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Cyber Security and Computational Laws in Nigerian Banking System

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Abstract: Banking system is central nervous system of any nation and cyber security and computational law is a major problem of banking system. The main aim of this research work is to examine the efficiency of cyber security and computational laws in Nigerian banking system, in this survey research method were used both primary and secondary data were used which includes; questionnaire, interview and internet were used in this work the data were analyzed using correlation and regression technique and Chi-square were used to test the hypothesis. From the Chi-square (x^2) distribution table, the degree of freedom 3 under the level of significance (0.05) = 7.8 15. Since the x^2 calculated is greater than x^2 statistical value i.e. 9.389>7.815, the null hypothesis is rejected and the alternative hypothesis is accepted. This means there is an efficiency of cyber security law in the Nigerian banking system.

Keywords: Cyber Security, Computational Law, Banking System

1. Introduction

The seed of banking system was first planted in Nigeria in 1892 when the African Banking cooperation (ABC) commenced the banking activities in Lagos a year later followed by British Bank of West Africa (BBWA). However, Conventional banking system started in Nigeria in 1952. during the banks failure when many national leaders advocate the establishment of the Central Bank of Nigeria to supervises banks and also instrument for promoting the economic development of the country. Since then, the industry has witnessed a lot of regulatory and institutional advances to both the CBN acts and the Banking Acts with a series of reforms resulted in the consolidation of 80 commercial banks into 24 stronger megabanks. This has provide a bedrock for the nation's banks bringing them in the league of the fastest-growing banks in Africa and in the world, attracting an estimated 34.8% of the net funds inflow into Africa between 2004-2007 [1].

In the bid to catch up with global developments and improve the quality of their service delivery, Nigerian banks have no doubt invested much on technology; and have widely adopted electronic and telecommunication networks for delivering a wide range of value added products and services. The financial system is the central nervous system of every economy, especially a banking sector. It comprises a number of separate but inter-related components all of which are essential to its effective and efficient functioning. However, the consequences of security problems in banking sector in Nigeria are paramount. Are there computational laws in Nigeria banking system? Who are responsible to implement the law? Do customers know about computational law? Is Cybercrime a Challenge? despite the implementation of current measures of addressing banking fraud, and the existing regulations on internet banking, internet fraud has remained ever so pervasive in Nigeria Security challenges in Nigerian banking system are high, largely due to poor internet and computer security. The main aim of this work is to examine if there exist at all any computational laws as used in Nigerian banking system, and also seeing how they can prevent, or better still, reduce to the barest minimum, the incidences of fraud in Nigerian banks.

Cyber security is the protection of digital information and the infrastructure on which it resides. Recently a lot of research has been conducted on computational laws and cyber security related to banking system as in [2-9]. In [10] believed that cyber technology has bring about a lot of profit to specifically financial institutions and cyber-attack also

poses intensive threat to the same institutions the study recommend that there is need for cyber security audit, cyber security training, cyber security assessment and tightening security. According to [15] the cost of cybercrime incident is 3 trillion in 2015 and projected to be 6 trillion US dollars by 2021. In [11] stated that Mexico is rank as a second in Latin America the most cyber-attacks with approximately 10 million victims in 2014. According to [12] stated that Indian Banks in May, 2017 had to shut down their ATMs in order to counter threat from ransom ware. Qatar National cyber security strategy in 2014 reported that Middle East and North Africa received the third highest volume of SMS spam (1.7 billion SMS spam text per month between November 2013 and March 2014. According to [13] malicious cyber activity cost the U.S. economy between $57 billion and $109 billion in 2016.

In Nigeria [14] released a risk based cyber security frame work and guidelines for deposit money banks and payment service providers the framework provides a risk-based approach to managing cyber security risk. The document comprises six parts: Cyber security Governance and Oversight, Cyber security Risk Management System, Cyber Resilience Assessment, Cyber security Operational Resilience, Cyber-Threat Intelligence and Metrics, Monitoring & Reporting.

In Nigerian context Regarding computational laws and cybercrime provisions exist in the following acts:

Economic and Financial Crimes Commission Establishment act (2015).

