Understanding the Factors that Influence User Adoption of
E-Banking Services in Developing Countries

(A case study of Nigeria)

By

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Abstract

This study examines the factors that influence user adoption of e-banking services in Nigeria. The questions this study hoped to answer involved whether there are significant differences between adopters and non-adopters of e-banking with respect to gender, tribe, age, income, education level, area of residence, salary payment method and internet literacy level, and with respect to their perceptions towards e-banking security, awareness, ease of use, privacy and trust.

Primary data were collected from using a self-administered questionnaire uploaded online for voluntary respondents within Nigeria. The data obtained were analyzed using frequencies, percentages, chi-squared tests, and independent t-tests.

Findings revealed that gender, tribe, age, education level, area of residence, internet literacy and e-banking awareness had significant effects in influencing user adoption of e-banking while income level, sector of employment and method of payment had no significant effect on customer adoption of e-banking in Nigeria. Also, based on respondents’ perceptions towards e-banking, the conclusion is that there is a significant difference between adopters and non-adopters with respect to their perception towards e-banking security, e-banking privacy, ease of use and trust in the Nigerian e-banking system.

Finally, as a result of the findings, the researcher recommends that Nigerian banks incorporate biometric authentication into their e-banking system to enhance security.
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CHAPTER 1

Introduction

1.1. Research background

In the course of the past four decades, there has been a witnessed increase in the proliferation of new information and communication technologies in the financial industry, and this has had a great impact on the way the banks now run businesses with their customers. Of particular note are the self-service technologies that have now enabled banks to cut down on employment expenses as customers are being forced to do certain things themselves, but the most important influence it has had will come in the form of how it has helped banks to pursue an electronically mediated multi-channel strategy [1]. From the viewpoint of the customers, these new technologies provide a form of new access to data, analysis and decision-making tools that is currently seen as one of the financial management approaches helping customers across the world [2].

The 1970s witnessed the first service technology in the finance [3] sector with the emergence of automated teller machines (ATMs) [4] in the banking industry, and this machine allows customers to withdraw or deposit money without going to the bank teller, allowing for 24/7 banking services. This was followed by the emergence of telephone banking services in the 1980s [5], followed by the emergence of the internet, which allows banks to further extend their existing channels into a web-based form of distribution channel by offering banking applications online [6][7]. In the course of the past decade, the emergence and high adoption of mobile technologies such as mobile phones, PDAs,
and smart phones have also served as a form of strong encouragement for banks to provide mobile banking applications [8] that now further extend the self-service features down to home based services, allowing customers to perform their bank related transactions directly from their homes without having to log into the internet.

In any case, the rates of adoption of these technologies have led to suggestions that banks are missing the opportunities of moving even more customers to adopt electronic banking channels [9]. Research has also shown that while 73% of European banking customers make use of an ATM at least once per month, only 30% of the same customers actually adopt the internet banking services [9][10][11]. From similar research, it was also found that most North American and Australian retail banks offer telephone banking and mobile services, but only 5-10% of the customers make use of these services [12].

The idea of moving clients to online banking is very important because of the fact that the banking industry now regards it as a process of reducing operational costs [12]. As an example, it was shown that E*TRADE’s implementation of telephone banking has been the main reason for an estimated cost saving of US $30million per annum [12]. Additionally, the implementation of e-banking channels helps financial institutions for the purpose of selling their financial products, and banks have been known to actively recommend and advertise financial instruments such as investment products, savings products or credit products through these e-banking channels [11].
The benefit of the internet from the point of view of the customers is that it serves as a form of decision support system because it allows individuals to make real-time financial decisions in a convenient, independent, time saving and efficient way [8]. Still providing benefits to the consumers, it allows them to make the decision on which banking services are good for them and which of them to adopt [13].

1.2 Research problem

Although there are presently numerous technologies that have been developed for the purpose of ensuring higher efficiency and convenience in internet banking [8], a number of technical issues result in lower adoption in the Nigerian case. These factors come in the form of lack of needed technical competence, lack of necessary knowledge on usage, lack of information systems needed to access these technologies and lack of computer skills that enhance the understanding of how these technologies can be accessed.

In the cloud computing system, customers’ lack of understanding on security issues means that some of the users expose their private and security information, which effectively leads to loss of passwords and then financial losses. Such dangers are also coupled with the fact that most Nigerian ATMs don’t have closed circuit television (CCTV), leading to difficulties with identifying the culprit. All these factors influence consumers’ decisions to adopt e-banking services in Nigeria. These problems and necessary solutions are what this research is designed to address from a computer security based view.
1.3 Purpose of research

Based on the above discussion, it is now clear that e-banking is an important feature in modern banking and, in view of that, this research is designed to understand the factors influencing the adoption of e-banking services in Nigeria from a technical standpoint. A case study of Nigerian users of banking services will be used to collect information on the views of user adoption of e-banking in Nigeria.

1.4 Significance of research

The significance of this research is reflected in a number of benefits that the research is expected to yield for the bank management. It should be noted as well that it is via understanding why consumers do what they do that companies can better design products that suit their specific needs. As such, understanding why consumers adopt e-banking services is very important in the Nigerian banking industry because it will help shed light as to what could be done to improve overall consumer experience. Thus, this research is deemed significant on the grounds that it is designed to fill an existing gap in research as well as portray what consumers need and help banking institutions to better advance and position their e-banking services towards specific consumer needs.

1.5 Research objectives

As already highlighted in the purpose of the research, the objectives of this research are:

1. To understand the factors that influence consumers’ decisions to adopt e-banking services in Nigeria.

2. To understand the overall adoption of e-banking services by consumers in Nigeria by evaluating the differences in demographic features between users and non-users.
of e-banking services.

3. To investigate how security plays an important role in the adoption of e-banking.

4. To give recommendations based on the research findings.

5. To understand how e-banking in Nigeria is perceived compared to other developing countries.

1.6 Research questions

Based on the research objectives, the following questions serve as the foundation for the whole research and an instrument for measuring success of the research.

1. How are e-banking services perceived in Nigeria?

2. What are the factors that influence customers’ decisions to adopt or not adopt e-banking services in Nigeria?

3. What are the correlations between factors that influence customers’ decisions to adopt e-banking services and those that force them not to adopt e-banking services?

1.7 Organization of Report

Fig. 1.1: Organization of Report
From the above figure (1.1), it can be seen that this report is basically divided into five sections.

Chapter 1: Introduction

In this section, the purpose is to define why the research is being conducted in terms of what the research is intended to achieve and how it will be achieved.

Chapter 2: Literature review

This chapter is designed to present an analysis of past studies in relation to the research topic. This chapter will also highlight relevant theories and models that will be used to address the whole research as well as aid in the development of variables that will be tested in the primary research.

Chapter 3: Research methodology

Research methodology is the third section and it is designed to present detailed analysis of approaches that will be used to conduct the primary research. Such analysis will include the target audience, demographics of the target audience and all variables used for analysis.

Chapter 4: Data analysis and Presentation of Findings

This chapter presents the analyzed data gathered from the questionnaire. The results and analysis gathered will be further discussed in relation to the literature reviewed to justify the factors that influence internet banking acceptance.

Chapter 5: Conclusions and Recommendations

This chapter gives an evaluation of the research findings collected. It also gives
recommendations and guidelines about how the level of acceptance of internet banking in Nigerian banks by customers can be improved as well as describing the limitations of the research and providing recommendations for further research.

1.8 Definition of terms

- **Electronic banking services** include all kinds of banking services that are conducted with the aid of electronic systems such as ATM, Point of sale (POS), Internet banking etc.

- **Banking consumers** are consumers that make use of banking services and can be any consumer using any bank in Nigeria.

- **Bankers** are the staff members employed to work in a bank.
CHAPTER 2

Literature Review

2.1 Introduction

In this chapter, the focus will be to present related theoretical background on the factors that influence consumers’ decisions when it comes to adopting internet banking, with specific reference to the Nigerian banking sector.

2.2 Defining the concept of E-Banking services

In straightforward words, e-banking implies provision of banking products and services through electronic conveyance channels. Electronic banking has been around for a long while, mainly as automated teller machines (ATMs) and phone transactions. Recently, it has been changed by the web, another conveyance channel that has encouraged electronic banking transactions for both clients and banks. For clients, the web offers prompt access and day and night accessibility regardless of who the clients are [14]. Internet banking involves the use of the internet for performing any banking transactions such as bill payments, withdrawals, viewing statements of account, making deposits, etc. [14]. It is important to understand that electronic banking is more than just banking over the internet.

Electronic banking was first launched in the United States in the early 1980’s in New York; shortly after, it was launched in the UK in 1983 with the “Homelink” service provided by the Nottingham Building Society and the Bank of Scotland [15]. It failed to gather enough
customer trust; therefore, the acceptance level was very low. But nowadays, due to the incessant growth of the various types of electronic services, most based on the Internet, there has been a renewed interest in electronic banking services and many banks have recently launched and made use of such services [15]. Electronic banking has various delivery means which are as follows: PC home banking, internet banking, managed networks, TV-based banking, telephone banking, mobile phone banking and automated teller machines (ATMs) [16].

- **PC home banking**: The bank issues proprietary software to the customers and the customers install this software on their PC with access to the bank provided via a modem directly linked to the bank [17].

- **Internet banking**: Customers are granted access via the internet for banking transactions, either through the use of a computer or a phone that has internet capabilities [17].

- **Managed networks**: The banks adopt online services that are provided by other parties to offer their banking services.

- **Telephone banking**: Customers are granted access to their bank accounts via telephone and it requires both customer ID and password in order to be initiated. One disadvantage is that customers lack the ability to visually see their transaction [17].

