Library Network Security Measures As Determinants of Archives Preservation in Public Libraries in Rivers State, Nigeria

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Abstract - **This study examined available library network security measures as determinants of archives preservation in public libraries in Rivers state. The descriptive survey design was adopted for this study. The target population of the study comprised 514 library staff drawn from Rivers State library board and staff from Jubilee library Port Harcourt. The sample size for this study was 399 library staff comprising 227 staff from Rivers state library board and 172 library staff from Jubilee library Port Harcourt. An instrument titled library network security measures for archives preservation questionnaire was used for data collection. Face validity of the instrument was ensured by three experts. The instrument consists of 10 items of 2 sections. The instrument yielded reliability coefficients of 0.79 with the use of Cronbach Alpha reliability method. The findings indicated that, among other things, encryption technologies such as firewall protection and secure logins are part of the library's network security measures that are employed to preserve archives in public libraries in Rivers state, Nigeria. Based on the findings, it can be concluded that public libraries in Rivers state are not lacking security features that would help preserve archives via a networked security system. However, the security measures were not effectively employed because staff members' security training was not sufficiently available. As a result, it was recommended that more training in security should be provided to staff in all of the public libraries in Rivers state.**
Keywords: **Library Network Security, Archives Preservation, Library Security Devices, Staff Trainings**

I. INTRODUCTION

The concept of preserving historical data has evolved over millennia. In ancient Greece, the word archive had a similar meaning to today: it referred to a collection of books and documents (Montanari, Matthaios & Rengakos, 2015; Muir, 2008). However, since the advent of electronic media, the term has acquired new meanings, such as library networks. This importance has to do with cutting-edge information technologies such as computer technology and the Internet to keep archives safe from unauthorized access (Obi, 2023). The library network promotes optimal preservation of archival documents by promoting the protection of sensitive paper and digital media. These properties include backup storage and communication between different parts of the system archive. In addition, archivists use security measures such as firewalls and virus scanners in their library networks (Xiao, Xu & Liu, 2021). These properties facilitate accurate and up-to-date data storage. Liu (2019) acknowledged that a library network is a security system consisting of techniques and procedures used to protect library networked computer systems from unauthorized access, malicious attacks, and other security threats. This includes controlling physical access to libraries and computers, monitoring user activity and encrypting data.

More so, library network security protects public library archives through regular risk assessments, setting user authentication policies, implementing data protection firewall systems, regularly applying software updates to reduce vulnerabilities (Zajdel, Costa & Mili, 2022), raising awareness for staff training on security policies and best practices as well as educating patrons on safe use of the Internet. The most obvious security feature of a library network is its access point or portal (Triskele, 2022). A single point of access ensures that only authorized personnel can access profile information while preventing anyone else from accessing the network. This central access point prevents unauthorized individuals or groups from accessing data in public library archives. Based on the above, this study sought to examine the availability of library network security as a determinant of archival preservation in public libraries in Rivers state, Nigeria.

A. Statement of the Problem

The recent problem of inadequate library network security in the preservation of archive in different parts of the world is a major issue that threatens the continuity, integrity, and reliability of digitized library resources. Librarians are doing their best to meet this challenge by regularly updating and reinforcing existing security systems but often find themselves outmatched due to the complexity of today's cyber threats. The cost impact of library network security failure can be significant. Not only are there potential legal costs associated with damages resulting from data breaches, but also from direct costs related to hardware and software repairs to loss of user trust and reputation for librarians when files or data are compromised. What therefore bothered and motivated the researcher was to find out if public libraries in Rivers state are equipped with library network security resources that can address the current level of threats to digital archives. In other words, the researcher resolved to establish if there are available library network security measures that can determine archives preservation in public libraries in Rivers state.

II. AIM AND OBJECTIVES

This study was aimed at examining available library network security measures as determinants of archives preservation in public libraries in Rivers state. Specifically, the objectives were to

1. Find out the availability of library security devices as determinants of archives preservation in public libraries in Rivers state.
2. Establish the availability of staff competence in management of members' security trainings as determinants of archives preservation in public libraries in Rivers state.

