected Academic Libraries in South-South, Nigeria 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 users services for library users. Our perception of the library, its services, and the materials it offers is greatly influenced by the Internet. For convenient access from anywhere in the globe, 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.

It has been observed that research topics exist on the place of Internet of Things (IOT) in some selected Academic Libraries, but no one has carried out a research on the place of Internet

of Things (IOT) in some selected Academic Libraries in South-South, Nigeria, hence the need for this study.

Research Questions

The following research questions were formulated to guide this study

1. What are the benefits of Internet of Things (IOT) in some selected academic libraries in South South, Nigeria?
2. What are the challenges of implementing Internet of Things (IOT) in some selected academic libraries in South South, Nigeria?

Literature review

Research has demonstrated that the Internet of Things has a wide range of applications in a variety of sectors, such as business, education, agriculture, and libraries (Nam et al., 2021); (Sinha & Dhanalakshmi, 2022). Smart homes offer convenience and energy efficiency by controlling lights, thermostats, and security systems using IoT devices (Hasan et al., 2022). The Internet of Things has the potential to transform companies, boost productivity, and improve our daily lives by establishing a highly intelligent and connected environment as technology develops (Sinha & Dhanalakshmi, 2022); (Thamilarasu & Chawla, 2019). Kevin Ashton was the first to use the phrase "Internet of things" (IoT) in 1999. First, the phrase was coined to explain how RFID and other sensors were added to commonplace items to establish the Internet of Things (IoT) (Simões, Filipe & Barbosa, 2019).

Through the use of embedded electronics that communicate with sensors, the objects in the Internet of organisms (IoT) behave like intelligent, living organisms. The standard Internet network, networks of physical items and different devices (gateway, border router, etc.) that link these networks make up the Internet of Things (IoT) (Tkachenko & Brezhniev, 2019). According to Xu et al. (2023), service-oriented architecture is a crucial technology in integrating heterogeneous systems or devices that may be used to support the Internet of Things (IoT), whereas RFID and WSN are the fundamental technologies of the IoT. The Internet of Things (IoT) has a four-layer architecture made up of technologies for networking, communication, identification and tracking, and service management (Liang, 2019). Numerous fields, including homes, cities, the environment, energy systems, retail, logistics, industry, agriculture, health, and academic libraries, are using the Internet of Things (IoT). The use of the Internet of Things (IoT) in libraries is the researcher's primary focus.

Despite the fact that IoT has several advantages for libraries (Alzoubi et al., 2021), there are a number of obstacles and disadvantages that should be taken into account when putting this technology into practice (Bansal, 2018). 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 (Ratta et al., 2021). 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 (Usak et al., 2020). 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. To properly manage the complexity of IoT systems, libraries may need to recruit outside specialists or make investments in staff training (Kassab et al., 2020).

IoT may be used to provide contextual cues and information on resources related to the user's current interest, according to Wojcik (2016). It is possible to connect mobile applications with current library systems. The Internet of Things (IoT) might inform a user about the start of new developments in his field of interest and associated projects. Notifications on account status, library events, and catalog searches can be sent to users. According to Sun (2014), Internet of Things (IoT)-based structures offer readers a hygienic and cozy learning environment. Building and people safety may be guaranteed by sophisticated fire and security systems (Nie, 2016). Energy efficiency is increased by the lighting and temperature controls that operate automatically. Data on the use of printed and electronic resources, the building's appropriateness, the cleanliness of the toilets, and the movement of furniture in the library's most popular study and research spaces may all be gathered using Internet of Things (IoT) technology. The Smart Library system, as proposed by Brian, Arockiam, and Malarchelvi (2014), is based on the Internet of Things (IoT) and offers the convenience of retrieving a book from its location with the help of an interconnected system that uses Near Field Communication tags and a Wi-Fi-based Local Positioning System.

Additionally, Li et al. (2016) evaluated how the Internet of Things (IoT) makes it possible to quickly search for and locate misplaced or misshelved goods. Android mobile readers use U

HF RFID tags on library materials shelves to scan the serial numbers on the tags, which serve as keys to the library database. The Android mobile reader's user interface displays a comprehensive list of the materials that are available on the shelf. IoT has a wide range of potential uses and impacts across industries, such as manufacturing, transportation, agriculture, and energy management (Ahmed et al., 2022). According to Ngo et al. (2019), it provides advantages including increased productivity, automation, real-time monitoring, data driven decision making, and efficiency. But the growth of IoT also brings up issues with data management, security, and privacy. Ensuring strong controls and standards for securing personal information and preventing unwanted access becomes essential as more things become linked and communicate sensitive data (Peng et al., 2019).