- **Mobile phone banking**: Customers are granted access to their bank accounts with the aid of short message service (SMS) and internet connections [17].

- **TV based**: This involves delivering account information to the TV screens of customers via the aid of satellite or cable.
- Automated Teller Machine: For customers to access the ATM's 24-hour banking services, they require an ATM card with a PIN which must be set by the customer personally [17].

Additionally, there is the need to differentiate between internet banking and PC home banking. This is because internet banking is performed via the web browser, while PC home banking requires that customers install software offered by their banks on their computer [16]. PC home banking provides customers with the opportunity to perform their banking services only via the PC that has the provided software installed on it. In the modern e-banking features, telephone banking, TV-based banking, and managed networks don’t play as much of a role as in the past because internet banking has made the electronic banking platform easier and faster. In any case electronic banking doesn’t necessarily need to be performed via a computer screen. It can now be performed even on the tiniest screen of mobile phones and other wireless media. With the aid of wireless applications, it is now easy for customers to check their bank account balances and history of their transactions, all in summarized pie-charts and figures that are easy to understand. Consumers can also have this information delivered to them via their email or other medium as demanded [16].

Finally, e-banking is going to develop faster than the banks or customers can imagine. In terms of cost alone it is an inevitable force [18]. “The financial muscle of the pioneers will, without doubt, transform the traditional relationship between a banker and his customer where the latter is king. And with the revolution, a new financial system will evolve that in many ways will be far more secure than the one we have today” [18].
2.3 Electronic banking in developed nations

In developed countries, e-banking is relatively young; in spite of that fact, there is a fast adoption rate of e-banking services in developed countries, and this urges numerous banks to offer their services through the web. Research showed “almost three quarters of adults in Great Britain used the Internet everyday (73%) in 2013, with 6 out of every 10 adults (61%) using a mobile phone or portable computer to access the Internet 'on the go'. In 2013, more people than ever before used the Internet for reading newspapers or magazines (55%), to access their bank accounts (50%), to seek health information (43%) or to buy groceries (21%).”[19] The study showed that in a developed nation like Great Britain, activities previously carried out on the street are now increasingly being carried out online.

However, the risk of providing credit card details to different online platforms is still a concern to credit card holders in most developed countries; they fear the incidence of credit card misuse and are concerned about online fraud. However, most customers either overlook or are not aware of the encryption technology and security certification this technology uses, which could serve as an assurance to many potential adopters. The easy and constant access to internet connectivity in developed nations contributes tremendously to the use of e-banking channels by customers who easily make use of the computers to access their accounts and perform transactions. E-banking services are available 7 days a week, 24 hours a day and transactions are executed and confirmed almost instantaneously [20].

Banking institutions seek to adopt internet banking mainly to increase their customer market and reduce the cost of providing physical banking incurred through the conventional banking method.
2.4 Electronic banking in developing nations

Unlike in developed nations, internet penetration is very low, which can be seen in Fig. 2.1. This might be linked to why e-banking is just at its beginning stages in developing countries. For example, the use of automated teller machines is relatively low in developing countries when compared to developed countries; there are 204.77 ATMs per 100,000 people in Canada as compared to 11.39 ATMs per 100,000 people in Nigeria [24]. The main obstacles that hinder adoption of e-banking in developing nations are the issues of trustworthiness, privacy and security of the banking platforms [35]. Another issue that may arise might be as a result of lack of needed support from the top management bank staff or no enthusiasm about the new technology. Even the reluctance to change can pose as an issue affecting the adoption of new technology [36].

Over the years, in developing countries, despite the hindering factors facing the adoption of internet banking, a large number of financial institutions still recognize the benefit of e-banking and adopt it, since it produces the cheapest means of conducting financial transactions.

Finally, the adoption of internet banking among banks in developing nations is growing. In order for financial institutions to acquire more customers in developing nations they need to make their websites more user-friendly. In other words, if customers find some bank website very difficult to use and not user-friendly, this would affect the adoption rate of the technology.
2.5 Benefits of Electronic Banking Services

2.5.1 Benefit to Banks

E-banking does come with numerous benefits to both banks and their customers. The major benefits it offers banks are better branding and better responsiveness to the market. E-banking helps reduce the load capacity of branches substantially by creating a centralized database of all resources and taking over most of the bank’s accounting functions [25]. ATMs can be better supervised and planned by setting up a consolidated data warehousing center and using the latest data mining tools [25]. E-banking also enables cost savings in banks, allows the bank to reach new areas of the population, and provides a higher level of efficiency in the bank, thereby enhancing the bank’s reputation and bettering customer
service and satisfaction. E-banking strengthens the relationship between the service provider (e.g. bank) and the customer and also helps in retaining and attracting customers [25].

From a global survey conducted, it was found that internet banking presents a potentially low cost alternative to conventional banks and, even if cost increases as financial institutions begin to offer e-banking services, the amount will still be less costly than establishing traditional branch banking. For example, to set up a traditional bank branch, it costs up to US$1.5million to US$2million, and US$350000 to US$500000 per year for its operation. The cost of generating a fully functional internet banking site is likely to cost US$1million to US$2million per year. However, while the operating cost of a traditional banking branch accounts for 50% to 60% of revenues, the running cost of internet banking is estimated to be between 15% to 20% of the revenues [20]. Moreover, e-banking can be used for strengthening cross-selling and also for price differentiation. This is because e-banking provides banks with the opportunity of offering numerous services on a 24/7 basis. With the existence of e-banking, customers can manage their account without being physically present in the bank and also avoid queue build up in the banks [25].

2.5.2 Benefits to consumers

Just like it does to banks, e-banking also provides customers with new values. The emergence of the internet has significantly reduced the operations cost of conventional banking methods. This is because the internet now ensures that banking is no longer time or geography bound as consumers across the world have relatively easy access to the internet on a 24/7 timeline.
E-banking gives customers the control over nearly every aspect of managing their bank accounts from anywhere at any time. Moreover, customers can buy and sell, check stock market information, check account balances, transfer money and view their transaction history without actually going to the bank. Another important benefit is that Internet banking is completely free.

Usually with E-banking, customers need not maintain a required minimum balance. E-banking also allows customers to enjoy the benefit of better interest rates. It is also more convenient for customers as it reduces time from queuing up in conventional bank branches and other inconveniences that can arise from conventional banking services.

2.6 Theoretical Framework

In recent days a large number of financial institutions are investing a lot in information technology, hoping that it will improve the productivity of their business. But for this to be successful, users need to adopt the new e-banking technology. In order to understand the different user acceptance of new e-banking technology, theoretical frameworks with roots in information systems were developed [26]. The most common ones are: The Theory of Reasoned Action and The Theory of Planned Behavior.

2.6.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action can be demonstrated as an antecedent of any model that can virtually explain actual human behavioral intentions. TRA suggests that a person's behavior is determined by his/her intention to perform the behavior and that this intention
is, in turn, a function of his/her attitude toward the behavior [27].

The TRA model revolves around attitudinal influence, social influence and intention variables that are used for predicting how people behave. Also, TRA is a general model and it doesn’t specify the beliefs that are exhibited by specific individual behavior. Studies involving the use of TRA need to first identify the beliefs that are inherent in the subjects with respect to the behavior that is being investigated. We can elicit five to nine inherent beliefs with the use of free response interviews with representative members of the subject population being interviewed. Recommendations have been made for the use of “modal” salient beliefs for the population, which is obtained by taking into consideration the beliefs that are more frequently elicited from a representative sample of the given population [27].

![Diagram of the Theory of Reasoned Action](image)

**Fig. 2.2:** The Theory of Reasoned Action. Source as adapted from: Fishbein and Ajzen (1975)

Fig. 2.2 shows that “TRA does hypothesize that the Behavioral Intention (BI) of individuals to understand certain behavior is determined jointly by their individual attitude towards performing the behavior (ATB) and subjective norms (SN), which is the general perception of the irrelevant things that others think the individual should either do or not do. For behaviors that have stronger attitudinal or personal-based influence (such as purchasing
personal consumptions), attitude towards performing the behavior (ATB) will be the dominant predictor for the Behavioral Intention (BI), while the SN will either have little or no predictive capability. On the other hand, behaviors that have stronger normative implications (such as purchasing things for other people to use) will have the subjective norms (SN) as the dominant predictor of Behavioral Intention (BI), thus making attitude towards performing the behavior (ATB) less importance”[27].

2.6.2 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) goes far beyond the TRA; it is more like an extension of the TRA. TPB was developed by Ajzen in 1988 wherein the individual’s behavior is best predicted by one’s intentions; intentions are, in turn, predicted by attitudes about the behavior, the subjective norms (a person’s perception of important others’ beliefs that he or she should or should not perform the behavior) encasing the execution of the behavior, and the individual’s perception of their control over the behavior. Ajzen’s TPB has been used to predict many different behaviors, ranging from gambling behaviors to the use of hormone replacement therapy [28]. Intentions are defined as a person’s determination to behave a certain way. Intentions can be categorized into:

1. Attitudes: refers to the negative or positive evaluation of a person’s behavior
2. Subjective norms: “represents the perceived social pressure to perform or not to perform a behavior”. [27]
3. Perceived behavioral control: this refers to the evaluation of a person’s ability to perform behaviors that are not under the complete control of the person. [27].
Although the TRA has widely been acknowledged to be strong across different studies, it does have problems in cases where the behavior being studied is not under full volitional control. Two major problems of TRA are discussed below:

The first issue is that the difference between behavior and intention must first be differentiated. This can lead to issues because a number of factors in addition to the intention of the individual is used to determine how behavior are performed.