A. Research Questions

1. What are the available library security devices that can determine archives preservation in public libraries in Rivers state?
2. What are the staff competences in management of available staff members' security trainings that can determine archives preservation in public libraries in Rivers state?

B. Hypotheses

The following two (2) hypotheses were tested at 0.05 significance level.

1. There is no significant difference in the mean scores of staff from Rivers State library board and staff from Jubilee library Port Harcourt on the available library security devices that can determine archives preservation in public libraries in Rivers state.
2. There is no significant difference in the mean scores of staff from Rivers State library board and staff from Jubilee library Port Harcourt on the staff competences in management of available staff members' security trainings that can determine archives preservation in public libraries in Rivers state.

III. CONCEPTUAL FRAMEWORK

The concept of this study was anchored on available library network security measures as determinants of archives preservation in public libraries in Rivers state as diagrammatically represented in fig. 1 below.
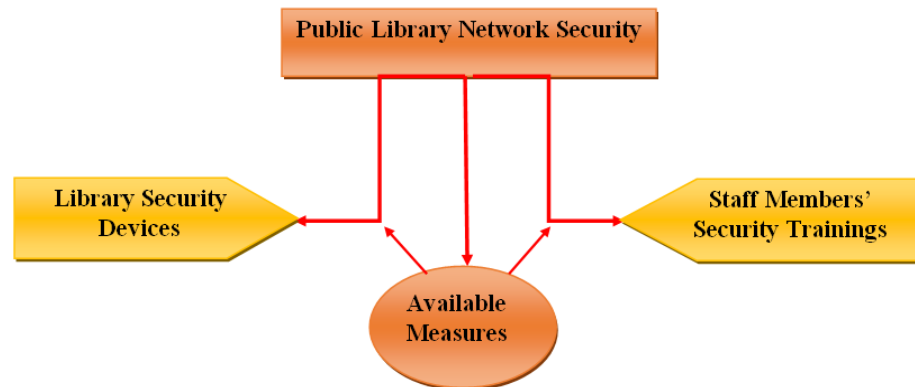

Fig. 1 Researcher's conceptualization (2023)

IV. CONCEPTUAL REVIEW

A. Library Security Devices as a Measure of Library Network Security and Preservation of Archives in Public Libraries

Library network security is an important aspect of the preservation of archives in public libraries. It helps protect public library systems and networks from malicious attacks and potential data breaches (Aljumah & Ahanger, 2020), ensuring that important records and documents remain safe. It also ensures the accuracy of information stored in the archive of public libraries by blocking any unauthorized access to it (Spacey, Cooke, Creaser & Muir, 2015).

According to Abduldayan, Abifarin, Oyedum and Alhassan (2018), library network security is a system of technologies, policies and procedures designed to protect the information stored in library databases and systems from unauthorized access, modification or destruction. Touhid (2019) added that library network security encompasses computer security, physical security, data security and other forms of safeguarding information. It is essential that libraries implement strong network security measures in order to preserve their archives and protect confidential data.

Today's digital world is beset by data theft and cyber-attacks; these are commonplace (Yusuf & Awoyemi, 2022). As such, libraries are in a precarious position that necessitates the utilization of advanced encryption technologies, such as firewall protection and secure logins, in order to ward off malicious attacks as documented by scholars (Upadhyay & Sampalli, 2020; Vacca, 2012).

Additionally, the importance of preserving archives is paramount; as a result, libraries must have digital backup

and archiving solutions that are both effective and safe in the event of accidental alteration or deletion. More so, as acknowledged by Pautz (2013) that it will be highly significant and beneficial if policies around internet use in public libraries can be enforced to limit potential risks associated with user behaviour online. Notably, library network security is critical for the preservation of archives as it works to prevent unauthorized access which could result in permanent damage or destruction of records. In most cases as noted by scholars, library network security works by using encryption, authentication protocols, digital rights management tools, and other security measures to prevent misuse of its systems. Muir and Creaser (2014) observed that by monitoring user activity online, preventing unauthorized access to restricted areas, controlling access to library resources, as well as regularly scanning for viruses or other vulnerabilities, library networks are safeguarded from a wide range of threats. Based on the foregoing, library network security ultimately helps maintain the accuracy of archives within public libraries and protects them from being compromised or stolen.

