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Information Security Awareness and Information Security Compliance in University Libraries in South-West, Nigeria

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Abstract

Information security compliance implies that library personnel follow the rules, guidelines, and principles governing information security and implement the security measures provided in the library to curb insecurity. Information security compliance ensures that information resources held in the library are protected from unauthorized access and preserved from risk of lost, damage and unwanted modification. However, evidence from the literature showed that there is low compliance with information security by library personnel in university libraries in Nigeria. This has impacted negatively information resources held by the library, especially the printed materials. A situation not unconnected with a lack of awareness of information security. This study therefore, examined the influence of information security awareness on information security compliance in university libraries in South-West, Nigeria. The study adopting a descriptive survey research design involving Multi-Stage random sampling technique to select 223 who are library personnel (professional and Para-professional librarians) in university libraries in South-West, Nigeria. Data were collected with the use of a questionnaire. Findings of the study revealed that information security awareness ($R^2=0.3305, \beta = 0.363, t = 8.836, p < 0.05$) had positive and significant influence on information security compliance. Also information security compliance among library personnel in university libraries is of low level. Similarly, there is low Information security awareness among library personnel in university libraries. The study concluded that information security awareness is inevitable for information security compliance in university libraries in South-West, Nigeria. The study recommended that management of the libraries should promote awareness programs among library personnel so as to boost awareness thereby curbing information security breaches and increasing compliance with information security. The study also recommended that, in order to avoid unauthorized access to library resources, library management and information professionals must devise strategies which will enable them provide adequate security that can protect the information resources available in the library.

Keywords: Information Security Awareness, Information Security Compliance, University Libraries, Nigeria

Introduction

Libraries are institutions set up to cater for the educational, cultural, research, recreational and information needs of their users. Libraries have the main objectives of being entrusted with the selection, acquisition, organization, storage and dissemination of information to their patrons. Jama'a et al. (2014) observed that academic libraries in particular, assume a focal point where users of diversified age groups, socio-political, economic backgrounds and cultural interests have to converge to utilize all the available resources that are relevant to their individual needs. As a result of this diverse use of the materials, these libraries stand to be vulnerable to all forms of crime and security risks from not only the users, but the library staff as well. The exponential growth of information and information bearing materials is a result of the ever increasing growth of knowledge that gives impetus for the need to organize information materials and to provide adequate security for these materials.

In order to avoid unauthorized access to library resources, library management and information professionals must devise strategies which will enable them provide adequate security that can protect the information resources available in the library. Security is the process designed to protect information against threat. It is an act of preventing crime, where in the case of library resources; it prevents un-authorized removal or loss of materials, usually as a result of intruders' or thieves' interference (Song, 2020). Conceptually, security means the overall manner in which policies, programs, procedures, or measures are deployed to mitigate risk and ensure access to a particular resource. Marett and Barnett (2021) consider that security is about preventing adverse consequences from the intentional and unwarranted actions of users. The objective of information security is to build protection against the users who would do damage, intentional or otherwise on information asset own by the library. Information security means protecting information (data) and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction (Surwade & Patil, 2019). Information security is the protection of information (and the facilities and systems that store, use and transmit it) from a wide range of threats, in order to preserve its value to an organization (Ngwum, Raina, Aguon, Taylor, &Kaza, 2020).

People are the main issue in the human aspects of information security due to their direct contact with information. Their responsibility and commitment to safeguard information assets formally documented in the information security policy play a vital role in this domain (AlHogail, 2015). Nieves, Dempsey, and Pillitteri (2017) described information security

policy as a set of formalized procedures, guidelines, roles, and responsibilities to which employees are required to adhere to safeguard and use properly the information and technology resources of their organizations. This means that, when employees in the library become familiar with the security policy, information security compliance will become a norm and information breaches will be easily overcome. Ifinedo (2014) also referred to information security policy as guidelines, requirements, and rules prescribed by organizations to aim at employees' behaviors, thus improving information security compliance. Humaidi and Balakrishnan (2015) said that if employees of the library are properly aware of library policies in regards to information security and the associated benefit, they will willingly comply and duly follow predefined policies, thus security practices will become effective. Guo (2012) describes information security compliance as behavior which does not violate organization information security policies, takes security precautions and reporting any security incidents that exist in the library. The literature has documented that information security compliance protects and safeguard library's resources from potential security threats and breaches (Bulgurcu, Cavusoglu & Benbasat, 2010). Information security compliance in the library according to Donalds and Osei-Bryson (2017) is the protection and safeguard of libraries' collections from potential security threats and breaches. This implies that having information security policy duly comply with by library staffs, information security will be ensured. Information security compliance makes it certain that information security mechanisms will work effectively to prevent threats and reduce risks (Harris & Martin 2019). According to Park et al. (2017), information security compliance is the library employee's willingness to execute information policy requirement written in the library. Liu, Liang, and Xue (2021) say that information security compliance is the extent to which an Library personnel follows the information security policy appropriately to curb information breaches. The finding of the study revealed that information security awareness influenced information security compliance among library personnel in university libraries. Therefore, the management of the library should promote awareness programs in which library personnel should gain more knowledge that will assist them solve information security breaches. Ismail and Zainab (2013) said that to minimize the risk of information security breaches, the library needs to implement an information security plan or strategy with proper awareness on the part of the staff. This means that before staff can be required to be compliant with a security measure, they must first be made aware of the need and the process.