The second issue is that there is no provision in the model for considering whether its lack of performance is due to the behavior of the subject or the behavior of a third-party. In order to deal with these issues TRA was extended with the inclusion of perceived behavioral control construct, which is used for predicting the behavioral intention and actual behavior of individuals. This extended model is known as the Theory of Planned Behavior (TPB) [27].

![Diagram](image)

**Fig 2.3:** Theory of planned Behavior. Source as adapted from: [29]

From Fig 2.3, we can note quite a number of similarities between TRA and TPB. In both of these models, the BI is a major factor for predicting actual behavior of subjects. Also,
both of the models have the assumption that human beings are basically rational and make use of available semantic information for making decisions. In consideration of control-related factors, it is assumed by TRA that behaviors being studied are under volitional control of the subject [39]. In any case, the boundary conditions of TRA are expanded by TPB into a more goal-directional action. [27].

2.7 Factors that influence adoption of e-banking services

There are a number of factors observed influencing the adoption of e-banking services and it is key to take those factors into consideration when studying a customer's attitude towards e-banking.

2.7.1 Trust

Trust is a vital issue that drives customers to accept and adopt e-banking services, because it plays an important role in the continued usage of internet banking. Trust can be said to comprise of customers' perception towards the security and privacy features of their banks' banking system; it is associated with lower perceived risk. In order for the customers to perceive increased security and privacy, they need to trust that the bank has both the capacity and motivation to deliver reliable and consistent e-banking services. “Customers’ perception of a bank as a trustworthy Internet banking provider also has a direct effect on their trust. The direct influence of perceived risk on intentions, is related to the notion of perceived behavioral control in the theory of planned behavior” [30].

2.7.2 Awareness

The level of knowledge and information a customer has about the various e-banking
services and their advantages influence the adoption rate for the better. Customers need to undergo a series of processes in proficiency, resolution, conviction and confirmation before they are willing to adopt a new product or service. The adoption or rejection of a technology begins the moment the customer realizes the existence of the technology. Lack of information or inadequate information is one of the most important factors that affect the adoption of e-banking services negatively; likewise we can argue that the average e-banking customer not adopting the technology is as a result of their unawareness of such a service and the benefits it possesses.[31]

2.7.3 Perceived ease of use

The idea here is that customers will more likely handle issues that will arise from usage of such technology if they find it easy to use. Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free from effort"[32].

2.7.4 Security and Privacy

Security can be defined as the ability to protect personal and confidential information against potential threat. Privacy can be defined as the ability to keep information about one's self confidential. A major concern for customers is that they are not aware of who is gathering the data they supply and what is being done with the data [32]. Some customers avoid making use of any e-banking service as they perceive it can be easily susceptible to fraud or hacking. This negative perception can damage customers' trust and confidence in the internet banking system. According to research carried out in Australia, 73% of
respondents avoided the adoption of online banking because they are concerned about safety and security of transactions over the internet [33]. With security, the higher the level of verification required, the higher the security features and overall protection given to users. On the same note, privacy is influenced by the remoteness of systems and the extent to which users can make use of the system without being noticed by other people. Safety concerns involve a combination of both security and privacy features. An application is considered safe if access by third parties is limited and users can make use of such applications without being noticed by third parties [32].

2.7.5 Age

Age is a factor that influences customer adoption of e-banking significantly. It can be said that what appeals to a younger generation can be totally different from what appeals to an older generation - for example their taste in cars, taste in clothing, etc. According to research, older bank customers are found to have negative mentality towards innovation and new technology whereas the much younger customers are seen to be more interested in utilizing new innovations and technologies, like the Internet, to conduct activities - for example, purchasing products online, or searching for new items online and the item information in order to compare and access their many choices [33].

2.7.6 Gender

Research shows that there is a significant difference between the male and female genders when it comes to adopting various technologies. “They found that gender can be an important determinant of short term usage and can be used to predict sustained usage
behavior in individual adoption and continued usage of technology” [33].

2.7.7 Income

Income is a popular demographic factor for segmenting markets, because income levels influence customers’ wants and determine their buying power. The more money you earn the more money you spend, either on personal needs or luxurious wants. Customers with higher income between the ages of 26 and 45 are said to adopt the use of internet banking more than low income earners within the same age group [33].

2.7.8 Educational Level

Education plays an important role in adjusting the attitude of customers towards the adoption of e-banking.

Nowadays the higher your educational level the more knowledgeable and exposed you are to new and modern technologies. The higher a customer’s level of education, the greater the chance that such a customer would not have issues when it comes to accessing the internet and making use of the various e-banking features available.

2.8 Security issues in e-banking

Security is one of the most talked about issues of e-banking, and with the increasing growth of e-banking services, numerous security issues arise and there is an increase in the cost of ensuring higher security for both e-banking users and the banks offering such services.
The most important issue in e-banking is to ensure full protection of valuable information so that it cannot easily be accessed by a third party. As such, it is important that banks constantly increase the security features of their e-banking services.

Internet crime may refer to any form of misconduct performed over the internet. Since the inception of the internet in the 1960’s, various forms of crimes have been linked to it, including hacking, telephone tapping, privacy violation, and introduction of viruses to people’s computers through malicious software. Today, the internet has been used for spying on individuals, used by government to obtain political information, and used as a medium to commit transactional crimes. With e-banking gaining ground in Nigeria, e-banking customers are open to risk of having their financial information stolen by internet fraudsters (hackers) who get their information either directly by hacking into accounts or through a website where customers recently made use of their financial information. They use this information to create fake cards, which they use without been detected.

“Absence of a law specifically dealing with card-related crimes in Nigeria may be giving thieves a loophole to operate freely. Police treat card-related crimes like any other case of fraud.” [37].

2.8. 1 Types of E-banking Security threats

There are so many ways through which attackers can choose to hack into an e-banking system. These include but are not limited to:

- Phishing: refers to a coaxing procedure utilized by identity thieves to fish for individual data or information in a pond of unsuspicous internet users. These criminals create emails and websites designed to look just like they were coming
from well-known, legitimate and trusted financial institutions. Such emails or websites contain the bank’s logo, and similar color and font schemes. In other cases they create a link similar to the legitimate link but this link redirects users to fake look-alike pages. Fig 2.4 displays a sample phishing email received by the researcher from a bank in Nigeria.

From the image on the next page, the phishing link is “http://www.zenithbank.com/internetbanking/login.security.aspx?” whereas the legitimate link is “http://www.zenithbank.com/internetbanking/login.security”. The fake link actually directs users to a login page just like that of the bank. Without a second look, a customer would easily fall prey to this phishing scam. The main aim of these fraudsters is to hoax unsuspecting users into divulging their banking and financial information [38].
Finally, "In Nigeria, the most recent phishing attacks were on the customers of Inter-switch, which remains the organization with the highest customer base in electronic transactions. The Nigeria Deposit Insurance Corporation (NDIC) disclosed in its 2007 annual report and statement of account that underhand deals by bank staff, among others,
resulted in attempted fraud cases totaling over ₦10.01 billion (over 65 million USD) and actual losses of ₦2.76 billion (13 million USD) in 2007” [37].

- Electronic Spam Mail: These are unrequested bulk emails, sent to multiple recipients. A very good example is the 419 mail or the Nigerian Advanced fee fraud which is used to trick possible victims into parting with some amount of money by coaxing them to think that they stand to receive a substantial benefit in return. It has been estimated that some US$5 billion was stolen worldwide through the use of these schemes in the 1990’s [39]. These mails emanate in a triangle called the "The Nigerian Connection" mostly in Europe and in some parts of Africa. The Nigerian Scam, according to published reports, is the third to fifth largest industry in Nigeria [37].

- Keyloggers: The criminals install software called a keylogger on the customer computer or device used to access their e-banking services. Every key stroke typed on the computer by the customer is copied to a file; this file might contain sensitive and personal information of the customer, which the fraudsters can use to carry out fraudulent and illegitimate acts.

- An emerging form of attack is the Trojan horse. It is generally referred as “man-in-the-middle” attacks, and it occurs between the user and security mechanism set by their browsers. These new forms of attacks are impossible for the users to detect and they also make use of real services. Additionally, there is no advanced authentication that can be used to defend against these forms of attacks because
they are attacks based on the transaction level and not based on the authentication level [40].

2.8.2 Categorizing security breaches in e-banking

Although there are numerous ways that security of e-banking services can be breached, these security breaches can be categorized into three groups as follows:

**Breaches with serious criminal intention** – Just as the name implies, they are breaches performed by third parties who desire to gain access to the e-banking platform in order to perform serious criminal related activities. This includes fraud or stealing of financial and sensitive information [41].

**Breaches by casual hackers** – These breaches are performed by casual hackers just to create awareness for consumers on the security issues of their service providers or to expose some people. Such breaches include defacement of websites or denial of services. From the examples, it can be seen that they can also be performed by competing brands against their competitors in order to damage the reputation of the brand and force customers to leave the brand. [41]

**Breaches caused by flaws in system design and set up** – Basically, these breaches are not intended but occur as a result of inefficiency in the design of the system. A good example is genuine users being able to transact on the accounts of other users as a result of design flaws. All of these threats do have huge legal, financial and reputational implications for the bank, the customers and the perpetrators [41].
2.9 Chapter summary

In conclusion, we have been able to identify a significant difference between how e-banking is perceived in developed countries as compared to developing countries. In developed countries, e-banking is at a highly advanced stage as compared to developing countries where e-banking is still in its elementary stage.

The Theory of Reasoned Action and the Theory of Planned Behavior were presented. Based on these theoretical ideas, it is proposed that the attitudes of individuals and of the people around them play an important role in decisions such as whether to adopt e-banking. The further analysis in this report can help us to understand which critical factors actually influence a consumer's attitude to accept e-banking in Nigeria: factors such as security, awareness of service and IT benefit, privacy, trust, and demographic factors.