B. Staff Members' Security Trainings as a Measure of Library Network Security and Preservation of Archives

Staff members' security trainings are designed to equip library staff, especially those in public libraries, with strategies and techniques for protecting library resources from physical theft, damage, and unauthorized use (Tobias, 2019). The skills required by library staff in archive preservation include the ability to access, organize, analyze, and store information (Si, *et al.,* 2015); knowledge of regional legislation regarding collection rights (Kaur & Kaur, 2015); familiarity with ethical considerations related to data storage and access (Pinfield, Cox & Smith, 2014); awareness of various archival formats such as digital records systems and analog artifacts (Borgman, Scharnhorst & Golshan, 2019; Asogwa, 2011); understanding of preservation methods used to maintain collections such as microfilming or digitization (Tyagi, 2022; Ekwelem, Okafor & Ukwoma, 2011); and excellent organizational skills (Yap, Barat & Kiszl, 2022; Petek, 2018; Laskowska, 2011). According to Adetunla and Osunride (2016) public library staff should understand how to handle fragile library resources, how to store them safely and how to properly access them for research purposes. They should also understand cataloguing systems, metadata tools, conservation best practices and digital archiving techniques (Riley, 2017; Asogwa, 2011). They are expected to keep abreast of knowledge of the principles, procedures and processes of archival work; mastery of reference management tools' software, such as ArchivesSpace or Archivists toolkit (Baudino, *et al.,* 2021; Dunham, 2016; Frank, 2013); ability to use specialized equipment for scanning documents(Burke, 2013); expertise in handling rare books, manuscripts and audiovisual objects (Mahmood & Khan, 2017); knowledge of an array of format-specific rules and regulations relating to their protection(Van-Kleeck, Langford, Lundgren, Nakano, O'Dell & Shelton

2016); experience with preservation activities like climate control assessments or digitization projects(Obi, 2023; Tansey, 2015); and proficiency in organizational strategies that facilitate efficient management of large collections(Antony & Vijayakumar, 2016; Gill, 2016; Kolle & Parmeshwar, 2014).

Scholars have pointed out three basic policy trainings that staff members in public libraries are expected to undergo in complementing the security architecture of archive preservation, viz: training on programme policies, issue-specific policies' training, and training on system-specific policies (Al-Sharidah, *et al.,* 2020; Whitman & Mattord, 2013; Hemsoth, 2002). Al-Sharidah, *et al.,* (2020) noted that programme policy trainings for staff members in archive preservation focus on the policies, procedures and expectations for the use, care, access and security of archival materials. This is in the same vein with Ekwelem, *et al.,*(2011) that programme policies trainings for staff members in public libraries are designed to ensure that public library personnel possess the knowledge and skills required when handling library materials. Also, Al-Sharidah, Syed, Alsannat and Gaddourah (2020) pointed out that issue-specific policy trainings address how different issues such as copyright, privacy or donor relations are addressed in the context of archival preservation. This was corroborated by Whitman and Mattord (2013) that when referring to library staff training on issue-specific policies, it incorporates trainings that are focused on specific topics such as copyright, privacy, intellectual property, data security, and records management. While all the authors in the foregoing agreed that system-specific policies trainings help staff understands how to use library systems and software to manage archives safely and securely. Such trainings provide instruction on filing systems, cataloguing protocols, indexing documents and other activities related to proper management of archives. Ultimately, all the three basic policy trainings for staff members are geared at empowering them to proactively prevent archival material degradation and increase efficiency in the preservation of current materials.

