

# The Effect of Internet Banking Security on Customer Satisfaction of Banking Sector in the North West Region of Cameroon

Takoutio Feudjio virginie<sup>1</sup>, Achamoh victalice<sup>2</sup>

<sup>1</sup>. Department of banking and finance, University of Bamenda, Bamili Cameroon

<sup>2</sup>. Department of economic science, University of Bamenda, Bamili Cameroon

Correspondence: Takoutio Feudjio virginie, Faculty of Economic and Management Sciences, The University of Bamenda

**Abstract:-** This article was focused on the analysis on how internet banking security affect customer satisfaction of banking sector in the North West Region of Cameroon. Specifically, the study evaluated the relationship that exist between encryption, firewalls, data intrusion system and customer satisfaction of banking sector. To achieve this, the random and convenient sampling technique was used to target a sample size of 145 customers from banking sector in the North West region of Cameroon. Inferential statistics using the Pearson correlation coefficient and the multi regression analysis were applied to analyze our data. The results obtained from the analysis shown that, there were positive and significant effect of encryption, Firewalls and data intrusion system on customer satisfaction of banking sector in the North West Region of Cameroon. The article recommended that, to maintain a best relationship with their customers, a banking sector should make an effort to increase the level of internet security to keep Secrecy of the customer's data and reduce fraud.

**Keywords:-** Internet Banking Security, Customer Satisfaction, Banking Sector in Bamenda.

## I. INTRODUCTION

The development of information and communication technology over the last two decades is drastically altering the way businesses are operated in Sub-Saharan Africa in general and Cameroon in particular Zafar *et al.*, (2012). The evolution of internet banking has giving a way for banking sector to adopt new financial mechanism such as online transactions. Internet banking offers many benefits for banking customers such as money transfer, account verification, quick payment option (Liang & Nguyen, 2018). The adoption of internet security into the banking sector is to protect customer information's against hackers.

Customer satisfaction is a key to any economic business in the world. Nowadays, banking sector is one of the main entity business that use internet to make it business.

Internet banking is an electronic customer platform for the distribution of banking services. Important transactions happen over internet, making lives easier for customers. Customers can easily access their account and statement when needed.

Despite the advantages that customers can have from the use of internet banking services, many are still reluctant because of the problem of data security. This has been demonstrate by the study of (Nigudge & Pathan, 2014) that concluded that, there is still a large group of customers who refuse to use internet services because of security concerns. Online transactions expose our personal data to cyber criminals or hackers. The hackers have devised numerous ways to steal important data, which make customer to be scared. Internet banking services have exposed and continue to expose customer to many risks such as identity theft, invasion of privacy and many others.

In bank domain, Customers are increasingly aware and concerned about how their data is collected, stored, and used. They expect their bank to safeguard their data and respect their privacy. As we transit more and more to a digital economy, electronic security in banking is becoming a serious concern. Security is important because it protects banks devices, data, and confidential information from online attacks. It also helps banks avoid online scams and protect their reputation. In addition, electronic banking security reduces the risk of online attacks and helps banks recover from an online attack (Zeshan Naz, 2023). With an exponential increase in demand of online banking services, Security is one of the main issues to focus on it because customer data are exposed (Omariba *et al.*, 2012). According to Belas *et al* (2016) , customers to get satisfied with electronic banking services, banks should offer quality services with attributes such as data security with continuous improvement. Internet security can boost customer trust and loyalty, and enhance the business performance and reputation. online attacks can result in significant financial losses for the customer and the banks. Attackers who steal sensitive data from a banking institution may sell it. Most often data securities issues cause customer's dissatisfaction

in many organisations, which affects customer satisfaction and expose the organization to serious problems. It is therefore against this, that this article seeks to assess the effect of internet banking security on customer satisfaction of banking sector in the North West Region of Cameroon.