This chapter also looks at past literature regarding security issues in e-banking, most especially as it relates to the Nigerian e-banking system.
CHAPTER 3

Research Methodology

3.1 Introduction

Research methodology refers to the methods and procedures used to gather information or data for the purpose of making meaningful observations. In other words, research methodology is concerned with how research is carried out. The choice of which research methodology to employ is dependent upon the nature of the research problem [42]. This chapter discusses different research methodologies and explains which methodology was chosen for the study and why.

This chapter also covers the research approach, research method, sampling size and method, target audience, data collection method and procedure and data analysis techniques used for the study.

3.2 Research Model

There are three main models when performing research; they are interpretive, critical and positivist. The interpretive model is used mainly when the questions to be answered are explanatory in nature. They rely solely on naturalistic models such as interviewing, observation and analysis of existing texts. The interpretative model ensures that there’s enough discussion between the researchers and those with whom they interact in order to collaboratively construct a meaningful reality [43]. The critical approach relies mostly on discussion models, models combining observation and interviewing with approaches that enhance conversation and reflection. This reflective discussion allows researchers
and participants to question the 'natural' state of affairs and challenge the mechanisms for order maintenance. A critical theorist tries to challenge guiding assumptions rather than just naming and describing. Critical models allow researchers to try and change a situation rather than just trying to describe a situation from a particular vantage point or set of values [43]. The positivist approach relies mainly on experimental and manipulative models. The positivist model allows researchers to provide an objective reality against which researchers can compare their claims and ascertain truth. Positivist models generally involve hypothesis generation and testing [43].

Based on the above description, for this report the positivist model is used because it fits into the study and also because it ensures that there is a large distance between the subjective bias of a researcher and the objective reality the researcher is studying [43].

3.3 Research Method

There are basically two applicable methods for conducting research: quantitative and qualitative methods.

Quantitative research refers to a type of research that involves an unbiased way of investigating issues or a particular subject matter in which its results are given in numerical values. It employs the use of charts, graphs, diagrams, as well as statistics to efficiently analyze the results and findings of the research. This method makes use of questionnaires and interviews, and participant responses are represented using numerical values.

When conducting quantitative research, researchers will have one or more questions that need to be answered. This may include prognosis about probable relationships between
variables that need to be investigated. In most cases researchers do not have access to all members of the population or a particular subject group, but researchers are more interested in making inferences from their study about these larger groups. Therefore, research participants are a representative sample of the larger population or group [44].

In qualitative research methods, numeric information is not used. This method initiates the use of non numeric outcomes or figures. Data here is not quantified. It is the collection of all research strategies, such as response to open ended questions, policy documents, questionnaires, as well as results of interviews. Qualitative researchers do not base their research on pre-determined hypotheses; they identify an issue or topic they wish to explore and they make use of an underlying theory to create a framework for their investigation. This method gives respondents a certain degree of freedom rather than forcing them to choose from a pre-defined set of responses, responses that might not accurately describe the respondent’s thoughts or feelings and try to create the right atmosphere to enable respondents to express themselves [44].

The quantitative method was adopted for use in this study. The choice of a quantitative approach is due to the fact that there are certain questions relating to e-banking adoption that this study hopes to provide answers to and this would be done by collecting data through the use of questionnaires and making statistical inferences from the data.

3.4 Target Population

The target population for this study comprises of bank users in Nigeria between the ages of 18 and 65. This study was open to all bank users in Nigeria, because not all bank users are adopting e-banking services. Therefore, it allows the researcher to collect data from
both adopters and non-adopters of the technology, to obtain their views on e-banking and be able to analyze it.

3.5 Sample Size and Sample Technique

The goal of this research is to obtain 150 responses from participants who say that they are e-banking users and the same number, 150, of responses from participants who are non-users. In total a sample size of 300 would be obtained for this research.

Given that the respondents to this survey will be self-selected, it is therefore acknowledged that there will be bias in the results and that it will not be possible to draw statistical conclusions from the non-random sample. However, the hope is that it will still be possible to learn interesting things from the responses, particularly when comparing the responses from users and non-users.

The sampling being done will be an example of convenience non-probability sampling, a technique used by researchers in conducting research with the hope of getting an inexpensive approximation of the truth [45].

The quota non-probability technique involves dividing subjects into groups and allocating proportions to each group [45]. For the purpose of this research we would be basing our quota on the users and non-users of e-banking services. The goal is to have a 50:50 ratio by considering responses from equal numbers of e-banking users and non-users.

3.6 Data Collection Method

Data was collected using a self-administered questionnaire which contained different closed-ended questions, because it allows the researcher to perform quantitative analysis
from the data gathered. A questionnaire was adopted for this study because it provides a quick and easy way to collect data, it offers respondents the assurance of being anonymous and because since all participants are asked the same questions, the researcher can be sure that all the participants answered exactly the same questions, which makes it a very reliable method of research [46].

The questionnaire was composed of 3 sections. Section 1 contained demographic information about participants such as gender, tribe, age, income, education level, area of residence, salary payment method and internet literacy level. Section 2 contained questions that attempt to obtain information about the participant’s perceptions towards using e-banking services. All responses to questions on perceptions towards e-banking were measured by adopting Likert’s rating scale [33] ranging from 1=strongly disagree to 5=strongly agree in order to understand respondents’ views with respect to any given question.

Questionnaires can be distributed in different formats such as email, courier, printed and online based. Among all the methods of distribution listed, the researcher chose the online based survey. The questionnaire was distributed via the use of an online based survey hosting service (freesurveyonline.com) and was advertised via Facebook in order to gather the necessary audience, and the audience was attracted with the knowledge that a small donation would be made to charity for each of the first 300 questionnaires completed.

3.7 Data coding and analysis

Data were coded with IBM’s (Original) SPSS software and coding with the original copy of the software is in line with the level of ethics that is attached with this research as all
processes were conducted in an ethical and transparent means to assure quality with every finding delivered from the research process. A number of data analysis and statistical techniques are used in this study, including: frequencies, percentages, Pearson’s chi-square and the Independent t-test to analyze data obtained from the research.

3.7.1 Frequencies

Frequency analysis is used to predict how often certain values of a variable or responses may occur and to assess the reliability of the prediction [47].

3.7.2 Percentages

A percentage is defined as part of a subgroup to the aggregate group and it ranges from 0% to 100%.

3.7.3 Hypothesis Testing

Hypothesis testing involves having two hypotheses: the alternate and the null hypothesis. Hypothesis testing refers to the theory, methods, and practice of testing an alternate hypothesis by comparing it with the null hypothesis. The null hypothesis is only rejected if the probability of seeing data as extreme as the observed data if the null hypothesis were true falls below a predetermined significance level.

**Alternative hypothesis (H₁):** The opposite of the null hypothesis. The alternate hypothesis is a claim of “difference” in the population studied [48]. For this study the alternative hypotheses are as follows:

H₁: there is a significant difference between adopters and non-adopters of e-banking with respect to gender.
$H_2$: there is a significant difference between adopters and non-adopters of e-banking with respect to tribe.

$H_3$: there is a significant difference between adopters and non-adopters of e-banking with respect to age.

$H_4$: there is a significant difference between adopters and non-adopters of e-banking with respect to annual income.

$H_5$: there is a significant difference between adopters and non-adopters of e-banking with respect to education level.

$H_6$: there is a significant difference between adopters and non-adopters of e-banking with respect to sector of employment.

$H_7$: there is a significant difference between adopters and non-adopters of e-banking with respect to where they reside.

$H_8$: there is a significant difference between adopters and non-adopters of e-banking with respect to forms of payment they receive.

$H_9$: there is a significant difference between adopters and non-adopters of e-banking with respect to internet literacy.

$H_{10}$: there is a significant difference between adopters and non-adopters of e-banking with respect to e-banking awareness.

$H_{11}$: there is a significant difference between adopters and non-adopters of e-banking with respect to the perception that e-banking security is sufficient.
H12: there is a significant difference between adopters and non-adopters of e-banking with respect to the perception that e-banking provides information privacy.

H13: there is a significant difference between adopters and non-adopters of e-banking with respect to the perception that e-banking services are easy to use.

H14: there is a significant difference between adopters and non-adopters of e-banking with respect to the perception that e-banking sites are trustworthy.

Null hypothesis (H0) - The null hypothesis is a claim of “no difference” in the population studied [48]. When using inferential statistics we do not directly address the testable statement (alternate hypothesis), rather we address the null hypothesis.

3.7.4 Pearson’s Chi-squared test for Independence

The chi-squared test for independence of two variables is a test which uses a cross classification table to establish a relationship between two categorical variables. The test for independence examines whether the observed pattern between the variables in the two categories is strong enough to show that the two variables are dependent on each other or not [50]. The test for independence between two variables A and B begins by assuming that there is no relationship between the two variables. The alternative hypothesis states that there is some relationship between the two variables. If the two variables in the cross classifications are A and B, the hypotheses are:

H0: No relationship between A and B

H1: Some relationship between A and B

In terms of independence and dependence these hypotheses could be stated
H₀: A and B are independent

H₁: A and B are dependent. [49]

Therefore, if we reject the null hypotheses based on what we observed that the two variables A and B are independent of each other, we would then conclude that one variable is related to the other. In order for this to be achieved a significance level is chosen beforehand. For this study, a significance level of 0.05 is chosen because it is one of the most common significance levels [51].