Methodology

This study adopted the descriptive survey design. The population of the study consists of 113 recruited librarians in all the federal universities libraries in South- South Nigeria. A self constructed questionnaire was used for the study. A total of 113 copies of the questionnaire were distributed and 95 copies were retrieved using descriptive statistics mean and percentage mean score of 2.5 and above and percentage score of 50% were considered as acceptable.

Table 1: Population of the study

S/N	Academic libraries in South-South, Nigeria	Librarians
1	Delta State University Library, Abraka	37
2	Enugu State University Library	18
3	University of Port Harcourt Library	19
4	Nnamdi Azikiwe Library Awka	21
	Total	95

Table 1 shows the population of librarians of the study in the following order: Delta State University Library, Abraka (37), Enugu State University Library (18), University of Port Harcourt Library (19) and Nnamdi Azikiwe Library Awka (21) respectively

Table 2: The benefits of Internet of Things (IOT) in some selected academic libraries in South South, Nigeria

Keys: Strongly agreed, Agree, Disagree, Strongly disagree

S/N	Items	SA	A	D	SD	-x	Decision
1	It increases efficiency	42	45	7	1	3.3	Accepted
2	It increase productivity	34	49	10	2	3.1	Accepted
3	It is easy to access	48	39	7	1	3.4	Accepted
4	Enhance library service	42	44	6	3	3.3	Accepted
5	Enhances job performance	40	41	5	9	3.1	Accepted

Table 2 depicts the benefits of Internet of Things (IOT) in some selected academic libraries in South South, Nigeria in the following order: It increases efficiency (3.3), It increase productivity (3.1), It is easy to access (3.4) Enhance library service, (3.3) Enhances job performance (3.1) respectively. This is in line with Ngo et al. (2019) when they opined that Internet of Things provides advantages including increased productivity, automation, real-time monitoring, data driven decision-making, and efficiency.

Table 3: The challenges of implementing Internet of Things (IOT) in some selected academic libraries in South South, Nigeria

Key: Strongly agreed, Agree, Disagree, Strongly disagree

S/N	Items	SA	A	D	SD	-x	Decision
1	Complexity	34	47	6	8	3.1	Accepted
2	Privacy concerns	33	49	9	4	3.1	Accepted

3	Inadequate Training For Librarians	43	38	7	7	3.2	Accepted
4	Security risk	42	38	9	6	3.2	Accepted
5	Unreliable power supply	47	42	6	0	3.4	Accepted

Table 3 shows the challenges of implementing Internet of Things (IOT) in some selected academic libraries in South South, Nigeria in the following sequence: Complexity(3.1), privacy concerns (3.1), inadequate training for librarians (3.2), security risk(3.2) and unreliable power supply (3.4) respectively. This is supported by Peng et al. (2019), when they also opined that the growth of IoT also brings up issues with data management, security, and privacy. Ensuring strong controls and standards for securing personal information and preventing unwanted access becomes essential as more things become linked and communicate sensitive data. In addition, Bansal, (2018) opined that 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.

Recommendations

1. Library management should integrate internet of things in their respective libraries to enhance their job performance

2. Since the project is capital intensive, library management through the university management should seek for adequate funding from the State and Federal Government.
3. Training of library staff on the usage is critical.
4. Librarian should have positive mindset towards the adoption of Internet of Things in the libraries.

Conclusion

Academic libraries might undergo a radical transformation thanks to Internet of Things technology. An emerging technology called the Internet of Things (IoT) connects different objects over the internet, allowing smart devices to gather and share data for automation and intelligent decision-making. Digitization, library administration, automation, search and access, preservation, social media, the internet, mobile applications, SMS, and email are just a few of the ways libraries may use IoT. The technology known as the Internet of Things (IoT) links gadgets to the internet, gathers data, analyzes it, and automates procedures. It provides libraries with several benefits, including faster operations, data-driven decision making, greater space usage, remote monitoring, improved patron experience, security and safety, and interaction with digital resources.. However, IoT applications face challenges such as security concerns, privacy risks, interoperability issues, scalability and complexity, reliability and resilience, data management and analytics, and regulatory compliance.

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