## II. CONCEPTUAL LITERATURE

### A. Internet Banking Security

Security is defined as the ability of a website to protect customer's personal information from any suspicious uses in electronic transactions (Guo *et al.*, 2012). Internet bank securities are various measures put in place by banks to protect customer information during online transaction. From the definition Mukuma *et al.* (2020), we can define electronic banking securities as e-banking sites that protect customer's information against hacker and others. In this study, the various securities measures used to capture internet-banking security are: encryption, firewalls, and data intrusion system.

#### ➤ Types of internet banking securities

- *Encryption*

Data encryption is the method of translating data into another form or code so that access to the data is limited to only those with the correct decryption key (or password). Encrypted data, sometimes referred to as ciphertext (difficult unreadable form) Rahman *et al.*, (2014) or (translated as hidden) (Pandya *et al.*, 2015).

To read an encrypted file, you must have access to a secret key or password that enables you to decrypt it.

Encryption is commonly used to protect data during the transaction. Every time someone uses an ATM or mobile phone to make a transaction encryption is used to protect the information being relayed. Encryption can also enable authentication, integrity, confidentiality, and non-repudiation of data and communications.

- *Firewalls*

Firewall is a network security that monitor and prevents unauthorized access to the network. It has two main components Hardware firewalls and software firewalls. Hardware firewall is used to protect the whole network, while software firewall is used to protect the individual computer only.

- *Intrusion Detection Systems*

Intrusion detection system is a security measure that monitor network traffic for suspicious activities and signal when such activities are discovered. It is use to examine network traffic and identify threats. According to Mohammed *et al.*, (2022), intrusion detection system is used to reduce network down time and remove all attacks that comes from hackers and intruders.

### B. Customer Satisfaction

Satisfaction is an overall customer attitude or behaviour towards the difference between what customers expect and what they receive, regarding the fulfillment of some desire, need or goal. Customer satisfaction can also be define as the ability of the bank to fulfill the customer's expectation and secures their transactions. Now days with the phenomena of competition, banks try to measure and identify the factors that can affect the satisfaction of their customers. According to Kotler *et al* (2016), wise firms measure customer satisfaction regularly, because it is one key to customer retention. Customer satisfaction measurement allows an organization to understand the key drivers that create satisfaction or dissatisfaction and what is really driving their satisfaction during a service experience. Customer satisfaction is viewed in this article through privacy of their transactions, web designing and content and convenience.

#### ➤ Determinants of Customer Satisfaction

- *Secrecy or Privacy*

Based on the relationship between the banker and the customer, privacy is very important because the banker does not have a right to go against it duty that is to keep Secrecy of the customer's data. Secrecy of Data is crucial for the following reasons: it helps to safeguard customer data information and maintain their privacy and trust. Fraud and Identity theft Prevention is the second reason of privacy that protect customers from financial harm. The third reason of privacy is Compliance with Requirements Set by Law and Regulation; it helps us to understand that, Data privacy are regulated by legal and regulatory frameworks that is applied to the financial sector.

- *Web Design*

Web design is design of websites that are displayed on internet. Websites have an array of elements organized in the ways that navigation become easier. Nowadays with the massive utilization of internet in banking activities, a good web design would make customer transaction easier and attract more customer, while a poorly web design would lead to frustration, and discourage a lot of customer. According to Ahmad and Al-Zu'bi, (2011), Web design is an important element to attract the usage of Internet banking and the importance of web design will be reflected in the customers' satisfaction level.

• *Convenience*

Shariq, (2006) defined Convenience as the main focus of the customers who use Internet banking. Based on the concept that time is money, Banks Customers consider internet banking convenient, if they can save time by doing their transaction online such as payment, checking of bank account for example. According to Jaspal and Parminderjit (2013) ease to use is measured as the degree to which an individual feels it is easy to use a specific service. Pooya, (2020) also suggested that one of the most significant factors to be considered is the ease of use of internet banking websites and Apps.

**III. METHODOLOGY OF THE STUDY**

A. *Source and technique of data analysis*

Data used in this article were collected through questionnaire. questionnaires were administered to customers of commercial Banks in Bamenda City for the purpose of gathering information from the respondent banks in question. After collection, data's were coded and logged in the computer using statistical package for social science. This involved coding closed ended items in order to run an inferential analysis. Before applying a technique such as the Multiple Regression to analyze the data, we first belt an index called the principal component analysis, because our variables (Encryption ,firewalls, Intrusion Detection System and customer satisfaction.) were makeup of many items. After building the index, the validation of the index was done by calculating the conbach's alpha and conducting factor analysis.