V. THEORETICAL FRAMEWORK

A. Integrated System Theory of Information Security Management

This study is situated on integrated system theory of information security management postulated by Kwo-Shing and colleagues in 2003. The theory averred that the availability, integration and harmonization of the different theoretical components involving risk management, staff motivation and upskilling, organizational leadership style, control and auditing are indispensable in building a thorough information security management (Kwo-Shing, Yen-Ping, Louis & Jih-Hsing., 2003). According to Whitman and Mattord (2021), it is now globally accepted that information security is not only a technical issue but should be seen as a management issue as well. In order to

successfully manage information security in an organization, various theories and concepts need to be taken into account and integrated into a coherent management system. The integrated system theory of information security management proposed by Kwo-Shing, *et al.,* is a comprehensive framework that takes into account all the different aspects of information security management (Martina, 2017; Vaish & Varma, 2010; Kwo-Shing, *et al.,* 2003).

The theory starts with the premise that information security is a shared responsibility of all members of an organization (Hu, Dinev, Hart & Cooke, 2012). It is not enough to have a few security experts who are responsible for the security of the organization as a whole. Every member of the organization needs to be aware of the importance of security and play their part in ensuring the security of the organization. This shared responsibility extends to all levels of the organization, from the top management down to the individual employees. The top management needs to provide the necessary resources and support to the security team and create a culture of security within the organization. The individual employees also need to be properly trained in security matters and be aware of their role in protecting the organization's assets. The second premise of the theory is that information security management should be integrated into the overall management of the organization (Martina, 2017). Too often, security is seen as a separate issue from the rest of the organization's activities. This leads to a siloed approach to security, where the security team is isolated from the rest of the organization and does not have a good understanding of the organization.

VI. METHODOLOGY

The descriptive survey design was adopted for this study. The target population of the study comprised 514 library staff drawn from Rivers State library board and staff from Jubilee library Port Harcourt. The sample size for this study was 399 library staff comprising 227 staff from Rivers State library board and 172 library staff from Jubilee library Port Harcourt representing 44.16% and 33.46% of the population respectively.

The sample size was determined using Taro Yamane sample size determination formula while a two-stage sampling technique of stratified and simple random sampling techniques was used to select the sample size. A self-structured questionnaire titled, 'Library Network Security Measures for Archives Preservation Questionnaire (LNSMAPQ)" was used for data collection. Face validity was ensured by three experts. The LNSMAPQ consists of twenty (10) items of two (2) sections. This was coded in the four-point Likert type scale of: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) and weighted as 4, 3, 2, and 1 respectively.

The instrument (LNSMAPQ) yielded reliability coefficients of 0.79 with the use of Cronbach Alpha reliability method. Mean and standard deviation was used in answering research questions while z-test was used in testing the null hypotheses at 0.05 significance level. After the administration of the respective copies of questionnaire to the respondents, 192 of the copies were completely filled and retrieved from Rivers State library board staff representing 84.58% return rate while 161 of the copies were completely filled and retrieved from Jubilee library Port Harcourt staff representing 93.61% return rate.

VII. RESULTS OF THE STUDY

A. Research Question 1

What are the available library security devices that can determine archives preservation in public libraries in Rivers state?

TABLE I MEAN AND STANDARD DEVIATION SCORES ON THE AVAILABLE LIBRARY SECURITY DEVICES THAT CAN DETERMINE ARCHIVES PRESERVATION IN PUBLIC LIBRARIES IN RIVERS STATE

Sl. No.	Preservation of archives in public libraries can be determined by available library security devices as follows	Rivers State Library Board Staff (n =192)		Jubilee Library Port Harcourt Staff (n =161)		Mean Set	Remarks
		$\bar{x}$	sd	$\bar{x}$	sd	xx	
1	Use of the library's available encryption technologies like firewall protection.	3.12	1.77	3.09	1.76	3.11	Agreed
2	Utilization of the library's available encryption technologies like secure logins.	3.04	1.74	3.07	1.75	3.06	Agreed
3	Implementation of the library's available plan for robust digital backup.	2.51	1.58	2.59	1.62	2.55	Agreed
4	Implementation of the library's available policies around internet use	3.06	1.75	3.02	1.74	3.04	Agreed
5	Use of the library's available digital rights management tools.	2.70	1.64	2.55	1.60	2.63	Agreed
	Cluster Mean	2.87	1.69	2.86	1.69	2.87	Agreed

Results in Table I showed the weighted Mean values for the response of Rivers state library board staff and Jubilee library Port Harcourt staff on the available library security devices that can determine archives preservation in public

libraries in Rivers state. All the items were agreed by the respondents (xx,>2.5) as the available library security devices that can determine archives preservation in public libraries in Rivers state. Thus, the cluster mean value of 2.87 for all the items implies that there are available library security devices that can determine archives preservation in public libraries in Rivers state, Nigeria.