3.7.5 Independent t-test

An independent t-test examines the means of two independent groups or variables (e.g. e-banking adopters and non-adopters) on one factor (dependent variable) to determine if there are significant differences [52]. If we reject the null hypotheses based on what we observed that the two variables are not significantly different from each other, we would then conclude that one variable is significantly different from the other. In order for this to be achieved a significance level is chosen beforehand. For this study, a significance level of 0.05 is chosen because it is one of the most common significance levels [51].
CHAPTER 4

Data Analysis and Presentation of Findings

This chapter presents findings from the primary research. Questionnaire responses are quantitatively analysed using graphs and tables created by SPSS, a comprehensive system containing several programs for manipulating, analyzing, and presenting data [57]. This chapter also analyses the differences between adopters and non-adopters of e-banking with respect to their demographic factors and perceptions towards e-banking.

4.1 Questionnaire Response Rate

A total of 281 responses were received from this survey, with 220 responses categorized as being valid and 61 responses as being invalid. The invalid responses were due to three factors:

- No data entry at all, respondents only agreed to take part in the survey.
- Only the demographic section was completed but no response was given to any of the survey questions.
- Questionnaires that came from regions outside Nigeria.

Of the 220 respondents, 61 percent were categorized as e-banking adopters and the remaining 39 percent were categorized as non-adopters of e-banking.
<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopters of E-banking</td>
<td>134</td>
</tr>
<tr>
<td>Non-adopters of E-banking</td>
<td>86</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
</tr>
</tbody>
</table>

**Table 4.1: Categorizing responses of respondents based on E-banking adoption rate.**

### 4.2 Demographic Analysis

The chi-squared test was used to check if there were any significant differences between adopters and non-adopters of e-banking with respect to their demographic factors. The chi-squared test compares observed data with data we would expect to obtain, according to a specific hypothesis. But in this study since we are not using previously observed data, but we are using the null hypothesis that there is no difference between the two groups, SPSS automatically calculates its expected value from the observed values obtained during the research. Below is how SPSS obtains the chi-squared value for a given variable.

First SPSS calculates the number of degrees of freedom; this measures the amount of variability involved in the data, based on the number of categories being examined, using the formula \((\text{number of rows} - 1) \times (\text{number of columns} - 1)\). Taking gender, for example, based on the data in Table 4.2: Number of rows = 2 and Number of columns = 2; therefore the number of degrees of freedom is 1.
Secondly, SPSS calculates the expected values using the formula \( E_{r,c} = \frac{(n_r \times n_c)}{n} \)

where \( r = \) row, \( c = \) column, \( n = \) total sample size, \( n_r = \) number of entries in row \( r \), \( n_c = \) number of entries in column \( c \). Using gender from Table 4.2, SPSS computes the expected value for each cell independently.

\[
\begin{align*}
E_{1,1} &= \frac{(127 \times 134)}{220} = 77 \\
E_{1,2} &= \frac{(127 \times 86)}{220} = 50 \\
E_{2,1} &= \frac{(93 \times 134)}{220} = 57 \\
E_{2,2} &= \frac{(93 \times 86)}{220} = 36
\end{align*}
\]

This implies that if all e-banking adopters and non-adopters were equally likely to be male or female, we would expect our data to include 77 male adopters, 57 female adopters, 50 male non-adopters and 36 female non-adopters. However the actual data obtained contained 70 male adopters, 64 female adopters, 57 male non-adopters and 29 female non-adopters. SPSS then computes the chi-squared value using the formula

\[
\chi^2 = \sum \left( \frac{(O_{r,c} - E_{r,c})^2}{E_{r,c}} \right)
\]

where \( O_{r,c} \) is the observed value in row \( r \) and column \( c \). Using gender from Table 4.2, SPSS computes the chi-squared value.

\[
\chi^2 = \frac{(70-77)^2}{77} + \frac{(57-50)^2}{50} + \frac{(64-57)^2}{57} + \frac{(29-36)^2}{36}
\]

\[
= 0.6992 + 1.088 + 0.9536 + 1.487 = 4.23 \text{ which can be confirmed from Table 4.3.}
\]

Finally, SPSS calculates the p-value, which is the probability that the observations could be at least as far from the expected results as they were if the null hypothesis were true. This p-value is used to determine if there is a significant difference between adopters and non-adopters. Using a chi table displayed in Appendix A, we can determine the range of the p-value. First find the degrees of freedom from the table, and then read across that row until you find a number greater than the chi-value being examined. In this case we
are examining the chi-squared value of 4.23 and the first higher number found is 5.02; looking to the top of this column, we see that the corresponding p value is 0.025. This implies that the p value is between 0.025 and 0.05, i.e. the next biggest p-value on the table. From Chapter 3 we declared a significant value prior to the test which was 0.05. Since the p-value falls between 0.025 and 0.05 that implies there is very little chance of seeing data as extreme as the observed data if the null hypothesis were true; therefore the null hypothesis is rejected, and the difference is considered to be significant.

4.2.1 Gender and E-banking Adoption

![Gender Distribution Chart]

Fig 4.1: Gender Distributions

According to the chart in Fig. 4.1, the majority of the respondents were male, which represents 58% of the respondents and female represents 42%.

The hypothesis $H_1$ states there is a significant difference between adopters and non-adopters of e-banking with respect to gender, as opposed to the null hypothesis that there
is no significant difference between adopters and non-adopters of e-banking with respect to gender. Table 4.2 and 4.3 displays a summary of the findings.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Respondents</th>
<th>E-banking Adopters</th>
<th>E-banking Non-adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>Male</td>
<td>127</td>
<td>58</td>
<td>70</td>
</tr>
<tr>
<td>Female</td>
<td>93</td>
<td>42</td>
<td>64</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100</td>
<td>134</td>
</tr>
</tbody>
</table>

Table 4.2: Gender as a determinant of E-banking Adopters and Non-adopters.

<table>
<thead>
<tr>
<th>Chi-Squared Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
</tr>
<tr>
<td>Pearson Chi-Square</td>
</tr>
</tbody>
</table>

Table 4.3: Gender Chi-squared test result.
From Table 4.2, the largest percentage of adopters and non-adopters were males; 52 and 66 percent respectively. The chi-squared test value of 4.231 had a probability of 0.040, which is less than 0.05, which implies that the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore there is a significant difference between adopters and non-adopters of e-banking with respect to gender. The results from this research showed there were more female adopters and more male adopters than expected.

4.2.2 Age and E-banking Adoption

According to the chart in Fig. 4.2, the majority of the respondents by age were in the 18-30 age group with 44 percent, followed by the 31-40 age group with 31 percent. 16 percent were in the 41-50 age groups, 7 percent were in the 51-60 age group and 2 percent were above 60 years of age.

The hypothesis $H_3$ states that there is a significant difference between adopters and non-adopters of e-banking with respect to age, as opposed to the null hypothesis that there is no
significant difference between adopters and non-adopters of e-banking with respect to age.

Table 4.4 and 4.5 displays a summary of the findings.

<table>
<thead>
<tr>
<th>Age</th>
<th>Respondents</th>
<th>E-banking Adopters</th>
<th>E-banking Non-adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>18-30</td>
<td>96</td>
<td>44</td>
<td>67</td>
</tr>
<tr>
<td>31-40</td>
<td>68</td>
<td>31</td>
<td>39</td>
</tr>
<tr>
<td>41-50</td>
<td>36</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>51-60</td>
<td>15</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Above 60</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100</td>
<td>134</td>
</tr>
</tbody>
</table>

Table 4.4: Age as a determinant of E-banking Adopters and Non-adopters.
### Chi-Squared Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig (2-sided)</th>
<th>Exact Sig. (2 sided)</th>
<th>Exact Sig. (1 sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>12.13</td>
<td>4</td>
<td>0.016</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 4.5: Age Chi-squared test result.*

From Table 4.4, the largest percentage of adopters were in the 18-30 age group with 50 percent and the largest percentage of non-adopters were in the 18-30 and 31-40 age groups with 34 percent each. The chi-squared test value of 12.13 had a probability of 0.016, which is less than 0.05, which implies that the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore there is a significant difference between adopters and non-adopters of e-banking with respect to age. These findings showed that adopters are more likely to be in the 18-30 age group and in the 51-60 age group than the expected values would tell us.

### 4.2.3 Education Level and E-banking Adoption

![Education Level Distributions](image)

*Fig: 4.3: Education Level Distributions.*
According to the chart in Fig. 4.3, a large number of the respondents were well educated, with 51 percent of the respondents having their bachelors' degree and 24 percent of the respondents being masters' degree holders, followed by 9 percent of the respondents who are Ph.D holders. 11 percent of the respondents were secondary school certificate holders, and the remaining 5 percent were respondents who hold other certificates such as technical schools, college of education, polytechnics, etc. The high rate of post-secondary respondents is not surprising based on the fact that highly educated people are the most common users of the internet in Nigeria, whereas in a developing country like Nigeria, secondary school students are not really exposed to the internet, so they would be less likely to become aware of this online survey.

The hypothesis $H_s$ states that there is a significant difference between adopters and non-adopters of e-banking with respect to education level, as opposed to the null hypothesis that there is no significant difference between adopters and non-adopters of e-banking with respect to education level. Table 4.6 and 4.7 displays a summary of the findings.

From Table 4.6, the largest percentage of adopters compared to non-adopters was Bachelors Degree holders with 54 and 48 percent respectively. The chi-squared test value of 31.145 had a probability of 0.000, which is less than 0.05, which implies that the null hypothesis is rejected and the alternative hypothesis is accepted. Therefore there is a significant difference between adopters and non-adopters of e-banking with respect to education level. These findings showed that adopters are more likely to be people with bachelors and masters degrees than the expected values would tell us, and less likely to be people with secondary education and people with a Ph.D.
<table>
<thead>
<tr>
<th>Education Level</th>
<th>Respondents</th>
<th>E-banking Adopters</th>
<th>E-banking Non-adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>Secondary</td>
<td>25</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Bachelors Degree</td>
<td>113</td>
<td>51</td>
<td>72</td>
</tr>
<tr>
<td>Masters</td>
<td>52</td>
<td>24</td>
<td>43</td>
</tr>
<tr>
<td>Ph.D</td>
<td>20</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100</td>
<td>134</td>
</tr>
</tbody>
</table>

Table 4.6: Education level as a determinant of E-banking Adopters and Non-adopters.