Rahman and Batcha (2020) said information security awareness is the degree of understanding of employees about the importance of information security and their responsibilities and acts to exercise sufficient levels of information security control. Singh and Margam (2018) defined information security awareness as a state where users in an organization are aware of and are ideally committed to their security mission (often expressed in organization security guidelines for employees). This means that information security awareness enhance library staff understanding about information security policy and their role, this can ensure effective information security practices in the library. Information security awareness can be defined as an employee's knowledge and understanding of the requirements prescribed in the organization's information security policy (ISP) and the aims of those requirements. According to Bulgurcu, Cavusoglu, and Benbasat (2010), information security awareness is an employee's knowledge of information security concepts and his or her consciousness of the organization's information security measures or plans. Much current literature has widely accepted that information security awareness as a key factor in contributing to a successful security strategy implementation (Spears & Barki, 2010; Siponen, & Vance 2010; Bulgurcu, Cavusoglu, & Benbasat, 2010). This implies that there is a positive and direct relationship between information security awareness and preventative action and thus improved security compliance. It was established that if library personnel are aware of the severity and susceptibility of information security threats, and are aware of the benefits of security-countermeasure which can help to protect the information resources holds by the library and promotes their works, information security breaches will become minimal. As rightly noted by Weeb et al., (2014) and Almindeel and Martins (2020) a properly planned and implemented information security awareness program through trainings curb the adverse effect created by information breaches. One of the key factors in successful information security compliance is the proper integration of "people" and "technology". When it comes to the issue of "people", this effect can be achieved through several mechanisms, one of which is the security awareness training of employees and technology which aid monitoring and dissemination of information (Bijlsma & Rutledge, 2020). However, adoption of technology has also made the library vulnerable to information security threat. Studies have also shown that threat against library collections is on the increase in a number of Nigerian university libraries. Such threat includes theft, mutilation, loose of books, tearing of textbooks and annotation in books margins that temper with the subject content of library collection, illegal borrowing of books, defacement, arson as a result of low information security compliance (Ofori et al. 2022, Gutpa & Madhusudhan, 2018;

Nweke, 2019). While many studies have examined information security awareness in different organizations, very few have considered the influence of information security awareness on information security compliance in university libraries. Therefore, this study assess the influence of information security awareness on information security compliance in university Libraries, South-West Nigeria.

Literature Review

Nigerian libraries are confronting so many problems ranging from pure funding, which hitherto affects other areas of library operations including the security of library information resources. Parsons et al. (2014) noted that library crime and vandalism is a serious and widespread problem in academic and public libraries, where damage to library materials, building, vehicles, equipment, furniture etc. could be recorded. Apart from this, theft, mutilation, loss of books, non-return of books, physical and verbal abuse, misuse of reading material, over borrowing, unauthorized borrowing, problem patron behavior, delinquent readership, misplacement, and illegal incidences also constitute vandalism in the library. For instance, the University of Port-Harcourt Library once announced the theft of 21 volumes of Lexicon Universal Encyclopedia and 10 volumes of World Book Dictionaries Ekere and Akor (2019) reported that the Law Library of the University of Abuja was attacked, and the Law Library suffered a severe blow to its collection from which 70 issues of Nigerian Weekly Law Reports, 49 volumes of Halsbury's Law of England, and 7 volumes of Encyclopedia of Islam were stolen from the library. In the case of the Olabisi Onabanjo University, 89 volumes of the Nigerian Weekly Law Reports were at one time stolen from the library. Similarly, a complete set of the 2003 edition of McGraw-Hill Encyclopedia of Science and Technology was stolen from the Federal University of Technology library, Akure.