The Money Laundering Act 1995.

The Money Laundering (Provision) Act 2004.

The Advance Free Fraud and other Fraud Related offence Act 1995.

The Failed Banks (Recovery of Debts) and Financial Malpractices in Banks Act 1994.

The Banks and other Financial Institution Act 1991; and Miscellaneous offence Act.

Many cyber security frame work are proposed for the sustainability of information systems, financial institutions, businesses and government agencies as illustrated by [16] in the figure below.

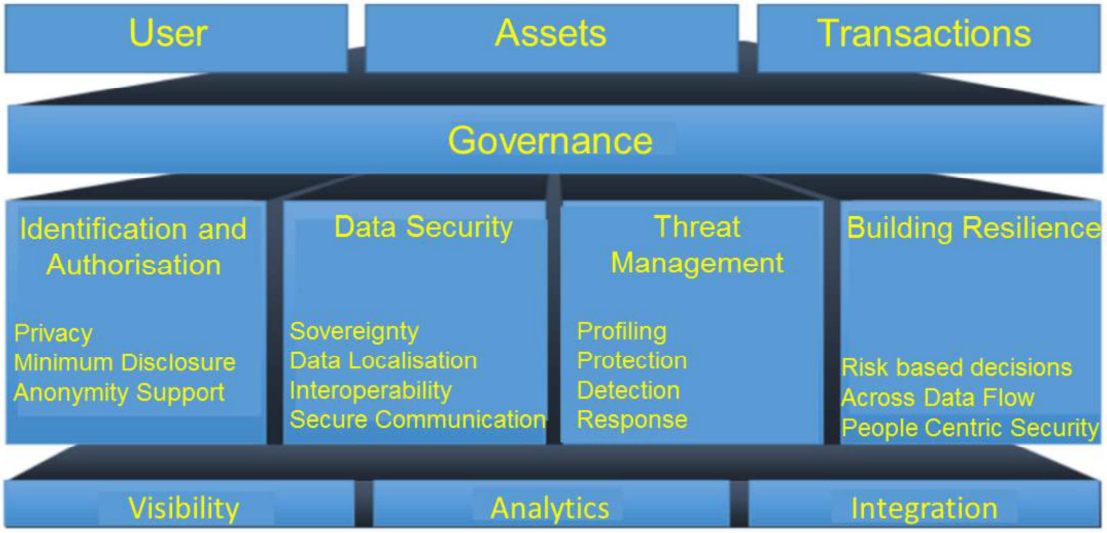

Figure 1. *Cyber security framework.*

2. Method

It is a well-known fact that almost all over the world, to obtain a good result of the research work depends on the instrument used for the data collection. In this survey research therefore, the instruments used are Questionnaires, Oral Interviews and Observations. In this research work the statistical technique used to analyze the data are correlation and regression analysis. Due to the nature of our variable in this research correlation and regression analysis is the best alternative.

3. Hypothesis

The null hypothesis (H0): The Efficiency of banking services to customer is not achieved through the use cyber security laws in Nigeria.

The alternative hypothesis (H1): The Efficiency of banking services to customers is achieved through the use cyber security laws in Nigeria.

The alternative hypothesis (Ha): The Efficiency of banking services to customers is achieved through the use computational laws in Nigeria.

The null hypothesis (Hb): The Efficiency of banking services to customers is achieved through the use computational laws in Nigeria.

4. Results and Discussion

The data collected in this research work were presented in tabular form as shown below; One hundred and twenty (120) questionnaires were distributed and only 82 have returned which is going to use in this research work.

Table 1. *Age of the respondents.*

Year	Respondents	Percentage
18-29	24	29.27%
30-39	25	30.49%
40-49	19	23.17%
50-59	9	10.98%
60 and above	5	6.09%
Total	82	100%

From the table 1 above the highest percentage of responses between the age of 30–39 years which has 25 people that project up to 30.49%, 18–29 years is 24 people which project to 29.27%, 40-49 years is 19 people which is 23.17% while 50–59 years had 9 people representing 10.98% and 60 and above had 5 people which representing 6.09 as illustrate in the bar chart below.

