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BANK VERIFICATION NUMBER (BVN) AS A POSSIBLE FOUNDATION FOR DIGITAL IDENTITY STRATEGY IN NIGERIA

MASTER'S THESIS

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Associate Professor

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NIGEERIA DIGITAALSE IDENTITEEDI STRATEEGIA LOOMINE PANGA IDENTIFIKAATORI (PI) ALUSEL

Magistritöö

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Author's declaration of originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

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Abstract

Identity management and public service delivery are crucial to the maintenance of a sustainable government role of providing for citizens in every part of the world. A sound identity management system of citizens promotes local, regional, and national development and in turn, makes it easier for communication of policy formulation, planning, and implementation among the citizens, private firms, and government.

The thesis aimed to investigate the possible adoption of BVN as digital means of accessing public services online and improving identity management in Nigeria as a case study. Thus, the problem statement premised on understanding the need to improve identity management in Nigeria as there exist fragmented databases of the government, and NIMC efforts towards harmonization of the databases have not been successful. The current barriers hindering the successful identity management schemes implementation as well as best practices that can be adopted to proffer solutions to the challenges the country experiences were examined. In order to achieve our goal, the case study research methodology was selected as the appropriate research methodology for carrying out this research while interviews, document reviews, and surveys were the main instruments for data collection. Results indicated that BVN is secured and successful in the financial sector and the acceptance level of the people is high with regards to accessing public services online, several barriers to identity management in Nigeria like inadequate IT infrastructures and personnel, poor data management, multiple databases, inadequate funding, enrolment challenges, lack of trust in the system and legal deficiency in data protection and privacy were revealed from the result as well. In the event of these findings, the researcher proposed a set of steps in the form of a framework to improve identity management in Nigeria and test run the use of BVN to access public services in the country.

The thesis concludes that BVN potentials can transcend beyond the financial sector in Nigeria by using it in identification and verification capacity to access public services online and to improve identity management in Nigeria, the necessary steps taken by advanced countries to fully implement and manage digital identities of citizens and render public services digitally must be taken in the country as well. This Master's thesis is written in English and has sixty pages , including six chapters, one figure, and five tables.

Keywords BVN, Digital identity, Public services, NIMC, NIN

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List of abbreviations and terms

AFDB   African Development Bank
BVN   Bank Verification Number
E-ID   Electronic Identity/Identification
FIRS   Federal Inland Revenue Service
FRSC   Federal Road Safety Corp
GSMA   Global System for Mobile Association
IDM   Identity Management
INEC   Independent National Electoral Commission
IT   Information Technology
ITU   Information Telecommunication Union
LASRRA   Lagos State Residents Registration Agency
LIRS   Lagos Internal Revenue Service
NIBSS   National Inter-Bank Settlement System
NIC   National Identity Card
NIMC   National Identity Management Commission
NIN   National Identity Number
NITDA   National Information Technology Development Agency
OECD   OrganizationofEconomic Co-Operation and Development
PKI   Public Key Infrastructure
PPP   Public Private Partnership
SSCE   Senior Secondary Certificate of Education
UN   United Nation
USSD   Unstructured Supplementary Service Data

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1   Introduction

Identification of human is referred to as the association of data and information with a person (Clark, 1994; Kodi & Lokay, 2001) and it is an essential activity that enables the society to maintain orderliness, as a result of this activity, both public services and commercial transactions are made possible such as applying for benefits from the government and loans application from commercial banks (Castro, 2011). The origin of human identification can be traced back to fourteen to sixteen centuries in European modern state (Lyon, 2009). Another view of the history was by (Berdah, 2006) and he believed the post-French revolution era witnessed the period when citizenship became officially linked with the registration of citizens and eventual issuance of identity documents.