<table>
<thead>
<tr>
<th>Chi-Squared Tests</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig (2-sided)</th>
<th>Exact Sig. (2 sided)</th>
<th>Exact Sig. (1 sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>31.145</td>
<td>4</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.7: Education level Chi-squared test result.
4.2.4 Form of Payment Received and E-banking Adoption

According to the chart in Fig. 4.4, the majority of the respondents receive direct deposit as their mode of payment, which represents 71 percent of the respondents, and 29 percent of the respondents receive cheques.

The hypothesis $H_8$ states that there is a significant difference between adopters and non-adopters of e-banking with respect to forms of payment they receive, as opposed to the null hypothesis that there is no significant difference between adopters and non-adopters of e-banking with respect to forms of payment they receive. Table 4.8 and 4.9 displays a summary of the findings.

From Table 4.8, the largest percentage of adopters and non-adopters received payment through direct deposit, 72 and 70 percent respectively. The chi-squared test value of 0.089 had a probability of 0.765, which is greater than 0.05, which implies that the null hypothesis is accepted and the alternative hypothesis is rejected. Therefore there is no significant difference between adopters and non-adopters of e-banking with method of receiving payment.
<table>
<thead>
<tr>
<th>Method of Payment Received</th>
<th>Respondents</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>Direct Deposit</td>
<td>156</td>
<td>71</td>
<td>96</td>
<td>72</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Cheque</td>
<td>64</td>
<td>29</td>
<td>38</td>
<td>28</td>
<td>26</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100</td>
<td>134</td>
<td>100</td>
<td>86</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4.8: Method of payment received as a determinant of E-banking Adopters and Non-adopters.

<table>
<thead>
<tr>
<th>Chi-Squared Tests</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig</th>
<th>Exact Sig. (2 sided)</th>
<th>Exact Sig. (1 sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>0.089</td>
<td>1</td>
<td>0.765</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.9: Method of payment received Chi-squared test result.
4.2.5 Other Demographic profiles

- **Tribe**: Analysis showed the largest percentage of adopters and non-adopters were Yorubas; 74 and 48 percent respectively. The chi-squared test value of 19.039 had a probability of 0.000, which is less than 0.05. Therefore there is a significant difference between adopters and non-adopters of e-banking with respect to tribe. These findings showed people from the Yoruba tribe are more likely to adopt e-banking than the expected values would tell us.

- **Income Level**: Analysis showed 36 percent of adopters earned between ₦1,000,001 - ₦10,000,000 naira. Also 35 percent of the non-adopters fell within the same income bracket. The chi-squared test value of 1.588 had a probability of 0.811, which is greater than 0.05. Therefore there is no significant difference between adopters and non-adopters of e-banking with respect to annual income.

- **Sector of Employment**: Analysis showed the largest percentage of adopters and non-adopters work in the private sector, with 44 and 40 percent respectively. The chi-squared test value of 1.151 had a probability of 0.886, which is greater than 0.05. Therefore there is no significant difference between adopters and non-adopters of e-banking with respect to sector employment.

- **Internet Literacy**: Analysis showed the largest percentages of adopters were advanced level respondents with 67 percent, while the largest percentage of the non-adopters was intermediate level with 51 percent. The chi-squared test value of 32.871 had a probability of 0.000, which is less than 0.05. Therefore there is a significant difference between adopters and non-adopters of e-banking with respect to internet literacy level. These findings showed people with an advanced level of
internet literacy are more likely to adopt e-banking than the expected values would tell us.

- **E-banking awareness**: Analysis showed 100 percent of the adopters were aware of e-banking, while 13 percent of non-adopters were not aware of e-banking services offered by their banks. The chi-squared test value of 21.528 had a probability of 0.000, which is less than 0.05. Therefore there is a significant difference between adopters and non-adopters of e-banking with the level of e-banking awareness. These findings showed people who are aware of e-banking are more likely to adopt e-banking than the expected values would tell us.

- **Area of Residence**: Analysis showed the largest percentage of adopters and non-adopters resided in the urban area, 87.3 and 64 percent respectively. The chi-squared test value of 16.757 had a probability of 0.000, which is less than 0.05. Therefore there is a significant difference between adopters and non-adopters of e-banking with area of residence. These findings showed people who live in urban areas are more likely to adopt e-banking than the expected values would tell us.

### 4.2.6 Preferred method of performing bank transfer

![Preferred Bank Transfer Method Distributions](image)

**Fig. 4.5**: Preferred Bank Transfer Method Distributions
According to the chart in Fig. 4.5, 50 percent of the respondents indicate ATM as being their preferred method of performing bank transactions, 44 percent of the respondents indicate internet banking as their preferred method for performing bank transactions and 6 percent of the respondents indicate phone banking as their preferred method for performing bank transactions. The finding is in line with a report on ICT banking systems in Nigeria, which "reveals that e-payment machinery, especially the card technology, is presently enjoying the highest popularity in Nigeria banking market. According to INTER SWITCH statistics, Nigeria has 30 million ATM card holders who conduct over 100 million transactions on the machines every month. Nigeria's 20 banks operate over 9,000 ATM machines across the country's 36 states and Federal Capital Territory"[58].

4.3 Relationship between adopters and non-adopters of e-banking with respect to their perceptions towards IB

The independent t-test was used to check if there were any significant differences between adopters and non-adopters of e-banking with respect to their perceptions towards e-banking. The independent t-test was a preferred choice for this test because the mean response from each category is what is used to check the relationship.

Based on the fact that the likert scale was used to gather responses, we used the following conversion between responses and a numerical scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. The mean value in a set of responses gives an idea of the degree to which that group agreed with the statement, on average.
4.3.1 Perception Towards e-banking security

Respondents were asked six questions to determine their level of agreement with respect to their perception towards e-banking security.

- Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries.
- The security of e-banking is important to me.
- The security policies of e-banking are available to customers.
- E-banking transactions are more secure than carrying money.
- E-banking offers higher security than conventional banking.
- Passwords and security keys are sufficient enough security for all my e-banking services.

With regards to the perception that Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries, the alternative hypothesis was that there is a significant difference between the mean responses of the adopters and non-adopters of e-banking with respect to the fact that Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries. The null hypothesis is that there is no significant difference between the mean responses of the adopters and non-adopters.

Table 4.10 displays that 30 percent of the adopters and 20 percent of the non-adopters agreed that Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries while 43 percent of adopters and 58 percent of non-adopters disagreed.
<table>
<thead>
<tr>
<th>Question 1</th>
<th>Respondents</th>
<th>E-banking Adopters</th>
<th>E-banking Non-adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>33</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Disagree</td>
<td>75</td>
<td>34</td>
<td>43</td>
</tr>
<tr>
<td>Neutral</td>
<td>49</td>
<td>22</td>
<td>34</td>
</tr>
<tr>
<td>Agree</td>
<td>44</td>
<td>20</td>
<td>27</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>13</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>6</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100</td>
<td>134</td>
</tr>
</tbody>
</table>

Table 4.10: Relationship between adopters and non-adopters of e-banking with respect to the perception that Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries.
### Group Statistics

<table>
<thead>
<tr>
<th>AdopterOrNonAdopter</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adopters</td>
<td>134</td>
<td>2.90</td>
<td>1.222</td>
<td>.106</td>
</tr>
<tr>
<td>Non-Adopters</td>
<td>86</td>
<td>2.55</td>
<td>1.280</td>
<td>.138</td>
</tr>
</tbody>
</table>

Table 4.11: Mean Response Score (Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries).

From Table 4.11, the mean response score of adopters is 2.90 while that of the non-adopters is 2.55.

### Independent Samples Test

<table>
<thead>
<tr>
<th>Levene’s Test for Equality of Variances</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig</td>
<td>df</td>
<td>Sig (2-tailed)</td>
</tr>
<tr>
<td>Question1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>318</td>
<td>.572</td>
<td>2.028</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td></td>
<td></td>
<td>.044</td>
</tr>
</tbody>
</table>

Table 4.12: Independent t-test (Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries).

From Table 4.12, the independent t-test value is displayed as 2.029 with an associated probability of 0.044, which is less than 0.05. This implies that the null hypothesis is rejected, and there is a significant difference between the mean responses of adopters and non-adopters with respect to the perception that Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries.

The results for all questions about security are summarized in Table 4.13.
<table>
<thead>
<tr>
<th>Question</th>
<th>Mean response from Adopters</th>
<th>Mean response from non-adopters</th>
<th>Significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria’s e-banking security measures are more advanced than its neighbouring West African countries.</td>
<td>2.90</td>
<td>2.55</td>
<td>Yes</td>
</tr>
<tr>
<td>The security of e-banking is important to me.</td>
<td>4.15</td>
<td>4.14</td>
<td>No</td>
</tr>
<tr>
<td>The security policies of e-banking are available to customers.</td>
<td>3.03</td>
<td>2.56</td>
<td>Yes</td>
</tr>
<tr>
<td>E-banking transactions are more secure than carrying money.</td>
<td>3.75</td>
<td>3.33</td>
<td>Yes</td>
</tr>
<tr>
<td>E-banking offers higher security than conventional banking.</td>
<td>3.36</td>
<td>2.80</td>
<td>Yes</td>
</tr>
<tr>
<td>Passwords and security keys are sufficient enough security for all my e-banking services.</td>
<td>2.77</td>
<td>2.15</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 4.13: Perception Towards e-banking Security

4.3.2 Perception Towards e-banking Privacy

Respondents were asked three questions to determine their level of agreement with respect to their perception towards e-banking privacy.
• E-banking offers higher privacy than conventional banking.