B. Research Question 2

What are the staff competences in management of available staff members' security trainings that can determine archives preservation in public libraries in Rivers state?

TABLE II MEAN AND STANDARD DEVIATION SCORES ON THE AVAILABLE STAFF MEMBERS' SECURITY TRAININGS THAT CAN DETERMINE ARCHIVES PRESERVATION IN PUBLIC LIBRARIES IN RIVERS STATE

Sl. No.	Preservation of archives in public libraries can be determined by staff competences in management of available staff members' security trainings as follows	Rivers State Library Board Staff (n =192)		Jubilee Library Port Harcourt Staff (n =161)		Mean Set	Remarks
		$\bar{x}$	sd	$\bar{x}$	sd	xx	
6	Staff trainings on ethical considerations related to secure storage of data.	2.68	1.64	2.53	1.60	2.61	Agreed
7	Upskilling of staff members on ethical considerations related to data access.	2.51	1.58	2.50	1.58	2.51	Agreed
8	Tutoring ofstaff members on safe preservation methods used to maintain collections such as microfilming.	2.45	1.57	2.49	1.58	2.47	Disagreed
9	Upskilling of staff members on secure preservation methods used to maintain collections such as digitization.	2.32	1.52	2.48	1.58	2.40	Disagreed
10	Organization of workshop for staff members on the development of expertise in safe handling of book archives, manuscripts archives and archives of audiovisual objects.	2.50	1.58	2.48	1.58	2.49	Disagreed
	Cluster Mean	2.49	1.58	2.50	1.58	2.50	Agreed

Results in Table II showed the weighted Mean values for the response of Rivers state library board staff and Jubilee library Port Harcourt staff on the staff competences in management of available staff members' security trainings that can determine archives preservation in public libraries in Rivers state. Two of the items (items 6 &7) were agreed by the respondents (xx,>2.5) while the remaining three were disagreed (xx, <2.5). However, the cluster mean set value showed 2.50. This implies that the staff competences in management of available staff members' security trainings can determine archives preservation in public libraries in Rivers state.

C. Test of Hypotheses

Hypothesis 1: There is no significant difference in the mean scores of staff from Rivers State library board and staff from Jubilee library Port Harcourt on the available library security devices that can determine archives preservation in public libraries in Rivers state.

TABLE III Z-TEST ANALYSIS ON THE MEAN DIFFERENCE BETWEEN THE RESPONSES OF STAFF FROM RIVERS STATE LIBRARY BOARD AND STAFF FROM JUBILEE LIBRARY PORT HARCOURT ON THE AVAILABLE LIBRARY SECURITY DEVICES THAT CAN DETERMINE ARCHIVES PRESERVATION IN PUBLIC LIBRARIES IN RIVERS STATE

Status	n	$\bar{x}$	sd	df	z-cal	z-crit value	Level of significance	Decision
Rivers state library board staff	192	2.87	1.69	351	0.81	1. 96	0.05	No significant difference
Jubilee library Port Harcourt staff	161	2.86	1.69					

Results in Table III showed that staff from Rivers state library board has mean and standard deviation values of 2.87 and 1.69 while staff from Jubilee library Port Harcourt has mean and standard deviation scores of 2.86 and 1.69. With a degree of freedom of 351, the z-calculated value of 0.81 was lower than the critical z-test value of 1.96. Therefore, the null hypothesis was retained.

By implication, there was no significant difference between the mean responses of staff from Rivers state library board and staff from Jubilee library Port Harcourt on the available library security devices that can determine archives preservation in public libraries in Rivers state.