Hassan, and Abdul-Qadir (2013) reported from the study carried out at Kano University of Science and Technology, Wudil, Kano State, Nigeria that the researcher during the interview segment with the circulation librarian gathered that 85.04% circulated books, 5.78% of reference books and in the serials unit, 9.18% items were mutilated, while 55% circulation books were stolen, and 30% serial items were also stolen. In their report, Gupta and Madhusudhan (2021) affirmed that new security measure will help to reduce the problem of stealing, mutilation, miss-shelving. Jagdish (2016) administered his study on the librarians of

seven universities and found that more than seventy percent of the librarians had faced theft, marring, and misplacement of resources in the libraries. The findings also revealed the disproportionate downloading of e-resources, theft, and mutilation of books and journals because of insufficient books, unavailability of required books, and students' financial condition. Akor (2013) identified the causes of book theft and mutilation in university libraries and how to restrain and care for the library's continuous utilization of information resources. The outcome of the analyzed data exhibited that the university library books were stolen and mutilated due to insufficient library materials, financial constraints, and selfishness on the part of library users. It was also revealed that various methods were adopted like tearing of book pages off, removing the book jacket cover, hiding books under their clothes, and their pockets for stealing and mutilating library documents. However, selecting, implementing and compliance to proper information security policies will help to established controls which will library bring down the risk to acceptable levels (Pecina, Estremera, Bilbao & Bilbao, 2011). Benedict, Onyeke, and Neeraj Kumar (2020) suggested measures to reduce the problems, which include tightening security at library entrances and exits. Nath and Deka (2020) said that library professionals cannot avoid and control information breaches without suitable security measures such as the application of CCTV, RFID, 3M Exit technologies and compliance to the policies can help the professionals to control and fix the security breaches. Nath and Dake further concluded that factors for encouraging illegal activities are due to poor security system. However, the library management should intensify effort to ensure compliance to security policy, which in turn enhance security system in the library.

Yerby and Floyd (2018) said that effective information security compliance cannot be implemented without an employees' awareness and training program to address policy, procedures, and tools. This means that information security compliance can only become effective when library personnel are aware and trained were necessary. Guimaraes (2021) also agreed that education of information security awareness plays a significant role in the overall level of security policy compliance in libraries. Adequate information security training is required to create and improve library staff awareness and behavior towards information security practices within the library (Albrechtsen & Hovden, 2010). Proper functionality of information security compliance solely depend on the level of security awareness created by library management which in turn leads to compliance on the part of employees or staff. This is in line with Siponen, Pahnla, and Mahmood (2010) who stated

that the effectiveness of information security practices can be achieved through promoting adequate information security awareness and constraining unacceptable information behavior among employees in the library. As rightly noted by Weeb et al., (2014) and Almindeel and Martins (2020) a properly planned and implemented information security awareness program through trainings curb the adverse effect created by information breaches.

Objective of the Study

The main objective of the study is to investigate the influence of information security awareness on information security compliance in university Libraries South-West Nigeria.

The specific objectives are to;

1. find out the information security measures available in the university libraries, South-West Nigeria.
2. ascertain the level of information security compliance among library personnel in university libraries South-West, Nigeria?
3. determine the level of information security awareness among library personnel in university libraries South-West, Nigeria?
4. ascertain the influence of information security awareness on information security compliance in university Libraries in South-West, Nigeria

Research Question

The study aim to answer the following research questions:

1. What are the security measures available in university libraries South-West, Nigeria?
2. What is the level of information security compliance among library personnel in university library South-West, Nigeria?
3. What is the level of information security awareness among library personal in university library South-West, Nigeria?

Research Hypothesis

To further investigate the problems, the following research hypotheses were proposed and tested by the researcher at 0.05 level of significance:

H₀₁: Information security awareness has no significant influence on information security compliance in university Libraries South-west, Nigeria.

Methodology

The study employed the survey research design. The population for this study is five hundred and thirty three (533). Multi-Stage random sampling technique was used to derive the sample size of 223 Library personnel. A structured questionnaire was used to collect data from 223 library personnel (professional and Para-professional Librarian) in university libraries in South-West, Nigeria. Out of 223 copies of questionnaire distributed, 180 (81.7%) were found valid for analysis. The data was analyzed with descriptive analysis namely frequency count, percentage, mean and standard deviation was used to analyze research questions.