• Banking institutions keep customers’ information private and confidential.

• Privacy in e-banking is important to me.

The results for all questions about privacy are summarized in Table 4.14.

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean response from Adopters</th>
<th>Mean response from non-adopters</th>
<th>Significant difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-banking offers higher privacy than conventional banking.</td>
<td>3.48</td>
<td>2.87</td>
<td>Yes</td>
</tr>
<tr>
<td>Banking institutions keep customers’ information private and confidential.</td>
<td>3.40</td>
<td>3.02</td>
<td>Yes</td>
</tr>
<tr>
<td>Privacy in e-banking is important to me.</td>
<td>4.36</td>
<td>4.00</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 4.14: Perception Towards e-banking Privacy.

4.3.3 Perception towards Ease of use.

With regards to the perception that e-banking services are easy to use, the alternative hypothesis was that there is a significant difference between the mean responses of the adopters and non-adopters of e-banking with respect to the fact that e-banking services are
easy to use. The null hypothesis is that there is no significant difference between the mean responses of the adopters and non-adopters of e-banking with respect to the fact that e-banking services are easy to use.

<table>
<thead>
<tr>
<th>Question 10</th>
<th>Respondents</th>
<th>E-banking Adopters</th>
<th>E-banking Non-adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>Strongly</td>
<td>21</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>disagree</td>
<td>59</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Disagree</td>
<td>26</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Neutral</td>
<td>61</td>
<td>28</td>
<td>44</td>
</tr>
<tr>
<td>Agree</td>
<td>46</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td>Strongly</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>agree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100</td>
<td>134</td>
</tr>
</tbody>
</table>

Table 4.15: Relationship between adopters and non-adopters of e-banking with respect to the perception e-banking is easy to use.
Table 4.15 displays that 64 percent of the adopters and 25 percent of the non-adopters agreed that institutions' e-banking is easy to use while 28 percent of adopters and 49 percent of non-adopters disagreed.

<table>
<thead>
<tr>
<th>Question10</th>
<th>Adopters</th>
<th>Non-Adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>134</td>
<td>86</td>
</tr>
<tr>
<td>Mean</td>
<td>3.63</td>
<td>2.87</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>1.375</td>
<td>1.309</td>
</tr>
<tr>
<td>Std. Error</td>
<td>.119</td>
<td>.141</td>
</tr>
</tbody>
</table>

Table 4.16: Mean Response Score (E-banking ease of use)

From Table 4.16, the mean response score of adopters is 3.63, while that of the non-adopters is 2.87.

<table>
<thead>
<tr>
<th>Question10</th>
<th>Equal variances assumed</th>
<th>Equal variances not assumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1.330</td>
<td>4.092</td>
</tr>
<tr>
<td>Sig.</td>
<td>.250</td>
<td>.002</td>
</tr>
<tr>
<td>t</td>
<td>4.048</td>
<td>187.811</td>
</tr>
<tr>
<td>df</td>
<td>219</td>
<td>187.811</td>
</tr>
<tr>
<td>Mean Diff.</td>
<td>.755</td>
<td>.755</td>
</tr>
<tr>
<td>Std. Error</td>
<td>.166</td>
<td>.184</td>
</tr>
<tr>
<td>95% CI</td>
<td>.367, 1.133</td>
<td>.391, 1.119</td>
</tr>
</tbody>
</table>

Table 4.17: Independent t-test (E-banking ease of use)

From Table 4.17, the independent t-test value is displayed as 4.048, with an associated probability of 0.000, which is less than 0.05. This implies that there is a significant difference between the mean responses of adopters and non-adopters with respect to the perception that e-banking is easy to use.

4.3.4 Perception towards E-banking Trust.

Respondents were asked two questions to determine their level of agreement with respect to their perception towards e-banking trust.
• The online banking site of my bank is trustworthy.
• I trust in the safety of online money transfer.

With regards to the perception that the online banking site of my bank is trustworthy, the alternative hypothesis was that there is a significant difference between the mean responses of the adopters and non-adopters of e-banking with respect to the fact that the online banking site of my bank is trustworthy. The null hypothesis is that there is no significant difference between the mean responses of the adopters and non-adopters.

<table>
<thead>
<tr>
<th>Question 11</th>
<th>Respondents</th>
<th>E-banking Adopters</th>
<th>E-banking Non-adopters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>Strongly</td>
<td>26</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>disagree</td>
<td></td>
<td></td>
<td>112</td>
</tr>
<tr>
<td>Disagree</td>
<td>55</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Neutral</td>
<td>48</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>Agree</td>
<td>59</td>
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<td>50</td>
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<tr>
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<td>11</td>
<td>22</td>
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Table 4.18: Relationship between adopters and non-adopters of e-banking with respect to the perception that the online banking site of my bank is trustworthy
Table 4.18 displays that 53 percent of the adopters and 15 percent of the non-adopters agreed that institutions’ e-banking is easy to use while 29 percent of adopters and 48 percent of non-adopters disagreed.

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**Table 4.19:** Mean Response Score (The online banking site of my bank is trustworthy)

From Table 4.19, the mean response score of adopters is 3.32, while that of the non-adopters is 2.77.

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<tr>
<td>Equal variances not assumed</td>
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**Table 4.20:** Independent t-test (The online banking site of my bank is trustworthy)

From Table 4.20, the independent t-test value is displayed as 3.106, with an associated probability of 0.002, which is less than 0.05. This implies that there is a significant difference between the mean responses of adopters and non-adopters with respect to the perception that the online banking site is trustworthy.

With regards to the perception that respondents trust in the safety of online money transfer, analysis showed the mean response score of adopters is 3.22 while that of the non-adopters is 2.62. The independent t-test value is displayed as 3.453, with a probability of 0.001, which is less than 0.05. This implies that there is a significant difference between the mean
responses of adopters and non-adopters with respect to the perception that they trust in the safety of online money transfer.

4.3.5 Perception that E-banking is convenient.

With regards to the perception that e-banking is convenient, the alternative hypothesis was that there is a significant difference between the mean responses of the adopters and non-adopters that e-banking is convenient. The null hypothesis is that there is no significant difference between the mean responses of the adopters and non-adopters of e-banking with respect to the perception that e-banking is convenient.

Table 4.21 displays that 66 percent of the adopters and 19 percent of the non-adopters agreed that e-banking is convenient while 28 percent of adopters and 40 percent of non-adopters disagreed.
Table 4.21: Relationship between adopters and non-adopters of e-banking with respect to the perception that e-banking is convenient.

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<th>E-banking Non-adopters</th>
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<tr>
<td>Strongly agree</td>
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<tr>
<td>Total</td>
<td>220</td>
<td>100</td>
<td>134</td>
</tr>
</tbody>
</table>

Table 4.22: Mean Response Score (E-banking is convenient.)

From Table 4.22, the mean response score of adopters is 3.67, while that of the non-adopters is 3.78.
### Table 4.23: Independent t-test (E-banking is convenient.)

From Table 4.23, the independent t-test value is displayed as -0.477, with a probability of 0.634, which is greater than 0.05. This implies that there is no significant difference between the mean responses of adopters and non-adopters with respect to the perception that e-banking is convenient.

### 4.4 Chapter Summary

This chapter analysed and further discussed the findings obtained from the questionnaire, in an attempt to analyse the factors influencing user adoption of e-banking in Nigeria.
CHAPTER 5
Conclusions and Recommendations

5.1 Introduction

This chapter highlights a summary of the entire report, offers interpretation of the data, and provides some recommendations and some discussion of areas where further research can be carried out.

5.2 Conclusions

The aim of this report was to analyse the factors influencing the adoption of e-banking from the customer perspective, mainly by analysing their perception and attitude towards e-banking, using information gathered through the survey carried out during the study. This study has verified that security and privacy are among the most important determining factors influencing customer adoption of e-banking. Drawing conclusions from the results in Chapter 4, for most of the questions asked pertaining to security and privacy, there was a significant difference in the mean responses of adopters and non-adopters. Individuals who are more comfortable with the privacy and security of e-banking are more likely to use it.

Data analysed was obtained through the use of a self administered questionnaire put online by the researcher. A self-selected sample of 220 respondents from Nigeria, a combination of adopters and non-adopters of e-banking, was obtained. From the questionnaire, sections pertaining to demographic factors and perception towards e-banking were first analysed.
using frequency and percentages to determine distributions between the adopters and non-adopters. The Pearson chi-squared test was also carried out to analyse how adopters and non-adopters differ based on their demographic factors. The independent t-test was used to analyse the mean responses of respondents, in order to differentiate adopters and non-adopters of e-banking based on their perception towards e-banking.

From the chi-squared test carried out above on the data gathered, gender, tribe, age, education level, area of residence, internet literacy and e-banking awareness had significant effects in influencing user adoption of e-banking, while income level, sector of employment and method of payment had no significant effects on customer adoption of e-banking in Nigeria. Also, based on the results of independent t-tests, the conclusion is that there is a significant difference between adopters and non-adopters with respect to their perception towards e-banking security, e-banking privacy, ease of use and trust in the Nigerian e-banking system.