Hypothesis 2: There is no significant difference in the mean scores of staff from Rivers State library board and staff from Jubilee library Port Harcourt on the staff competences in management of available staff members' security trainings that can determine archives preservation in public libraries in Rivers state.

TABLE IV Z-TEST ANALYSIS ON THE MEAN DIFFERENCE BETWEEN THE RESPONSES OF STAFF FROM RIVERS STATE LIBRARY BOARD AND STAFF FROM JUBILEE LIBRARY PORT HARCOURT ON THE STAFF COMPETENCES IN MANAGEMENT OF AVAILABLE STAFF MEMBERS' SECURITY TRAININGS THAT CAN DETERMINE ARCHIVES PRESERVATION IN PUBLIC LIBRARIES IN RIVERS STATE

Status	n	$\bar{x}$	sd	df	z-cal	z-crit value	Level of significance	Decision
Rivers state library board staff	192	2.49	1.58	351	0.49	1. 96	0.05	No Significant difference
Jubilee library Port Harcourt staff	161	2.50	1.58					

Results in Table IV showed that staff from Rivers state library board has mean and standard deviation values of 2.49 and 1.58 while staff from Jubilee library Port Harcourt has mean and standard deviation scores of 2.50 and 1.58. With a degree of freedom of 351, the z-calculated value of 0.49 was lower than the critical z-test value of 1.96. Therefore, the null hypothesis was retained. By implication, there was no significant difference between the mean responses of staff from Rivers state library board and staff from Jubilee library Port Harcourt on the staff competences in management of available staff members' security trainings that can determine archives preservation in public libraries in Rivers state.

VIII. FINDINGS AND DISCUSSION

The findings of this study are discussed under the following subheadings.

A. Available Library Security Devices as a Measure of Library Network Security and Preservation of Archives in Public Libraries

It was found that encryption technologies like firewall protection and secure logins are a few of the available library network security measures used in the preservation of archives in public libraries in Rivers state, Nigeria. Others are plan for robust digital backup, policies around internet use and digital rights management tools. This finding supports the finding of Ismail and Zainab (2013) that information system in libraries support the delivery of image, services and collections to local and remote patrons and this availability over the Internet inevitably exposes it to security threats. As a result, libraries should maintain the privacy of their information assets such as the library's financial information, patrons' circulation information, and passwords to access the library systems. More so, libraries should also implement good backup policies and recovery procedures to ensure their data and services via information systems can be accessed and shared in a convenient way whenever it is needed, and data can be restored quickly during downtime (Ismail & Zainab, 2013).

B. Available Staff Competences in Management of Staff Members' Security Trainings as a Measure of Library Network Security and Preservation of Archives in Public Libraries

It was found that staff trainings on ethical considerations related to secure storage of data and up-skilling of staff members on ethical considerations related to data access are some of the available measures of library network security that can determine archives preservation through staff members' security trainings. Others that are available but not sufficiently available are: tutoring of staff members on safe preservation methods used to maintain collections such as microfilming, up-skilling of staff members on secure preservation methods used to maintain collections such as digitization as well as organization of workshop for staff members on the development of expertise in safe handling of book archives, manuscripts archives and archives of audiovisual objects. This finding supports the findings of Schaefer, McGovern, Zierau, Goethals and Wu (2022) and Wang (2017) that in ensuring a safe use of public libraries for patrons; emphasis should be laid on the implementation of secure storage of data. Also, the finding of this study resonates with Hussein (2015) that staff members' security trainings is an indispensable factor in ensuring a well-secured library network for an effective archives' preservation.

IX. RECOMMENDATIONS

The following recommendations were made based on the findings of the study.

1. Sufficient security trainings should be made available to staff members in all the public libraries in Rivers state. By so doing, they will be able to effectively put available security devices to use in safeguarding the libraries' network for archives preservation.
2. More information technologists should be employed by the Rivers state government to work with librarians in sustaining the ongoing efforts of digital archives preservation.

X. CONCLUSION

Based on the findings of this study, it can be concluded that public libraries in Rivers state are not without security devices that can provide needed library security network for archives' preservation. However, the security devices were not effective on account of the fact that staff members' security trainings were not sufficiently available.

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