

Emerging Technologies and Security of Library Resources at Bayelsa State Library Board

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Abstract

This study investigates the application of emerging technologies in the security of library resources at Bayelsa State Library Board (BYSLB). The loss of rare intellectually stimulating and information-rich resources due to ineffective security methods at the Bayelsa State Library Board resulted in this study. Two objectives and two research questions guided the study, and two research hypotheses were formulated and tested at a 0.05 level of significance. The study was carried out using correlation research designs, with a population of 24, comprising professionals, paraprofessionals, and supporting staff. A census sampling technique was used to select all the respondents. A questionnaire was used for data collection and a total of 24 copies were administered, but only 21 copies were found valid for analysis. The data was analysed using the mean score and standard deviation for research questions and the Pearson product-moment correlation to test the hypotheses. The findings reveal that the application of emerging technologies such as radio frequency identification (RFID), barcode, and closed-circuit television (CCTV) were not fully adapted. There is a significant relationship between RFID/barcode and CCTV technologies and the security of library resources at BYSLB. The study concluded that librarians should strive to adopt technological applications for securing public library resources. They should organise orientation programmes to educate users on the importance of safeguarding library resources. The study recommended, among others, funding from the government and private sectors,

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training of library staff as security specialists who will conduct risk assessment, and disaster preparedness towards library resources.

Keywords: emerging technologies; security; library resources; Bayelsa State Library Board

Introduction

The library, being an integral part of the educational system, serves as the pillar on which any civilisation flourishes, and without which no system in the country can survive effectively. Without the involvement of a public library at the Bayelsa State Board, Yenagoa, meeting the information needs of the citizens would not be easy. Public libraries are established by local, regional, or national governments through the support and funding of the state and community. Public libraries have long been used to document and support the writing of library history and are expected to deliver high-quality information to their patrons in a timely manner (Masenya 2020). The library resources are an integral part of the public library because the public library mostly comprises staff, resources, and public users. Therefore, there is no library without information resources. Information resources are basically sources through which information can be sought to meet the information needs of the users. They are media through which the intellectual content of human knowledge, ideas, opinions, or feelings are preserved and secured. Information resources found in libraries can be classified into print, non-print, electronic, and digital information resources. Print information resources include books, serials, encyclopaedias, dictionaries, handbooks, almanacs, and directories. Non-print information resources are items such as compact disks, audiovisuals, tapes, slides, microfilms, and microfiche (Abubakar 2016).

The application of computer technology in library resources management, according to Xiaodong (2015), marks the progress and development of an era. Dating from the emergence of libraries, the management of library resources has undergone a long period of development. As society moved forwards and abundant resources appeared, the management and security of library resources became increasingly difficult and challenging. Managing library resources with traditional methods could no longer be effective. Thus, the intelligent management era of computer applications technology was an inexorable trend in the development of library management (Xiaodong 2015). Promoting the development of modernisation, the application of computer technology also enhances the security of library resources.

Maintaining the security of information resources and services involves integral library operations that can make libraries remain perpetually useful. Security is the state or condition of being protected from harm, danger, or threats. It includes physical, digital, and organisational security, among other aspects. According to Jansen and Grance (2011), security refers to the protection of collections from unauthorised use, displacement, defacement, modification, and destruction. The Center for Medicare and Medicaid Services (CMS 2021) also defines security as the protection of information

and information systems from unauthorised access, disclosure, disruption, modification, or destruction. Similarly, the National Institute of Standards and Technology (NIST) describes security as the protection of information and information systems by addressing information security processes, information security management, and information security measures. In the medieval era, information resources were chained to keep them safe and avoid theft, mutilation, underlining of sentences, writing words in the margin, joining and sometimes ripping pages from books and other delinquencies.