According to the United Nation e-government Survey in 2016, the potential of e-government in promoting transparency, accountability, efficiency, and citizen engagement in public service delivery was made known and recognized. Furthermore, its significance was revealed to enhance digital government success (Agbozo, 2017). The confirmatory evidence can be found in countries like Denmark, Finland and Estonia who have been able to deploy the use of digital identity means to provide electronic services for its citizens and legal residents, by this, the efficiency and effectiveness of their respective public services and state administration remained sustainable (Schuppan, 2009). The electronic identity elements in these countries have remained a vital tool for accessing secured means to online services (Digital Single Market, 2016).

Digital identity is paramount and can be of immense value to the attainment of a digitally inclined society where government, private firms, and citizens are able to communicate without physical contacts and therefore achieve effective and efficient public service delivery to the citizens. Public service according to (Oyedele, 2015) is designed to be the prime mover of the social and economic development of a nation. In a study conducted by Oladimeji and Said (2012), public service is said to be essential for the maximum performance of government administrative duties in every political community. Along similar lines, Oyedele (2015) argues that governments all over the world depend on a reliable public service to realize the general objectives of their public policies, and they

achieve this by translating their plans and programmes into concrete public goods and services for the use of the citizens.

For developing countries to make good progress in the global space, they were able to orderly develop a national identity management system and ensured the proper execution of such policies (Adjei, 2013). However, it is not a challenge only for developing countries, as this issue is relevant for all countries who are moving to digital transformation and seeking e-services implementation. For instance, in Estonia known as a tech-savvy country, the concept of the identity management has been widely discussed (Lips et al. 2018 & Lips et al. 2019). However, studies have indicated that most developing countries such as Nigeria are yet to fully embrace and implement a sustainable identity management policy towards advancing the socio-economic and political life of their citizens (Olesen, 2011). New knowledge required to actualize the adoption of Bank Verification Number (BVN) in Nigeria would consist of an in-depth inquiry of the IT architecture that enables the linking of bank accounts with their holders and the communication mechanism among commercial banks through Nigeria Inter-Bank Settlement System(NIBSS), citizens' behavioural pattern with regards to using BVN as a form of digital identity and accessing public services, also the legal requirement among others.

1.1   Problem Statement

Most of the governments of developing countries in the world, including Nigeria constantly struggled to achieve the establishment of a national form of modern identity for their citizens, and this situation continuously hinders the economic and social development of these countries. Identity management is a crucial and inevitable issue in the economic and socio-political well-being of any nation. A nation that lacks the capacity and facilities to identify her citizens is on the verge of continual disturbance of peace, economic instability and would not be able to provide adequate security for its citizens. (Ayamba, & Ekanem, 2016) in their study concluded that a properly implemented identity management policy in its economic and social development role acts as a driver towards national development which complements the growth of various sectors in the economy.

In the context of Nigeria situation, in spite of the ongoing implementation of e-ID by the National Identity Management Commission (NIMC) and migration of few public services online and harmonization of various databases of the government, the citizens still experience the rigour of visiting government offices, long and bureaucratic processes

before they can access most of these services (Martin, 2014), this is as a result of the non -existence of a comprehensive database that manages citizens' identity. There exist various fragmented identity schemes such as voters' card registration, drivers' licenses, international passports issuance and mobile phone sims' registration, putting data into these systems and databases manually is operationally risky and lacks data integrity due to human error, manipulation of citizens information and open access for citizens to give different data to different systems, at the long run defeating the purpose and objective of digital identification project of the government.

Bank verification number (BVN) contains 11 digits, and it was mandated by the Central Bank of Nigeria in 2014 to be the universal ID in all banks in the country (Munis,2015) as part of the Know Your Customer (KYC) initiative to prevent identity theft in the banking industry. According to Ayamba et al, 2016, it was revealed that there is no centralized database in Nigeria which links public and private sectors, though the financial services sector had been proactive by adopting digital means to deliver services to the people.