Analysis and Results

Demographic Data

Findings from this study indicate that the highest respondents were from UNILAG and university of Ibadan with (11.1%) while Hallmark and Caleb Universities had the least respondents with two (0.5%) responses. This indicates that UNILAG, Obafemi Awolowo University and University of Ibadan have more library personnel than other universities. It could be inferred from this result that government owned universities have more library personnel than private universities. Further analyses also revealed that the highest number of respondents belong to the library officers with (32.2%) while Deputy Librarian are the least of the respondents with (5.6%). This means that in university libraries, library officers, librarian II and senior librarians dominate library personnel in the study locale, while the number of deputy librarians and librarian I are very low. Gender distribution of library personnel showed that there are more male library personnel (55.6%) than female (44.4%). Furthermore, the result revealed that the highest percentage of the respondents fell within the age range of 41-50 (41.1%), while the least frequency fell within the age range of 20-30 years. In addition, distribution by qualification showed that most of the respondents are PhD holders with (38.9%) while Diploma certificate holders recorded the least with (8.9%). Also, the result showed that (60.0%) of the respondents have spent 20-30 years in service while just (1) of the respondents have spent 31 years and above.

Research Question one: what is the level of information security measures available in University libraries in South-West, Nigeria?

Table 1: Information Security Measures Available in University Library in South-West, Nigeria

S/N	Information Measures Available	Security measure	Highly Available	Available	Slightly Available	Not Available	Mean	Std. Dev.
Manual Security measure Available in my Library								
1.	The presence of personnel	security	92(51.1%)	88(48.9%)	0(0%)	0(0%)	1.49	0.50
2.	Security locks		147(81.7%)	33(18.3%)	0(0%)	0(0%)	1.18	0.39
3.	Visible shelf monitoring	which enhance	128(71.1%)	26(30.3%)	2(1.6%)	0(0%)	1.29	0.46
4.	Window security lock to prevent theft		165(91.7%)	11(6.1%)	4(2.2%)	0(0%)	1.11	0.37
5.	I.D card to facilitate access	authorized	159(88.3%)	21(11.7%)	0(0%)	0(0%)	1.12	0.32
6.	Installation of Grills on windows to prevent theft		20(11.1%)	15(8.3%)	62(34.4%)	83(46.1%)	3.16	0.99
7.	Books signed by every user on a daily basis		105(58.3%)	31(17.2%)	35(19.4%)	9(5.0%)	1.71	0.95
Average Mean							1.58	
Electronic Security Measures Available								
8.	Electronic access control for information security		13(7.2%)	18(10.0%)	116(64.4%)	33(18.3%)	2.94	0.76
9.	Video Surveillance such as CCTV Cameras		15(8.3%)	19(10.6%)	141(78.3%)	5(2.8%)	2.76	0.64
10.	Biometric technology to ensure authorized access to information resources		10(5.6%)	13(7.2%)	125(69.4%)	32(17.8%)	2.99	0.69
11.	Alarm system installed at the entrance to detect unauthorized removal of library material (theft)		7(3.9%)	33(18.3%)	76(42.2%)	64(35.6%)	3.09	0.83
12.	Electromagnetic installation to protect information resources	systems to protect	149(82.8%)	21(11.7%)	10(5.6%)	0(0%)	1.23	0.54
13.	Radio frequency identification solution for detecting information breaches		33(18.3%)	38(21.1%)	53(29.4%)	56(31.1%)	2.73	1.09
Average Mean							2.62	
Overall Grand Mean							2.06	

Decision Rule: if mean is ≤ 1.49 = Not Available, 1.5 – 2.49 = Slightly Available, 2.5 – 3.49 = Available, 3.5 – 4.49 = Highly Available

The information security measures available in university libraries in South-west, Nigeria revealed that the information security measures are slightly available. The result also indicate that electronic information security measures are available with ($\bar{x}=2.62$) than the manual security measures available with ($\bar{x}=1.58$). Alarm system installed at the entrance to detect unauthorized removal of library material, biometric technology to ensure authorized access to information resources, electronic access control for information security, surveillance such as CCTV Cameras are available while security locks and window locks are not available

Research Question Two: What is the level of information security Compliance among library personnel in university libraries in South-West, Nigeria?

Table 2: Level of Information Security Compliance among library personnel in university libraries