Aina (2013) and Igbeka (2008) posit that the advent of information and communications technology (ICT) caused libraries to protect their information resources through electronic methods. Information in printed format can now be recorded on a computer using compact disks (CDs), flash drives, and through digitisation of library information resources. Abubakar (2016) identified the use of closed-circuit television (CCTV), radio frequency identification (RFID) technology, security doors, and digitisation as some of the emerging technologies used in maintaining the security of library resources. Although emerging technologies provide adaptable alternatives to securing library resources, the level of application of these technologies in public libraries is low. It also appears that little academic research has been conducted on the application of emerging technologies, with practically nothing conducted on the management of library resources (Lemieux 2016). It is, therefore, necessary that studies are carried out to investigate the application of emerging technologies in the security of library resources at Bayelsa State Library Board (BYSLB).

Statement of the Problem

Library resources constitute an essential part of the public library as they are the major reason users approach the library for information. They continue to increase in multiple formats, and if they are not properly secured, there can be no information resources to offer in the public library. Anunobi and Okoye (2008) have indicated that Nigerian libraries face hybrid challenges in managing resources, one of which is the issue of the security of the library collection. They are of the opinion that book theft is a major security issue in libraries, with special collections being the most targeted materials, and that some library staff also take materials from the library without checking them out. In the same vein, Kishan and Chakravarthy (2021) alluded that many libraries face challenges related to security threats and loss of information due to unethical practices, such as theft and mutilation. A study by Osayande (2011) is also of relevance to this research. He indicated that the different ways in which library materials are illegally taken from the library include outright stealing of library books and impersonation, among many other security threats. He concluded that “the traditional ways of manually checking patrons’ bags are both inefficient and not user-friendly” (Osayande 2011, 8). However, contemporary public libraries and other information centres are faced with the challenge of securing their hybrid resources, which include print and electronic resources.

The development of emerging technologies is therefore imperative to pinpoint issues pertaining to strategies for the security of library resources in the public library. Nevertheless, public libraries have adopted security measures to ensure the security of library resources. These include the use of fire alarms, fire extinguishers, security staff, etc. Yet, it seems that the security measures used to protect library resources are not effective. Thus, to effectively secure library resources, there is a need to adopt emerging technologies such as databases, including institutional repositories, blockchain, cloud computing, CCTV RFID/barcode technology, etc. Despite all the security measures put in place in libraries to secure information resources, the researchers noticed that there were still reports of security risks to library resources in libraries, especially in the context of Africa and Nigeria, more specifically at the Bayelsa State Library Board, Yenagoa. Although studies have been carried out to unravel the application of emerging technologies in the security of library resources, none to the best of the researchers' knowledge and from the literature reviewed have been carried out to specifically investigate the application of emerging technology to secure library resources at Bayelsa State Public Library Board. The study therefore sought to fill this gap.

Purpose and Objective of the Study

The study investigates the emerging technologies used to secure library resources at Bayelsa State Library Board. In carrying out the study, the following research questions were considered:

1. What is the relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board, Yenagoa?
2. What is the relationship between the application of closed-circuit television and the security of library resources in Bayelsa State Library Board, Yenagoa?

Hypotheses

The hypotheses were tested in a null format at 0.05 level of significance.

H₀₁: There is no significant relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board, Yenagoa.

H₀₂: There is no significant relationship between the application of closed-circuit television and the security of library resources at Bayelsa State Library Board, Yenagoa.

Literature Review

The adage "Prevention is better than cure" is relevant to the security of library resources. In other words, it is vital to keep library resources safe from loss, neglect, waste, destruction, exploitation, etc. for future access and use. In a nutshell, it is an act of safeguarding and maintaining library resources for future assessment and use. A

librarian identifies materials to be digitised, clears copyright issues, digitises, provides metadata, and acquires software to make such resources available, as well as its maintenance in the form of a digital library (Fabunmi, Paris, and Fabunmi 2006). In their study of the challenges and solutions to securing library materials, Gupta and Madhusudan (2018) outlined the challenges to library materials' security in academic libraries to include theft and mutilation, vandalism, disruptive (juvenile) behaviour, book mis-shelving, mutilation by humidity and microbes, damage and disaster, and other reasons (misdeeds of staff and users). Gupta and Madhusudan (2018) also postulate that there are many non-technological approaches to safeguard materials and theft prevention, including the use of security guards, physical checks of patrons' packages, closing stocks, and even the mundane book stamp.