There are different approaches to identity systems, some countries have a national digital identity scheme, usually associated with credentials of a national identity card. In Nigeria, various government agencies do have their respective identity schemes and databases, among which are Voters' card database managed by the Independent National Electoral Commission (INEC), Taxpayers Identity Number Database managed by Federal Inland Revenue Services (FIRS), Driver License Database managed by Ministry of Transportation, Bank Verification Number managed by Nigeria Inter-Bank Settlement System (NIBSS), NIC and NIN database managed by National Identity Management Commission(NIMC). In a bid to harmonizing these databases, there exist various challenges to improve identity management of the citizens, therefore there exists a need to research possible means of achieving this through selecting a digital identity scheme with the ability to enable citizens to assess public services online and improve identity management in Nigeria. Estonian experience also revealed interoperability of systems and good collaboration of public and private sector are crucial components of identity management (Paide et al, 2018).

1.2   Research Objectives and Questions

The general focus of this research is to investigate the possibility of using Bank Verification Number as a form of digital identity in Nigeria to access public services and recommend how BVN can improve identity management in Nigeria.

Hence, the following research questions if answered, we believe would help to achieve the set objective.

The overall research question seeks to investigate how BVN adoption can improve the identity management of citizens in Nigeria?

This main research question forms the basis for the research in the sense that BVN would be investigated and possible steps to be taken in order to make it a possible solution for means of digital identity beyond the banking industry and financial sector in the Nigerian economy aside from the banking sector. Both the government and private sector would benefit from the availability of a verifiable digital means of accessing public services as this would foster socio-economic development. The question is expected to generate a direction to the outcome of this study if BVN would be a viable means of accessing public services online. In order to answer the overall research question, the following research questions should be researched:

RQ 1 How would Nigerians react to digital means of accessing public services?

The essence of this sub-question is to provide an overview and evaluate the acceptance pattern of Nigerians towards accepting digitalized services and digital means of securing such public services like health, education among others. The importance of accessing public services online is to increase the efficiency and effectiveness of the government agencies, however, the people's perception is key to embarking on such motives by the government.

RQ 2 How secured is the BVN and its links to other databases of government agencies? This question is necessary in order to establish the security status and level of the BVN database and how the existing commercial banks in Nigeria are currently able to exchange data without security threats in the financial sector.

RQ 3 What are the current shortcomings of existing government schemes in Nigeria to building a comprehensive and secured database?

This question is paramount to this research in order to examine the obstacles and factors affecting the successful implementation of current identity schemes of government in Nigeria such as NIN and NIC so that these challenges can be compared with possible ones for Bank Verification Number. Since developed countries of the world like Canada, Sweden, Estonia among others were able to overcome these challenges and became successful early adopters of digital identity schemes, developing countries do have their challenges, and Nigeria as one of these countries has peculiar barriers which must be investigated.

RQ 4 What regulations would be required or modified for BVN usage as digital identity in Nigeria?

The legal aspect and privacy issues related to digital societies are paramount to be investigated and as Nigeria seeks to be one, this question is inevitable as this question will provide the research with the existing laws and regulation on data protection, digital identity management and how much can be modified if Bank Verification Number is deemed possible to be a digital identity means of accessing public services in Nigeria and building a comprehensive database.

1.3   Significance of the Study

The contribution of this study will add to the existing body of knowledge in digital identity management with a primary focus on Nigeria. The study is expected to benefit the National Identity Management Commission, Ministries, Agencies, as well as the Federal government of Nigeria, in reviewing their current schemes and programmes on national identity management for citizens. Also, the outcome of this study would provide a template or roadmap for steps and policies to be taken to improving the identity management of citizens in Nigeria through the adoption of BVN as a digital means of accessing public services online in Nigeria. Similarly, the study will also highlight current barriers of National Identity Number scheme in the country and suggest the need to adopt a holistic approach of decision making towards attaining a sound and effective digital identity management in Nigeria.

1.4   Overview of thesis

This thesis comprises of six chapters. In the first chapter, an introduction to the related phenomena under study was addressed, preceded by the problem statement, the research objective and questions, the significance of the study, and overview of the thesis. The second chapter consists of the conceptual clarifications, theoretical framework, and review of works of literature with a brief discussion of the current state of identity management in Nigeria. The third chapter discussed in detail the methodology for the research, method of results analysis using RQDA and percentages for the survey and interviews respectively. The fourth chapter presents findings from the research and discussions of the findings while chapter five focused on the recommendation and explain the proposed framework in detail. The conclusion and answers to research questions are presented in chapter six along with study limitation and future research.