B. *Validity Techniques*

**The adjusted R – square**, probability, number of observation and frequency are first order statistical tests. They were used to test the reliability of the coefficients estimated. The adjusted R- square measures the extent to which the dependent variable is caused by the changes in the independent variables.

**The t- statistics** was used to test the level of significance of the coefficients of the regression.

C. *Model Specification*

In order to analyze how internet banking security affect customer satisfaction in Bamenda, multi regression technique was use to link our variables.

➤ *Dependent Variable: customer satisfaction*

Customer satisfaction (**CSAT**) was captured by: privacy, Web Design and Convenience.

➤ *Independences Variables: Internet banking securities*

Internet banking securities was break down into: Encryption (**ENCR**), firewalls (**FIWL**) and Intrusion Detection System (**INDS**).

➤ *Control variable: Level of Education(LEDU).*

From the variables, we came up with the following functions; Customer Satisfaction = f (Encryption, Firewalls, Intrusion Detection System and level of education). It thus follows that

$$CSAT = f (ENCR, FIWL, INDS, LEDU) \dots\dots\dots (1)$$

Econometrically, the model is specified as follow:

$$CSAT = \beta_0 + \beta_1 ENCR + \beta_2 FIWL + \beta_3 INDS + \beta_4 LEDU + \epsilon) \dots\dots\dots (2)$$

Where,  $\beta_0$  = Constant and  $\beta_1, \beta_2, \beta_3$  = The coefficients of the independent variables

$\epsilon$  = Error term

**IV. RESULTS**

A. *Summary of Descriptive Statistics*

**Table 1: Summary of Descriptive Statistics**

| Variables   | Obs | Mean     | Std. Dev. | Min  | Max  |
|-------------|-----|----------|-----------|------|------|
| <b>CSAT</b> | 145 | 3.474483 | 0.321407  | 2.8  | 4.2  |
| <b>ENCR</b> | 145 | 3.750345 | 0.68659   | 2    | 4.8  |
| <b>FIWL</b> | 145 | 3.77069  | 0.460698  | 2.75 | 4.75 |
| <b>INDS</b> | 145 | 3.681609 | 0.309892  | 3    | 4.5  |
| <b>LEDU</b> | 145 | 2.2      | 0.795822  | 1    | 4    |

*Source: Author's Computation (2023)*

The mean value of customer satisfaction in the sample is 3.474483 with a standard deviation 0.321407, which is lower than the mean revealing that there is a moderate dispersion of customer satisfaction in the sample. The mean value of encryption in the sample is 3.750345 with a standard deviation 0.68659, which is lower than the mean revealing that there is a moderate dispersion of encryption in the sample implying that it fluctuates between 2 and 4.8. The average value for firewalls is 3.77069 with a standard deviation of 0.460698 indicating a moderate variability around the mean value with values ranging from 2.75 to 4.75. Intrusion detection system has a mean of 3.681609, with a standard deviation of 0.309892, indicating a moderate variability around the mean value (values ranging from 3 to 4.5). The mean value of level of education in the sample is 2.2 with a standard deviation 0.795822, which is lower than the mean, revealing that there is a moderate dispersion of level of education in the sample ranging from 1 to 4

*B. Presentation of Inferential statistics*

➤ *Correlation Analysis*

Prior to the regression analysis, we conducted a correlation analysis as a pre-test for multicollinearity among independent variables. Results of the pairwise correlation analysis are presented in table 2

**Table 2: Pairwise Correlation Matrix**

| Variables | CSAT    | ENCR   | FIWL   | INDS   | LEDU |
|-----------|---------|--------|--------|--------|------|
| CSAT      | 1       |        |        |        |      |
| ENCR      | 0.1276  | 1      |        |        |      |
| FIWL      | 0.2146  | 0.0362 | 1      |        |      |
| INDS      | 0.1259  | 0.1112 | 0.0995 | 1      |      |
| LEDU      | -0.0478 | 0.0615 | 0.1724 | 0.0113 | 1    |