Gartner (cited in EconoTimes 2016) proclaims that the application of modern technologies in managing resources can fundamentally change society. Although public libraries have shown great interest in the implementation of modern technologies, technological innovation has always been a key challenge in storing and managing records. Furthermore, a move from file cabinet storage systems towards digital management systems was never painless. Masenya (2020) examined the application of modern technologies in the management of records in public libraries and established that although public libraries acknowledge the importance of modern technologies such as databases, blockchain, cloud computing, and the Internet of Things in managing their records, these technologies were being slowly adopted due to lack of information technology infrastructure, technical support, knowledge, and skills. Akor (2013) studied security management for the prevention of book thefts in Benue State University Library and discovered that closed-circuit television and security personnel moving around in the library were among the measures in use to reduce the acts of theft and mutilation at the Benue State University Library.

In their work "Security of Library Materials: Challenges and the Solutions," Gupta and Madhusudan (2018) state that the application of modern technologies to the security of library resources involves electronic security systems, which include closed-circuit television, electromagnetic systems, burglar alarm systems, etc. Similarly, Abubakar (2016) investigated the methods for securing information resources in academic libraries at Niger State, Nigeria. A case study design was adopted for the research. A purposive sampling technique was used to select 35 respondents from a population of 297 staff in all 12 academic libraries in Niger State. Semi-structured interview guides were used to collect data from respondents, while field note guides were used to record data with respect to participants' observations. The data collected using individual interview guides and the field notes guides, which were properly completed, were presented and subjected to qualitative analysis. The findings revealed that the academic libraries in Niger State are yet to embrace modern technologies such as radio frequency identification, security doors, CCTV, digitisation, and migration in securing and preserving their information resources. However, they used antivirus software, repairs, binding, and environmental control to preserve library resources. The study then

recommended that libraries should endeavour to have written policies on all aspects of the security of information resources, upgrade and maintain facilities such as binderies, air conditioning systems, fire prevention equipment, etc., and adopt digital preservation methods. Bishoff and Smith (2015) reported a study by the Bishoff Group on digital collection management practices performed by 145 academic libraries to gain a better understanding of the status of their current digital content creation, management, and preservation activities. The study revealed that a significantly large number of the respondents reported that they were currently creating and/or acquiring digital content, such as the output of faculty and student research, institutional records, dissertations and theses, and digital library collections.

Methodology

The study employed a quantitative research approach, utilising a correlational survey research design. The study population encompassed 24 library staff members, including professionals, paraprofessionals, and supporting staff from the Bayelsa State Library Board. Due to the relatively small population size, the entire group was considered as the sample, a choice in line with enumerative sampling techniques, which involve using the entire population as the sample size. For data collection, a structured questionnaire was utilised, designed in alignment with the research questions. It was first reviewed and validated by experts in the field of library and information science, particularly senior librarians, prior to administration to the designated respondents. The distribution of the questionnaires occurred over a two-week period, aided by a research assistant. Respondents were given one week to complete the questionnaires during their working hours. Before collecting the questionnaires, the researchers conducted follow-up phone calls to remind the respondents, considering their busy schedules. Additionally, a reliability test using Cronbach's Alpha was performed to assess the consistency of the research instrument, resulting in an overall index value of 0.83, indicating its reliability. Data obtained from the respondents were analysed using mean and standard deviation, while hypothesis questions were assessed using the Pearson product-moment correlation. Ethical standards were rigorously upheld throughout the study, ensuring the protection of respondents' privacy and personal information, as well as proper acknowledgment of all sources used in the research.

Results and Discussion

Research question 1: What is the relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board?

Table 1: Summary of mean and standard deviation in the relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board.