Adopters of e-banking were significantly more likely to say that Nigeria’s e-banking security policies are available to customers, e-banking offers higher security than conventional banking, e-banking offers higher privacy than conventional banking, e-banking is easy to use, online banking sites are trustworthy and they trust in the safety of online money transfer.

5.3 Recommendations.

Noting that e-banking is fast evolving in Nigeria, findings acquired from this study can proffer strategies that will help retain and acquire new customers that will improve the e-banking adoption level in Nigeria.
From this study, based on the number of demographic factors that showed a significant
difference between the adopters and non-adopters of e-banking services in Nigeria, it is
clearly evident that awareness is one of the main issues hindering the adoption of e-banking
in Nigeria. Nigerian banks should invest more money in advertising the advantages of the
various e-banking services, e.g. through magazines, billboards, television and radio
adverts. In Nigeria, most bank advertisements are mostly related to discussing benefits of
opening their different types of accounts, e.g. super saving accounts, children’s education
fund accounts and so on, rather than pitching the aspect of having a cashless Nigeria. Based
on my study, which is not to generalize to the whole Nigerian population, older customers
find it difficult to adopt this new technology, which is a sign that advertisement should be
made appealing to that target audience to enable them see the benefits of the technology.

Also this study showed that less educated individuals, residing in rural areas, find it
difficult to adopt this technology. This shows that banks should take their awareness to
the grassroots. Banks should organize free workshops and seminars with incentives, to
enable them to harness a lot of participants and explain how these services can be used. It
should also be noted that the survey respondents were quite highly educated overall, so
we have not captured a true representation of the whole Nigerian population. It is likely
that the issues observed in the survey results are even more of a concern in the overall
population.

Also, this study showed there was significant difference between adopters and non-
adopters with respect to perception towards security and privacy. Currently in Nigeria,
the authentication methods adopted by commercial banks are passwords, PINs, tokens and One-Time passwords.

According to the Central bank of Nigeria guidelines, all commercial banks must make use of Two-factor authentication methods for any e-banking service. For example, when using the ATM or POS service for a transaction, a user must provide the card number and a PIN only the user knows. Also, when performing internet banking or online banking, the user enters his / her password and also makes use of a onetime password that is generated through the use of a token specifically assigned to the user account.

This research recommends that Nigerian banks should increase their security measures by adding biometric authentication to their security process.

Biometrics technology is said to be the most reliable and secure means of authentication based on the fact that it uses human distinctive features (e.g fingerprint, facial recognition, etc.) and behavioural traits (e.g voice, gait, etc.) for authentication. Biometrics has been described as the most secure and convenient authentication tool that cannot be stolen, forgotten, borrowed or forged [53]. This method of validation compares an enlisted or registered biometric sample, registered when opening an account, against a newly captured biometric sample such as a retina scan captured during a login process [54]. There are several forms of biometrics, but this research proposes the use of fingerprint verification. This project recommends:

- Fingerprint verification for ATM and POS transactions. "Finger print based identification method is one of the most mature and proven technique."[55] More
so, fingerprint sensors are getting less expensive and smaller in size; this would enable easy addition to the bank processes.

This involves having Nigerian banks install fingerprint scanners alongside the ATM machines. Once a user needs to perform any transaction using the ATM or POS, the user enters their ATM card, and the machine determines that the card is a valid card. If the card is invalid, it is returned to the user but if the card is valid, the ATM prompts the user to enter their 4 digit PIN. If the PIN is invalid the user is asked to try again; if the user enters the wrong PIN three times, the ATM withholds the card and displays a message informing the user to visit their bank branch to report the issue. If the PIN is valid, then the ATM requests the user to put their thumb in the fingerprint scanner. If the fingerprint does not match what is in the bank database, the customer is advised to visit the nearest customer service of their bank.

- **Face Recognition for Internet banking and online banking:** this involves customers performing any online transaction to have a webcam connected to their personal computer. Before a successful transaction can be made, the user must have entered a valid card number, with the right password, a onetime password from the token issued by the bank and finally a retina scan which, when performed, sends data to the bank database and once a match is made a successful transaction can be made.

- **Voice Recognition for phone banking:** bank customers would have to record a short voice note when opening an account. During account verification, a user would need to enter the correct card number, enter a password corresponding to
the card and finally the system would request for voice authentication. Once the
voice authentication is granted, a successful mobile transaction can occur.

If biometric systems can be implemented in the Nigerian banking system, this would
increase customer confidence in e-banking.

"With 22.5 million accounts, Bradesco the largest private bank in Brazil, is currently
equipping its ATM machines with biometric technology in order to increase security.
Trials started in 2006, and Bradesco was the first bank in the Western hemisphere to
adopt biometrics at ATMs. The "Bradesco Security on Your Hand" biometric reading
system, which identifies customers using the vascular pattern of their hands, works in
conjunction with more traditional password-based security at the bank’s ATMs. As such,
registered account holders no longer need a personal identification number (PIN) when
making a transaction at an ATM equipped with a sensor. In the first quarter of 2010, this
technology was available in 13,889 machines and was used up to 57.8 million times
[56]."

Also in a developed country like Japan, financial institutions have rolled out the use of
biometrically authenticated ATM machines in 2006. "Research suggests there are
approximately 4 million consumers using the service with bank-issued cards containing
stored biometric data (finger vein or hand vein), which means that biometric customer
authentication can now be performed at ATMs by using either a palm vein pattern or
finger vein pattern, depending on the bank and ATM supplier. Japan currently has 150 banks with 12,000 branches and over 400 million bank accounts. In 2007, there were 20,000 ATMs equipped with this technology, a figure that rose to 80,000 ATMs, being used by 15 million customers in 2010."[56]

Also, some financial institutions in developed countries like Poland and Turkey have also adopted the technology.

5.4 Research limitations and future research

Because a non-random sampling technique was used to gather the respondents for the study, this produced a bias in the data and made it difficult for the researcher to generalize findings for the whole population of Nigeria. However, time constraints, cost and the researcher’s location made the researcher opt for the convenient sampling method.

Secondly, the research took place in an uncontrolled atmosphere, which could have caused inaccuracies in the rating scale result. For example, a respondent may encounter time constraints and other priorities, which can affect how accurate their result was.

Future Research

The following are areas that could be considered for future research:

- Similar research can be carried out using a random sampling method, so as to be able to generalize for the population as a whole.
• Similar research can be carried out when the number of e-banking users in Nigeria becomes higher; studies could be used to examine the factors that contributed to this increase in usage.

• Similar research can be carried out, but comparing two top banks in Nigeria and trying to understand the differences between each bank’s customers in terms of adoption of e-banking.
REFERENCES


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[34] Author Unknown, Internet population and penetration Available at: http://geography.oii.ox.ac.uk/?page=internet-population-and-penetration.


[56] Author Unknown, Biometric authentication begins to gain momentum, Available at: https://www.chyp.com/assets/uploads/Files/Biometric%20Payments%20Final_Transport_April%2018%202011.


[60] Akgame, Chi-squared Distribution Table. Available at: http://www.docstoc.com/docs/31237893/Chi-Square-Distribution-Table.
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APPENDIX B

QUESTIONNAIRE TO UNDERSTAND FACTORS THAT INFLUENCE ADOPTION OF ELECTRONIC BANKING IN NIGERIA

Objective: the purpose of this research is to understand factors that influence consumers’ adoption of e-banking in Nigeria; thus, your genuine response is needed as findings from this research will be used to develop new means of satisfying customers effectively.

Term to note:

Conventional Banking: Banking done via the bank counters with the cashiers attending to the customers.

Respondent A: Customers

Section A: Biographical data

Gender: Male □ Female □

Tribe: Igbo □ Hausa □ Yoruba □ Others □

Age: 18-30 □ 31-40 □ 41-50 □ 51-60 □ above60 □

What is your annual income level?: □ N 10,000 - □ N 100,000 □ N 100,001 - □ N 1,000,000 □
□ N 1,000,001 - □ N 10,000,000 □ N 10,000,001 - □ N 100,000,000 □ above □ N 100,000,000 □

What is your educational level?: □ Secondary □ Bachelors Degree □ Masters □
□ Ph.D □ Other □

Sector of employment: Private □ Government □ Not Employed □ Student □
□ Other □

Where do you reside?

Urban area: □ Rural area: □
What forms of payment do you receive?

Direct deposits: ☐ Cheques: ☐

Internet Literacy: Novice ☐ Intermediate level ☐ Advanced level ☐

I am aware of e-banking services offered by my bank: Yes ☐ No ☐

Do you currently use e-banking services? : Yes ☐ No ☐

{If you selected No above do not answer next question}

Which is your preferred method of performing bank transfer?

Internet banking ☐ ATM ☐ Phone banking ☐

Section B: Questionnaire

FACTORS THAT INFLUENCE USAGE

Instruction: 1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = totally agree
Not Applicable Option

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<th>Questions</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<td>The security of e-banking is important to me.</td>
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<td>The security policies of e-banking are available to customers.</td>
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<td></td>
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</tr>
<tr>
<td>Passwords and security keys are sufficient enough security for all my e-banking services</td>
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<td>Banking institutions keep customers’ information private and confidential.</td>
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<td>The online banking site of my bank is trustworthy.</td>
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<td>I trust in the safety of online money transfer.</td>
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<td>I make use of e-banking because it offers needed convenience.</td>
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<td>I make use of e-banking because of government policies against carrying cash (e.g Cash-Lite by Central Bank of Nigeria (CBN), interest on excessive withdrawals and deposits, etc.)</td>
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Curriculum Vitae

Candidate’s full name: Motunrayo Olatundun Josiah

Universities attended: Ajayi Crowther University, Oyo, Oyostate, Nigeria (2011, B.Sc)

University of New Brunswick, Fredericton, Canada (2015. MCS)