*Source: Author's Computation (2023)*

Table 2 above represents the Pairwise correlation matrix, which shows the correlation that exists among the variables included in our model. The diagonal shows that the correlation coefficient for each variable is one. This thus indicate that each variable has a perfect positive correlation with itself. From the table, we also observed low

multicollinearity values of each variable, which are less than 0.8. Therefore, the results of this article can be accepted using the above variables.

➤ *Factor Analysis (Variance Inflation Factor Test)*

**Table 3: VIF Test Results**

| Variable | VIF  | 1/VIF    |
|----------|------|----------|
| FIWL     | 1.04 | 0.957409 |
| INDS     | 1.02 | 0.976713 |
| ENCR     | 1.02 | 0.980547 |
| LEDU     | 1.04 | 0.965503 |
| Mean VIF | 1.03 |          |

*Source: Author's Computation (2023)*

According to results from table 3, there is no major problem of multicollinearity given that none of the individual VIF coefficient exceeds 10. Similarly, the mean VIF is lower than 2.5 which indicate that there is absence of multicollinearity in the model. In addition, no individual VIF was found to be greater than 10. Thus, the results of the regression are reliable and predictable.

➤ *Test of Reliability (Cronbach Alpha)*

**Table 4: Reliability Statistics**

| Cronbach's Alpha (Cut off point) Hair et al.,2016 | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|--|------------|
| 0.6   | 0.784  | 6          |

*Source: Author's Computation (2023)*

The Cronbach value from table 4 above reads 0.784 which is accepted. This indicate good internal consistency given that the overall value of Cronbach alpha (0.784) is > 0.6 which is greater than the bench mark of 0.6 proposed by Hair et al.(2016)

*C. Presentation of results*

In order to show and analyse the relationship that exist between internet banking security and customer satisfaction of banking sector in the North West Region of Cameroon, we employed the multi regression technique to our data and obtained the following results.

**Table 5: Regression Results**

|   | Coef.       | Std. Err. | t        | P>t             | [95% Conf.    | Interval |
|---|-------------|-----------|----------|-----------------|---------------|----------|
| ENCR  | 0.049414**  | 0.038344  | 1.29     | 0.0200          | -0.02639      | 0.125221 |
| FIWL  | 0.154413*** | 0.057831  | 2.67     | 0.008           | 0.040078      | 0.268748 |
| INDS  | 0.141409*   | 0.08512   | 1.66     | 0.099           | -0.02688      | 0.309696 |
| LEDU  | -0.00713    | 0.033337  | -0.21    | 0.831           | -0.07304      | 0.058777 |
| Cons  | 2.202002*** | 0.421247  | 5.23     | 0.000           | 1.369174      | 3.034831 |
| Source  | SS          | Df        | MS       |                 |               |          |
|   |             |           |          | F(4, 140) =     | 3.0           |          |
| Model   | 1.174953    | 4         | 0.293738 | Prob > F =      | 0.0206        |          |
| Residual  | 13.70063    | 140       | 0.097862 | R-squared =     | 0.079         |          |
|   |             |           |          | Adj R-squared = | 0.0527        |          |
| Total   | 14.87559    | 144       | 0.103303 | Root MSE =      | 0.31283       |          |
| Breusch-Pagan / Cook-Weisberg test for heteroskedasticity |             |           |          |                 | Chi2(1) =     | 0.00     |
| Ho: Constant variance                                     |             |           |          |                 | Prob > chi2 = | 0.9448   |

**Note:** \*, \*\* and \*\*\* means significant at 10%, 5% and 1% respectively

*Source: Author's Computation (2023)*

## V. INTERPRETATION OF FINDINGS

According to results from table 5, the coefficient of encryption is positive (0.049414) and significant at 5%. This means that encryption measure of internet security affect customer satisfaction of banking sector positively. This can be justify by the fact that, encryption is real use by banks in North west region to protect customer information. Every time someone uses an ATM or buys something online with a smartphone, encryption is used to protect the information being relayed Peter Loshin (2022).