S/N	My library secures library resources by:	\bar{x}	\pm	Decisions
1	Using RFID/barcode reader to verify and track documents	1.4	1.3	Disagree
2	Using RFID/barcode to identify products and patrons	1.5	1.4	Disagree
3	Using RFID/barcode to improve inventory control	1.5	1.4	Disagree
4	Using RFID/barcode to get better accuracy and on-time data	1.6	1.7	Disagree
	Weighted mean	1.5<2.5	1.7	Disagree

The results in Table 1 indicate the summary of mean and standard deviations in the relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board and it revealed that items 4, 2, 3, and 1 have mean scores 1.6, 1.5, 1.5, and 1.4 and standard deviations of 1.7, 1.4, 1.4 and 1.3, respectively. This shows the respondents indicated that their library does not secure library resources using the following methods: using RFID/barcode to detect book theft, scanning identity cards with the barcode to identify users, using barcodes to monitor attendance to prepare statistics, using a barcode reader to verify documents. The weighted mean of 1.5 indicates that most of the respondents indicated that Bayelsa State Library Board does not secure library resources using RFID/barcode. This could be attributed to the lack of RFID/barcode technologies to render security services.

Research question two: What is the relationship between the application of closed-circuit television and the security of library resources at Bayelsa State Library Board?

Table 2: Summary of mean and standard deviations in the relationship between the application of closed-circuit television and the security of library resources in public libraries in Yenagoa.

S/N	My library secures library resources using CCTV by:	\bar{x}	\pm	Decision
1	Monitoring and recording evidence of criminal activities in and around the library	1.0	1.3	Disagree
2	Monitoring the frequent use of library resources	1.0	1.3	Disagree
3	Reducing the cost of replacing library resources	1.2	1.5	Disagree
4	Reducing security cost	1.1	1.4	Disagree
5	Providing peace of mind since it acts as a comfort blanket	1.2	1.5	Disagree
	Weighted mean	1.1<2.5	1.3	Disagree

The results from Table 2 show the summary of mean and standard deviations in the relationship between the application of closed-circuit television and the security of library resources at Bayelsa State Library Board and revealed that items 3, 5, 4, 1, and 2 have mean scores of 1.2, 1.2, 1.1, 1.0, and 1.0, with standard deviations 1.5, 1.5, 1.4, 1.3, and 1.3, respectively. This indicates that according to the respondents, their library does not secure library resources using CCTV by checking theft and mutilation, checkmating library delinquency, and surveying the users against mishandling of library resources. The weighted mean of 1.1 indicates that most of the Bayelsa State Library Board is not using CCTV to secure library resources. This could be due to poor funding to purchase and install CCTV cameras in the libraries.

Hypotheses

Hypothesis 1: There is no significant relationship between the application of RFID/barcode technology and the security of library resources at the Bayelsa State Library Board.

Table 3: Summary of Pearson product-moment correlation on the relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board

SN	Variables		Application of RFID/barcode technology	Security of library resources
1	Application of RFID/barcode technology	Pearson correlation	1	-.121
		Sig. (2-tailed)		.04
		N	31	31
2	Security of library resources	Pearson correlation	-.121	1
		Sig. (2-tailed)	.04	
		N	31	31

The results from Table 3 show the summary of the Pearson product-moment correlation on the relationship between the application of RFID/barcode technology and the security of library resources at the Bayelsa State Library Board. It shows that the joint relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board has a correlation coefficient of $r = -.121$ which shows a weak negative relationship and is statistically significant at 0.05 alpha level ($r = -.121, P = 0.04 < 0.05$). Thus, the null hypothesis which stated that there is no significant relationship between the application of RFID/barcode technology and the security of library resources at Bayelsa State Library Board is rejected. Therefore, there is a significant relationship between RFID/barcode technology and the security of library resources at the Bayelsa State Library Board.

Hypothesis 2: There is no significant relationship between the application of closed-circuit television and the security of library resources at the Bayelsa State Library Board.