S/N	Information Security Compliance	Very High level	High Level	Low Level	Very Low Level	Mean	Std. Dev.
Manual Security Compliance							
1.	I ensure that the security personnel are always present at strategic areas to ensure the safety of library information resources to a	17(9.4%)	19(10.6%)	80(44.4%)	64(35.6%)	3.06	0.92
2.	I always ensure that the security locks in my library are put to use to a	94(52.2%)	51(28.3%)	25(13.9%)	10(5.6%)	1.73	0.90
3.	I ensure that information resources in my library are safeguarded, window locks are always fixed to a	169(93.9%)	9(5.0%)	2(1.1%)	0(0%)	1.07	0.30
4.	I ensure that shelves are visibly arranged to enable monitoring to a	129(71.7%)	51(28.3%)	0(0%)	0(0%)	1.28	0.45
5.	I ensure that library users present their I.D card to prevent unauthorized access to information resources to a	15(8.3%)	17(9.4%)	119(66.1%)	29(16.1%)	2.90	0.76
6.	I always ensure library security clearance procedure for graduating students are duly followed to a	71(39.4%)	79(43.9%)	26(14.4%)	4(2.2%)	1.79	0.77
Average Mean						1.97	
Electronic Security Compliance							
7.	I use book theft sensor system to avoid information breaches to a	17(9.4%)	43(23.9%)	82(45.6%)	38(21.1%)	2.78	0.89

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8.	I use video contents from video surveillance such as CCTV cameras for information security to a	13(7.2%)	18(10.0%)	71(39.4%)	78(43.3%)	3.19	0.89
9.	I use radio frequency identification solution to detect information beaches to a	13(7.2%)	15(8.3%)	83(46.1%)	69(38.3%)	3.16	0.86
10.	I use electronic access control for information security to a	31(17.2%)	22(12.2%)	59(32.8%)	68(37.8%)	2.91	1.09
11.	I use biometric technology to prevent unauthorized access to information to a	69(38.3%)	98(54.4%)	8(4.4%)	5(2.8%)	1.72	0.68
12.	I use alarm system installed to detect unauthorized removal of library materials to	104(57.8%)	72(40.0%)	4(2.2%)	0(0%)	1.44	0.54
Average Mean						2.53	
Overall Mean						2.25	

Decision Rule: if mean is ≤ 1.49 = Very Low Level, $1.5 - 2.49$ = Low level, $2.5 - 3.49$ = High Level, $3.5 - 4.49$ = Very High Level

The level of information security compliance among library personnel in university library in South-West Nigeria revealed that the level of information security compliance in university libraries in South-West Nigeria is low. The result also indicates that there is a low level of policy compliance to ensuring that information resources in my library are safeguarded, window locks are always fixed, and shelves are visibly arranged to enable monitoring

Research Question Three: What is the level of information security awareness among library personnel in University libraries in South-west, Nigeria.

Table 3: Level of information Security Awareness among library personnel in university libraries

S/N	Information Awareness	Security	Very High	High	Low	Very Low	Mean	Std. Dev.
1.	My idea about the guideline regarding Information Security of my Library is to a	69(38.3%)	98(54.4%)	8(4.4%)	5(2.8%)	1.72	0.68	
2.	My understanding of the rules and regulations prescribed by the information security policy of my library is to a	71(39.4%)	79(43.9%)	26(14.4%)	4(2.2%)	1.44	0.54	
3.	My knowledge about security responsibilities as prescribed in the information security policy to enhance the security of my library is to a	73(40.6%)	102(56.7%)	5(2.8%)	0(0%)	1.62	0.54	
4.	My understanding to operate security technology such as	66(36.7%)	84(46.7%)	25(13.9%)	5(2.8%)	1.83	0.77	

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CCTV is to a									
5	My understanding about phishing attack is to a	42(23.3%)	16(8.9%)	119(66.1%)	3(1.7%)	2.46	0.87		
6.	My knowledge on what to do if theft occur in the library is to a	116(64.4%)	55(30.6%)	9(5.0%)	0(0%)	1.41	0.59		
7.	My understanding about the danger behind sharing password is to a	156(86.7%)	17(9.4%)	7(3.9%)	0(0%)	1.17	0.47		
8.	My understanding if the library computer is infected with a virus is to a	28(15.6%)	15(8.3%)	96(53.3%)	41(22.8%)	2.83	0.95		
9.	My understanding about antivirus software usage on library computer is to a	27(15.0%)	39(21.7%)	47(26.1%)	67(37.2%)	2.86	1.08		
10.	My capability to detected information breaches in the library is to a	103(57.2%)	77(42.8%)	0(0%)	0(0%)	1.43	0.50		
Overall Grand Mean						1.87			

Decision Rule: if mean is ≤ 1.49 = Very Low Level, $1.5 - 2.49$ = Low level, $2.5 - 3.49$ = High Level, $3.5 - 4.49$ = Very High Level

The level of information security awareness among library personnel in university library in South-West Nigeria is low. The result also indicate that library personnel understanding about antivirus software usage on library computer, the understanding if the library computer is infected with a virus, and there understanding to operate security technology such as CCTV is moderately high. Library personnel has a low level of information security awareness about the danger behind sharing password and knowledge on what to do if theft occur in the library. This could be the one of the reasons while information breaches persist in university libraries in South-West, Nigeria

Hypothesis Testing and Interpretation

One hypothesis was formulated and tested using simple linear regressions. For simple linear regressions, the R^2 was used as the coefficient of determination and the t value was used as the test statistics. The hypothesis and result is posted in the table that follows

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Restatement of Hypothesis One

H₀1: Information security awareness has no significant influence on information security compliance in university libraries in south-west, Nigeria.