Further results reveal that the coefficient of firewalls as other measure of internet banking security is positive (0.154413). This means that an increase in firewalls security by one point will lead to an increase in customer satisfaction of banking sector by 0.15 point. It should however be noted that this result is statistically significant at 1% level given that the probability value of the variable (0.008) is less than 0.01 (1%). Thus, there is a positive and significant effect of firewalls on customer satisfaction banking sector in the North West Region of Cameroon. This result is in line with our priori expectation.

Results also showed that, the coefficient of intrusion detection system as another measure of internet banking security is positive (0.141409). It should however be noted that this result is statistically significant at 10% level given that the probability value of the variable (0.099) is less than 0.1 (10%). Thus, there is a positive and significant effect of intrusion detection system on customer satisfaction of commercial banks in the North West Region of Cameroon. This result is in line with a priori expectation.

The constant is the intercept of the model , from the results above , when all independent variables are held constant, customer satisfaction of banking sector will be 2.202002 caused by other factors. Moreover, the constant term is significant at 1% given that the sig value 0.000 is less to 0.01 which indicates that they are other omitted variables which have a bearing on customer satisfaction of banking sector in the North West Region of Cameroon.

The adjusted R square is derived from the R square and is adjusted for the level of significance and the sample size. This statistic indicates the percentage of variance in the dependent variable that can be accounted for by the independent variables fitted in the regression model. The model fit table above therefore indicates that about 5.27% of the changes or variation in customer satisfaction of commercial banks is accounted for by the changes in the independent variables (Encryption, Firewalls and Intrusion Detection System) fitted in the regression model. Therefore, other variables not in the model explain 94.73% changes in the dependent variable (customer satisfaction of commercial banks).

The F test derived above shows the overall significance of the regression model. The F test above; 3.0 is significant given that the Sig value 0.0206 is less than 0.05. This indicates that there is enough evidence to conclude that the independent variables (Encryption, Firewalls and Intrusion Detection System) fitted in the regression model put together, have a significant effect on the dependent variable (customer satisfaction of banking sector).

## VI. CONCLUSIONS

The main objective of this article was to analyze the effect of internet banking security on customer's satisfaction of banking sector in North West Region of Cameroon. To achieve that, internet banking securities was break down into encryption, firewalls, data intrusion system and customer satisfaction was capture by privacy, Convenience, Web Design and Content. To obtain our results, the analysis was done based on the information gotten from respondents through questionnaires. Collected data was coded in to SPSS version 25 for analysis, index was belt because our variables were bread down in to items and multivariate regression technique was used for estimation. From the analysis, the study concludes that, encryption, firewalls and data intrusion system affected customer satisfaction of banking sector in North West region positively. The result this article reveals that the overall result was statistically significant at 5% level of significance given that the probability value of the Fischer statistics (0.0206) of overall significance is lower than 0.05. This implies that internet security has a significant effect on customer satisfaction of banking sector in the North West Region of Cameroon.

## VII. RECOMMENDATIONS FOR FURTHER STUDY

Banking sector in this time of digitalization should always focus on data security with continuous improvement during online transaction. This would help them to avoid to go against their duty of secrecy and continue to maintain a best relationship with their customers.

## REFERENCES

- [1]. **Ahmad, A. E., & Al-Zu' bi, H. A. (2011).** E-banking Functionality and Outcomes of Customer Satisfaction: An Empirical Investigation. *International Journal of Marketing Studies*, 3(1), 51-59.
- [2]. **Belas, J., Michal, K. and Anton, K. (2016).** "Electronic Banking Security and Customer Satisfaction in Commercial Banks", *Journal of Security and Sustainability Issues*, Vol. 5, No. 3, pp. 1-12.
- [3]. **Guo, X.,Ling, K.C., And Liu, M.(2012).** Evaluating Factors influencing customer satisfaction