Table 4: Summary of the Pearson product-moment correlation on the relationship between the application of closed-circuit television and the security of library resources at Bayelsa State Library Board

SN	Variables		Application of closed-circuit television	Security of library resources
1	Application of closed-circuit television	Pearson correlation	1	-.125
		Sig. (2-tailed)		.04
		N	31	31
2	Security of library resources	Pearson correlation	-.125	1
		Sig. (2-tailed)	.04	
		N	31	31

The results from Table 4 show the summary of the Pearson product-moment correlation on the relationship between the application of closed-circuit television and the security of library resources at the Bayelsa State Library Board. It shows that the joint relationship between the application of closed-circuit television and the security of library resources at Bayelsa State Library Board has a correlation coefficient of $r = -0.125$ which shows a weak negative relationship and is statistically significant at 0.05 alpha level ($r = -0.125, P = 0.04 < 0.05$). Thus, the null hypothesis which stated that there is no significant relationship between the application of closed-circuit television and the security of library resources at Bayelsa State Library Board is rejected. Therefore, there is a significant relationship between closed-circuit television and the security of library resources at Bayelsa State Library Board.

Discussion of Findings

The findings of this study show that according to the respondents their library does not secure library resources by using RFID/barcode to detect book theft, scanning identity cards with the barcode to identify users, using barcodes to monitor attendance to prepare statistics, or using a barcode reader to verify documents. This indicates that most of the Bayelsa State Library Board does not secure library resources using RFID/barcode. This could be attributed to the lack of RFID/barcode technologies to render security services. Furthermore, the findings reveal that according to the respondents their library does not secure library resources using CCTV to check theft and mutilation, to checkmate library delinquency, or to survey the users against mishandling of library resources. This indicates that most of the Bayelsa State Library Board is not using CCTV to secure library resources. This could be due to poor funding to purchase and install CCTV cameras in the libraries. Furthermore, the null hypothesis tested shows there is a significant relationship between closed-circuit television and the security of library resources at Bayelsa State Library Board. Therefore, there is also a significant relationship between RFID/barcode technology and the security of library resources at the Bayelsa State Library Board. The implication of this finding is that if necessary measures are taken to adopt the application of emerging technology such as radio

frequency identification, barcode, and closed-circuit television to secure library resources at Bayelsa State Library Board to complement the manual methods of securing the library resources, the security threats associated with the resources will be eradicated. These findings are in line with the view of Osayande (2011) who posits that the traditional ways of manually checking patrons' bags are both inefficient and not user-friendly. It is evident that the libraries have not yet taken advantage of the opportunities presented by technological advancements regarding information resource security. However, it is sufficient to say that numerous threats must be avoided by current technological innovations such as radio frequency identification, barcode, and closed-circuit television to stop any possible loss of materials, as this can never be overemphasised. It goes without saying that this will improve patron access to high-quality information resources and help the library maintain the sustainability of its operations and services.

Conclusion and Recommendations

Library resources remain a vital element of the library and therefore need proper security. This is necessary to protect library resources from theft, mutilation, mishandling, deterioration, and damage, and to safeguard them for posterity and future usage. Due to the ineffectiveness of the manual security methods, libraries, particularly public libraries, are adopting the use of emerging technologies in the security of library resources. This study surveyed the application of emerging technologies to secure library resources and revealed that emerging technologies such as RFID/barcode technologies and CCTV were not fully adopted. There is a significant relationship between RFID /barcode technologies and CCTV and the security of library resources at Bayelsa State Library Board. The study concluded that the Bayelsa State Library Board management should adopt the use of electronic security systems as this will eradicate the troubling issues of security threats in public libraries. Based on the findings of the study, the following recommendations are made:

1. Bayelsa State Library Board should adopt emerging technologies such as RFID/barcode technologies and CCTV to secure library resources.
2. Public library management should solicit government support in terms of funding for emerging technologies such as RFID/barcode technologies and CCTV in the library to fight against security threats to library resources.
3. Funding from the private sector as well as any other well-meaning individuals should be sought by the Bayelsa State Library Board management regarding the acquisition of emerging technologies such as RFID/barcode technologies and CCTV in the library.
4. The librarians should consistently organise orientation programmes to sensitise their users on the usefulness of library resources and the need to secure and protect these resources from security threats.

5. Public library management or Bayelsa State Library Board should train some librarians as security specialists who will conduct risk assessment and disaster preparedness assessment for all library resources.

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