2 Literature review

2.1 Introduction

This chapter highlights related works and research relevant to our study. As such, it is broken down into three sections. The first part which is the conceptual clarification focuses on defining basic terms such as identity, digital identity, electronic identification and national identity document. The basic component of electronic identity and igital identity lifecycle were discussed including the notable success factors in developing countries of the world.

In addition, the theoretical framework section discusses the main theories of technology acceptance and reasoned action of people to accept digital identity. Also, countries like Germany, Estonia and Sweden that successfully implemented digital identity schemes and technologies for citizens were compared with the present barriers to choosing and implementing a unique digital identity for citizens in developing nations, for example Nigeria which is the primary focus of this research. The last section of this chapter focusses on Nigerian case of identity management and mode of accessing public services online. The aim here is to provide the necessary framework for this study and recommend the best approach in theory and practice that could be adopted not only in Nigeria but other nations struggling to adhere to one unique form of digitally recognising their citizens.

2.2 Conceptual clarification of identity, digital identity and identity management

To thoroughly comprehend what an identity document is, we will start by examining clarification of what the idea of identity itself implies. Identity is simply the person's "exceptional sense, separating self from others" (Ashforth, Harrison, and Corley, 2008; Kornum, Gyrdjones, Al, and Anthony, 2017). Aside from this definition, Cap and Maibaum (2000) consider it to be, a parameter related with an individual (e.g., name, age, work environment), to guarantee that certifiable tasks are conjured on the right individual

(e.g., placing an individual in prison, granting a prize to an individual), to confirm, regardless of whether an individual has certain rights or to take part in correspondence acts with the proposed recipient like sending a letter or an email.

From another perspective, theorists of social identity like Postmes et Jetten (2006), have additionally defined identity as "that piece of a person's self-idea which gets from his insight into his enrolment of a social gathering (or gatherings) together with the worth and enthusiastic centrality joined to that participation" (referred to in Tanis and Beukeboom, 2011, p.786)." We accept that it is this need to relate as a functioning individual from a social gathering or offer a typical bond that offers confidence to the modern state putting such a great amount of attention regarding details and features of the individual" (Torpey, 2000 referred to in Lyon, 2009). Lyon illuminates the topic by clarifying that Torpey utilized the word grasp to mean "getting a handle on or enlisting residents by the state in manners that both include and exclude people". A good explanation for this as per Lyon was to confirm residents' trust at the same time as their entitlements. These entitlements are sourced for by mobilizing economic resources through taxation and then later redistributed to citizens in need through welfare programmes, in major areas such as education, health, social benefits among others. Therefore, it is accurate to suggest that providing public services using identification systems is an important aspect of governance whose root is traceable to the era of the modern state systems creation. From the examined scenario, the stress on identity goes beyond just having one instead of its use within the society to enhance a lawful and controlled society of humans who constantly interact with the government.

The International Organisation for Standardisation (ISO) states that digital identity is an "item inside or outside an information and communication technology system, such as a person, an organization, a device, a subsystem, or a group of such items that has a recognizably distinct existence'' Also, The International Telecommunication Union (ITU) in 2018 defined identity as a "representation of an entity in the form of one or more attributes that allow the entity or entities to be sufficiently distinguished within context".
 According to the GSMA discussion paper in 2016, digital identity (DID) or electronic identity (e-ID) is the digital representation of the information of a person, organization, or object. It is information about a person, organization, or device used by computer networks to represent us. This information can be used for many purposes such as proving one's identity. Like real identity, a person's digital identity may include username, date of birth, unique numbers among others. This information is available in our electronic ID,

driving licenses, and passports. The digital identity is the primary means to have access to digital government, employment, social security benefits, health care, and tax filling (Sullivan 2016) Also, according to a joint world bank group discussion paper on secured identity alliance 1n 2016, digital identity was defined as a collection of identity attributes that are electronically captured and stored which uniquely gives more details about a person in each given context and used in electronic transactions.