Table 4: Simple Regression between information Security awareness and information security compliance in university libraries in south-west, Nigeria.

Variables	B	Std. Error	Beta (β)	T	P	R ²	F	Df	P
(Constant)	0.437	.123		3.549	0.000	0.305	78.07	1	0.000
Information Security Awareness	.363	.041	0.552	8.836	0.000				
Dependent Variable: Information security Policy Compliance									

Source: Researchers' Field Survey, 2022

Table 4.5 shows the simple regression analysis result for information security awareness and information security compliance in university libraries in south-west, Nigeria. The result shows that information security awareness ($\beta = 0.363$, $t = 8.836$, $p < 0.05$) has a strong positive and significant relationship on information security compliance in university libraries in south-west, Nigeria. The R value 0.552 indicates that information security awareness has a strong positive relationship with information security policy compliance. The $R^2 = 0.305$ indicates that about 30.5% variation that occur in the level of information security policy compliances among library personnel in university libraries south-west, Nigeria can be accounted for by the level of information security awareness of library personnel while the remaining 69.5% changes occur is accounted for by other external factors not captured in the model. Hence, the null hypothesis was rejected.

Discussion of Findings

The findings revealed that information security measures put in place to curb information breaches in university libraries in South-West, Nigeria are slightly available. This implies that most security measure in relation to electronic security measures such as biometric technology to ensure authorized access to information resources, electronic access control for

information security, video surveillance such as CCTV Cameras, Radio frequency identification solution for detecting information breaches, alarm system installed at the entrance to detect unauthorized removal of library material (theft) are slightly available in most university libraries. This the findings of this study is in agreement with Nath and Dekka (2020) who stated that information security available in University library is moderately available especially the manual security measures put in place to curb security breaches in the library. The findings also corroborate with Akor (2013) who revealed that manual security are implemented more than the electronic security because of financial challenges faced by the university libraries. Furthermore, Ofori et al. (2022) also supported this finding in his study highlighting theft and arson as threats to collections and proposed that libraries management formulate a planned security measure to protect their collections. Ofori et al. (2022) also identified physical weaknesses in libraries in terms of unsecured windows, faulty emergency exits, unstaffed computer rooms, poor policies and procedures, lack of security plans, poor security points (exits, loading areas, windows, special collections) inadequate loans, and renewal periods, lack of security manuals and poor signage as some of the causes of security breaches.

Concerning the level of information security compliance by library personnel, evidence from the findings reveals that the level of information security compliance is low. This implies that library personnel does not comply with information security policy in regards to ensuring the security personnel are always present at strategic areas to ensure the safety of library information resources, to ensuring that the security lock in my library are put to use, ensure that information resources in my library are safeguarded, window locks, that library users present their I.D card to prevent unauthorized access to information resources, the use of book theft sensor system to avoid information breaches, use video contents from video surveillance such as CCTV cameras for information security, use radio frequency identification solution to detect information beaches, use electronic access control for information security, I use biometric technology to prevent unauthorized access to information. This findings is supported by Jagadish and Sarasvathy (2016) reported low information security practices as threat such as underlining and highlighting text in library books, tearing and or removing pages of books, and annotating in books margins can temper with the subject content of library collection etc., thereby making it unusable to users. In a study of Osunrinde and Adetunla (2018), factors like theft, mutilation, loss of books, non-return of books, physical and verbal abuse, misuse of reading material, over borrowing,

unauthorized borrowing, problem patron behavior, delinquent readership, misplacement, and illegal incidences constitute information security breaches in the library. The existence of these factors in the library indicates poor information security practices. In a similar vein Chiderah and Iroze (2021) reported that the University of Port-Harcourt Library once announced the theft of 21 volumes of Lexicon Universal Encyclopedia and 10 volumes of World Book Dictionaries, this indicate the a low level of their information security practices. Jagdish (2016) administered his study on the librarians of seven universities and found that more than seventy percent of the librarians had faced theft, marring, and misplacement of resources in the libraries. The findings also revealed the disproportionate downloading of e-resources, theft, and mutilation of books and journals because of insufficient books, unavailability of required books, and students' financial condition.