- [4]. **Hanzaee K., (2010).** Customer satisfaction factors with online banking services; Journal of <http://dx.doi.org/10.5539/ijef.v5n1p166> Individual Employees. *Managing Service Quality* 14:40-57 *International Journal of Bank Marketing*, 24(6), 360-383  
*Islamic Marketing* 1(3), 249-267
- [5]. **Kotler P et al. (2016)** *Marketing Management* (6<sup>th</sup> edn.), Longitudinal Assessment of customer, Prentice-Hall LaBarbera, New Jersey.
- [6]. **Liang, C.C., & Nguyen, N.L. (2018).** Marketing strategy of internet-banking service based on perceptions of service quality in Vietnam. *Electronic Commerce Research*, 18(3), 629-646
- [7]. **Moghavvemi, S., Lee, S.T., & Lee, S.P. (2018).** Perceived overall service quality and customer satisfaction: a comparative analysis between local and foreign banks in Malaysia. *International Journal of Bank Marketing*, 36(5), 908-930
- [8]. **Mohammed, K. et al. (2022).** Internet Security on E-banking Users. *CUER-WS.ORG*, 3149, 118-123.
- [9]. **Mukuuma, K. et al. (2020).** Examining the influence of E-banking security on customer satisfaction in Uganda. A case of Ugandan Commercial banks. *Journal of management studies*, 06(03), 1225-1232.
- [10]. **Nigudge, S., & Pathan, M. (2014).** E-banking: Services, Importance in Business, Advantages, Challenges and Adoption in India. *Asian Journal of Management Sciences*, 190-192.
- [11]. **Omariba, Z., Masese, N., & Wanyembi, G. (2012).** Security and Privacy of Electronic Banking. *International Journal of Computer Science Issues*, 432-446.
- [12]. **Pandya, D. et al. (2015).** 'Brief History of Encryption', *International Journal of Computer Thousand Oaks, CA*, 241-68.
- [13]. **Peter Loshin (2022):** What is data security? The ultimate guide, updated version
- [14]. **Pooya, A. (2020).** Investigating the effect of perceived quality of self-service banking on customer satisfaction. 13(2), 263–280. <https://doi.org/10.1108/IMEFM-12-2018-0440>
- [15]. **Reddy et al, (2021)** . IMPACT OF E-BANKING ON CUSTOMER SATISFACTION. *PalArch's Journal of Archaeology of Egypt / Egyptology*, 18(08), 4220-4231. Retrieved from <https://archives.palarch.nl/index.php/jae/article/view/9660>
- [16]. **Rahman, A. U., Miah, S. U. and Azad, S. (2014).** 'Advanced encryption standard', *Practical towards online shopping in China*. *Asian Social Science*, 8(13), 40-50
- [17]. **Rajaobelina, L. (2011).** The antecedents and consequences of online trust: the case of the financial sector, Doctoral dissertation, University of Quebec, Montreal.
- [18]. **Rahman, A. U., Miah, S. U. and Azad, S. (2014).** 'Advanced encryption standard', *Practical towards online shopping in China*. *Asian Social Science*, 8(13), 40-50
- [19]. **Shariq S. (2006).** Internet Banking in Pakistan, D Master Thesis, Department of Business Administration and Social Sciences, Luleå University of Technology, Sweden.
- [20]. **Zameer, H., Tara, A., Kausar, U., & Mohsin, A. (2015).** Impact of service quality, corporate image and customer satisfaction towards customers' perceived value in the banking sector in Pakistan. *International Journal of Bank Marketing*, 33(4), 442-456.
- [21]. **Zafar, M., Zafar, S., Asif, A., Hunjra, A.I., & Ahmad, H.M. (2012).** Service quality, customer satisfaction and loyalty: an empirical analysis of banking sector in Pakistan. *Information Management and Business Review*, 4(3), 159-167.
- [22]. **Zeshan Naz, (2023).** Effect Staffing, Inc. on LinkedIn: AI in cybersecurity: Transforming Defenses, latest blog dives into the importance, threats, LinkedIn <https://www.linkedin.com>