Table 2. *Occupation of the respondents.*

Year	Respondents	Percentage
Banker	20	24.39%
Civil servant	34	41.46%
Military/Paramilitary	15	18.29%
Others	13	15.85%
Total	82	100%

From the table 2 above the highest percentage of responses where civil servants and it is 34 people which is 41.46%, Bankers are 20 people which is representing 24.39%, Military/Paramilitary are 15 people which is representing 18.29% while others are 13 respondents which is representing 15.58%.

4.1. Correlation and Regression Analysis

The data was analyzed using the Pearson's product moment correlation denoted by letter "r" which measure the linear relationship between the two variables from the data collected. From the data collected, the Yes variables are represented by X. and No variable are represented as Y. Below is the person's product formula that is used:

$$r=\frac{n\Sigma xy-\Sigma x\Sigma y}{\sqrt{(n\Sigma x^2-(\Sigma x)^2(n\Sigma y^2-(\Sigma y)^2}} \quad (1)$$

Where: n = number of pairs of value.
r = Pearson's coefficient of correlation.

Table 3. *The efficiency of cyber security and computational law in Nigerian banking system.*

X	Y	XY	X^2	Y^2
18	0	0	324	0
3	15	45	9	225
18	0	0	324	0
18	0	0	324	0
18	0	0	324	0
18	0	0	324	0
18	0	0	324	0
18	0	0	324	0
5	13	65	25	169
18	0	0	324	0
18	0	0	324	0
18	0	0	324	0
18	0	0	324	0
206	28	110	3598	394

From the table 3 above Cyber security and computational laws in Nigerian banking system is the independent variable (x) while the efficiency of security and computational laws in the Nigerian banking system is the dependent variable (y).

From equation (1) above:

$$r=\frac{13\times110\times-206\times28}{\sqrt{(13\times3598-42436)(13\times394-784)}}$$

$$r=\frac{14030-5768}{\sqrt{(4338)(4338)}}$$

$$r=\frac{-4338}{\sqrt{18818244}}$$

$$r=\frac{-4338}{4338}$$

$$r = -1$$

4.2. Interpretation of Findings

There is strong negative relationship that exists between the security and computational laws in the banking system and the efficiency of security and computational laws in Nigerian banking system, which means there is increase in the use of cyber security and computational laws in Nigerian banking system.

4.3. Hypotheses Test and Results

Chi-square was used to test the hypotheses. The interval estimate was used and it specifies a range of values within whose limits can assert with some measure of certainly where the value being estimated lie. This range of value is called confidence interval.

The level of significant used is 5% 0.05.

4.4. Testing of Hypothesis One

The first hypothesis is stated as:

The null hypothesis (H_a): The Efficiency of banking services to customer is not achieved through the use cyber security laws in Nigeria.

The alternative hypothesis (H_b): The Efficiency of banking services to customer is achieved through the use cyber security laws in Nigeria.

In testing this hypothesis, the study used the responses from Question 1 to 6. Four Questions out of the six were selected at random for testing the hypothesis.

Table 4. *The efficiency of cyber security in Nigerian banking system.*

Variables	Q1	Q4	Q2	Q7	Total
Yes	18	18	15	18	69
No	0	0	3	0	3
Total	18	18	18	18	72

From the table 4 above, degree of freedom is: d. f = (r–1) (c–1).

Where: r = number of raw.

C = number of column.

The formula used is?

$$X2-text=\frac{\Sigma(0-E)^2}{E} \quad (2)$$

Where: 0 = observed frequency.

E = Expected frequency.

Therefore, d. f = (4–1) (2–1) = (3) (1).

Expected Frequency

The expected frequency (E) is calculated by multiplying total column by the total raw and divided by the total observation.