On level of information security awareness by respondents, findings revealed that library personnel in University libraries possess low level of information security awareness. The findings is in support by Othman et al. (2019) who recorded a low level of information security awareness and suggested that the management should organized a continuous awareness training program in other to increase library personnel level of security awareness

Furthermore, the test of hypothesis revealed a positive and significant influence between information security awareness and information security compliance among library personnel in University libraries in south-west, Nigeria. This implies that an increase in information security awareness will lead to a rise in information security compliance among library personnel in university library in south-west, Nigeria. This position was supported by Guimaraes (2021) also agreed that education of information security awareness plays a significant role in the overall level of security policy compliance in libraries. Adequate information security training is required to create and improve library staff awareness and behavior towards information security practices within the library (Albrechtsen & Hovden, 2010). Proper functionality of information security compliance solely depend on the level of security awareness created by library management which in turn leads to compliance on the part of employees or staff. This is in line with Siponen, Pahnla, and Mahmood (2010) who stated that the effectiveness of information security practices can be achieved through promoting adequate information security awareness and constraining unacceptable information behavior among employees in the library.

Conclusion and Recommendation

The study which examined the influence of information security awareness on Information security compliance in university libraries in South-West, Nigeria has succeeded in establishing the fact that information security compliance of the respondents was indeed low as most of them scored below the criterion mean, likewise the information security awareness of library personnel. In addition, information security awareness was found to have positive and significant influence on the information security compliance of library personnel in university libraries. Consequently, training that foster information security awareness should be maintained.

University libraries should strive to update library personnel in other to curb information breaches in university libraries. Seeing the importance of information security in the library, attention should be focus on unveiling those factors that can boost information security compliance of library personnel. The study also recommend that the management of the library should promote awareness programs in which library personnel should gain more knowledge that will assist them solve information security breaches.

Reference

- Albrechtsen, E., & Hovden, J. (2010). Improving information security awareness and behaviour through dialogue, participation and collective reflection. An intervention study. *Computers & Security*, 29(4), 432-445
- AlHogail, A. (2015). Design and validation of information security culture framework. *Computers in human behavior*, 49, 567-575.
- AlMindeel, R., & Martins, J. T. (2020). Information security awareness in a developing country context: insights from the government sector in Saudi Arabia. *Information Technology & People*.
- AlMindeel, R., & Martins, J. T. (2020). Information security awareness in a developing country context: insights from the government sector in Saudi Arabia. *Information Technology & People*.
- Benedict, A., Onyeke, O. E., & Niyi, A. M. (2020). Strategies and Policies for Disaster Management in Academic Libraries: a Case Study Of Kaduna State College Of Education Library, Gidan-Waya. *Strategies*, 3, 14-2020.
- Bijlsma, A., & Rutledge, L. W. (2020). Information Security Awareness of bank employees: how differences between headquarter and branch employees affect ISA program design.
- Bulgurcu, B., Cavusoglu, H., & Benbasat, I. (2010). Information security policy compliance: an empirical study of rationality-based beliefs and information security awareness. *MIS quarterly*, 523-548.
- Chiderah, U., & Iroze, P. C. (2021). Level of disaster management preparedness by library staff in academic libraries: The experience of Academic Libraries in South Eastern State, Nigeria. *Library Philosophy and Practice*, 1A-23
- Ekere, J. N., & Akor, P. U. (2019). The use of ICT for security and theft prevention in two university libraries in Nigeria. *Library Philosophy and Practice*, 1-40
- Guimaraes, J. (2021). Information Security Awareness: Learning for Effectiveness (Doctoral dissertation, St. Thomas University).

- Guo, K. H., & Yuan, Y. (2012). The Effects of Multilevel Sanctions on Information Security Violations: A Mediating Model. *Information & management*, 49(6), 320-326.
- Gupta, P., & Madhusudhan, M. (2021). RFID Technology as a Potential Electronic Security System: An Assessment from Twenty-four Academic Libraries of India.
- Harris, M. A., & Martin, R. (2019). Promoting cybersecurity compliance. In *Cybersecurity education for awareness and compliance* (54-71).
- Humaidi, N., & Balakrishnan, V. (2015). Leadership styles and information security compliance behavior: The mediator effect of information security awareness. *International Journal of Information and Education Technology*, 5(4), 311.
- Ifinedo, P. (2014). Information systems security policy compliance: An empirical study of the effects of socialization, influence, and cognition. *Information & Management*, 51(1), 69-79.
- Ismail, R., & Zainab, A. N. (2013). Information systems security in special and public libraries: an assessment of status.
- Jagadish, M. V., & Sarasvathy, P. (2016). What Librarian's Think of Theft, Mutilation and Misplacement of Library Resources? A Study of Karnataka University Libraries. *International Research: Journal of Library and Information Science*, 6(4).
- Jama, A. Y., Siraj, M. M., & Kadir, R. (2014, August). Towards Metamodel-based Approach for Information Security Awareness Management. In *2014 International symposium on biometrics and security technologies (ISBAST)* (pp. 316-321).
- Liu, C., Liang, H., Wang, N., & Xue, Y. (2021). Ensuring employees' information security policy compliance by carrot and stick: the moderating roles of organizational commitment and gender. *Information Technology & People*.
- Marett, K., & Barnett, T. (2021). Information security practices in small-to-medium sized businesses: a hotspot analysis. In *Research Anthology on Small Business Strategies for Success and Survival* (pp. 576-596). IGI Global.
- Nath, R., & Deka, D. (2020). Practice of Security Systems in University Libraries of Assam

- Nieles, M., Dempsey, K., & Pillitteri, V. Y. (2017). An introduction to information security. *NIST special publication*, 800(12), 101.
- Nweke, A. C. (2019). Effect of Theft And Mutilation on The Use of Library Collection in an Academic Library in Lagos State. *Library Philosophy and Practice*, 0_1-15.
- Ofori, K. S., Anyigba, H., Ampong, G. O. A., Omoregie, O. K., Nyamadi, M., & Fianu, E. (2022). Factors influencing information security policy compliance behavior. *In Research Anthology on Business Aspects of Cybersecurity* (pp. 213-232). IGI Global.
- Ofori, K. S., Anyigba, H., Ampong, G. O. A., Omoregie, O. K., Nyamadi, M., & Fianu, E. (2022). Factors influencing information security policy compliance behavior. *In Research Anthology on Business Aspects of Cybersecurity* (pp. 213-232). IGI Global.
- Osunrinde, A. A., & Adetunla, B. O. G. (2018). Security Control and Disaster Preparedness as Panacea for Preservation and Conservation Practices in University Libraries in South-West, Nigeria. *International Research: Journal of Library and Information Science*, 8(2).
- Othman, M. F. I., Alqahtani, F., Bari, M. A., Pee, A. N. C., Rahim, Y. A., & Sulaiman, H. A. (2019). The level of information security awareness among academic staff in IHL. *Journal of Telecommunication, Electronic and Computer Engineering (JTEC)*, 10(2-5), 65-68.
- Park, S. K., Lee, S. H., Kim, T. Y., Jun, H. J., & Kim, T. S. (2017). A performance evaluation of information security training in public sector. *Journal of Computer Virology and Hacking Techniques*, 13(4), 289-296
- Parsons, K., McCormac, A., Butavicius, M., Pattinson, M., & Jerram, C. (2014). Determining employee awareness using the human aspects of information security questionnaire (HAIS-Q). *Computers & security*, 42, 165-176.
- Pecina, K., Estremera, R., Bilbao, A., & Bilbao, E. (2011). Physical and Logical Security management organization model based on ISO 31000 and ISO 27001. *In 2011 Carnahan Conference on Security Technology* (pp. 1-5).

- Rahman, A., &Batcha, M. S. (2020). Knowledge and Awareness of Web-based Services among Library Professionals in JMI Library
- Singh, V., &Margam, M. (2018). Information Security Measures of Libraries of Central Universities of Delhi: A Study. *DESIDOC Journal of Library & Information Technology*, 38(2).
- Siponen, M., & Vance, A. (2010). Neutralization: New insights into the problem of employee information systems security policy violations. *MIS quarterly*, 487-502.
- Siponen, M., Pahnala, S., & Mahmood, M. A. (2010). Compliance with information security policies: An empirical investigation. *Computer*, 43(2), 64-71.
- Song, H. H. (2020). Testing and evaluation system for cloud computing information security products. *Procedia Computer Science*, 166, 84-87
- Spears, J. L., &Barki, H. (2010).User participation in information systems security risk management. *MISquarterly*, 503-522.
- Surwade, Y. P., &Patil, H. J. (2019).Information Security. *E-Journal of Library and Information Science*, 458-466.
- Webb, J., Ahmad, A., Maynard, S. B., & Shanks, G. (2014).A situation awareness model for information security risk management. *Computers & security*, 44, 1-15.
- Yerby, J., & Floyd, K. (2018). Faculty and staff information security awareness and behaviors. In *Journal of The Colloquium for Information Systems Security Education*,6(1)23-23.