Calculation of (E) for "Yes" is:

$$E = 18 \times 69 = 1242/72 = 17.25$$

For "No" is:

$$E = 18 \times 3/72 = 54/72 = 0.75$$

Table 5. *The expected frequency distribution table.*

X	Y	XY	X^2	Y^2
18	17.25	0.75	0.5265	0.333
18	17.25	0.75	0.5265	0.033
15	17.25	-2.25	5.0625	0.293
18	17.25	0.75	0.5625	0.033
0	0.75	-0.75	0.5625	0.75
0	0.75	-0.75	0.5625	0.75
3	0.75	2.25	5.0625	0.75
0	0.75	-0.75	0.5625	0.75

The table 5 above shows the computed value of $x^2 = 9.389$. From the Chi-square (x^2) distribution table, the degree of freedom 3 under the level of significance (0.05) = 7.8 15. Since the x^2 calculated is greater than x^2 statistical value i.e. 9.389>7.815, the null hypothesis is rejected and the alternative hypothesis is accepted. This means there is an efficiency of cyber security law in the Nigerian banking system.

4.5. Testing of Hypothesis Two

The second hypothesis is stated as:

The null hypothesis (H_0): The Efficiency of banking services to customer is not achieved through the use computational laws in Nigeria.

The alternative hypothesis (H_1): The Efficiency of banking services to customers is achieved through the use computational laws in Nigeria.

The aim of this hypothesis is to establish a variation between the achievement or non-achievement efficient services to customers through the use of computational laws in Nigerian banking system. In testing this hypothesis, the study used the responses from Question 7, 6, 13, 9 and 11.

Chi-square technique was used to test this hypothesis.

The formula is:

$$x^2\text{–test} \quad (3)$$

Where: 0 = Observed frequency.

E = Expected frequency.

Determination of degree of freedom (d. f), the following formula is used:

$$\text{d. f} = (r–1)\ (C–l)$$

Where: r = number of raw.

c = number of column.

Hypothesis on The Efficiency of banking services to customers is achieved through the use computational laws in Nigeria.

Table 6. *The efficiency of cyber security in Nigerian banking system.*

Variables	Q7	Q8	Q9	Q11	Q13	Total
Yes	18	18	5	18	18	**77**
No	0	0	13	0	0	13
Total	18	18	18	18	18	

From the table 6 above, degree of freedom is:

$$\text{d. f} = (r–1)\ (c–1) = (4)\ (1) = 4 \quad (4)$$

The level of significant is 5% = 0.05.

Expected Frequency

The expected frequency (E) is calculated below:

For "Yes":

$$E = l8 \times 77/90 = 15.4$$

The expected frequency for "yes" is 15.4.

For "No" = 18 × 13/90 = 234/90 = 2.6.

The expected frequency for "No" is 2.6.

Using x^2–test is computed as shown below;

Table 7. *The efficiency of cyber security in Nigerian banking system.*

X	Y	XY	X^2	Y^2
18	15.4	2.6	6.76	0.439
18	15.4	2.6	6.76	0.439
5	15.4	-10.4	108.16	7.023
18	15.4	2.6	6.76	0.439
18	15.4	2.6	6.76	0.439
0	2.6	-2.6	6.76	2.6
0	2.6	-2.6	6.76	2.6
13	2.6	10.4	108.16	41.6
0	2.6	-2.6	6.76	2.6
0	2.6	-2.6	6.76	2.6

The table 7 above shows the computed value of $x^2 = 60.78$.

From the Chi- square (x^2) distribution table, the level of significant (0.05) under d. f 4 = 9.488.

5. Conclusion

The first hypothesis sought to test the Efficiency of banking services to customers is achieved through the use security laws in Nigeria or otherwise on the second hypothesis either the Efficiency of banking services to customers is achieved through the use of computational laws in Nigeria or otherwise. After careful analysis of the questions and test at 5% level of significance, the alternative hypotheses were accepted on both

the two hypotheses. These show that the Efficiency of banking services to customers is achieved through the use security and computational laws in Nigeria. There is an efficiency of security and computational law in banking system in Nigeria. The study shows that there exist computational laws used in Nigerian banking system and the introduction of EFCC help in minimizing cybercrime in Nigerian Banking system.

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