The term identity management has been widely used in recent years both in practice and academia and due to the nature of digital society and emerging digital environments rampant to the world, a cursory look at available literatures with an attempt to defining what this term really means is paramount to the foundation of our study. IDM represents a set of business processes and supporting infrastructure for the creation, maintenance, and use of digital identities" (Scorer, 2007, p.43). This definition gave a valid point on the premise of comprehensive efforts from technology to policy and management of the system. Taking a close look at another definition as given by (Crompton, 2004, p.1) where IDM was referred to as a set of data management systems and practices to increase confidence in the identity of individuals where appropriate, it can be deduced that the people and their identities are valuable to the successful planning and implementation of a sound identity management system or scheme. However, in contrast to modern realities where identity management has gone beyond just maintaining digital identities and issuing identity documents, emerging links are showing the positive relationship between a sound IDM and effectiveness of public services delivery, responsive government, and increased economic development (LBS Breakfast Club Meeting, 2015).

2.2.1 Characteristics and components of digital identity/e-ID

The primary focus of this study is on digital or electronic identity; therefore, it is needed to carefully examine the main features of digital identity according to accepted standards their components and life cycle. According to the European Union Regulation, No 910 of 2014, digital or e-ID must allow the use of person's identification data in an electronic environment and e-ID can take two different forms, either in material form i.e. physical cards like an electronic card and smart card or in nonmaterial forms like an entity's identification data valid for physical identification and authentication when accessing online services either public services or private services. To further explain the nonmaterial form of e-ID, a good example is India's unique number issued by the Aadhaar program or the BVN in Nigeria which serves as the unique ID for Nigerians in the banking industry. Electronic identification can be achieved in different ways or means which could be in form of username-password, username and password with text message verification,

public key infrastructure(PKI) certificates, contact and contactless smart cards with chips on which a certificate is placed or by means of Mobile ID solutions (Ducastel 2015)

Digital Identity Lifecycle

Drawing from the collaborative report of 2016 by the World Bank Group and GSMA, it was noted that there exist three fundamental stages of digital identity namely, registration which includes enrolment and validation, issuance of documents or credentials and lastly authentication for service delivery or transactions. The three stages would be explained in detail in the table below,

Table 1: Digital Identity Lifecyle

Stages	Description of activities
Registration	This represents the foundational stage of any identity scheme or programme which covers the enrolment activities and validation of details. **Enrolment:** Capturing and recording of unique key identity attributes of an individual who claims a certain identity takes place, it basically includes biographical data like name, date of birth, gender, home address, email, biometrics(fingerprints and facial image capturing) and other attributes required by the law guiding the identity programme or scheme.
	Validation: The stage tends to look out for the existence of the claimed identity after enrolment if the person is alive and can be reached via the provided contact details, uniqueness of the identity claimed which is most accurately done by biometrics, and lastly for any form of linkages to existing databases.
Issuance	The credentialing process is mandatory before a registered identity is confirmed and used by a person. At this stage, the asserted identity is considered digital, the credentials or certificates must be able to store and communicate data electronically via any of the following electronic credentials like Smartcards in Estonia, Sweden, Finland, Mobile-ID in most developed countries and ID in the cloud in India notably by the Aadhaar program.

Authentication	This stage of activities falls on the part of the end-users once their identity registration and issuance are completed. The essence of the digital identity is to access associated benefits and services electronically and online platform. The end-user determines the appropriate means of authentication based on the ability of the credentials 'capability, i.e., smartcards use of card readers with a secure PIN or digital signature based on public key infrastructures (PKI), users of smartphones application like USSD or SMS-based authentication would opt for mobile identity means of authentication and last for biometric authentication channel for ID in the cloud

(Adopted from Secure Identity Alliance Discussion Paper,2016 by World Bank Group &GSMA)

It should be noted that the fundamental stages of digital identity lifecycle go beyond the discussion in table 1 above, the lifecycle management of digital identity is paramount to the continued existence and maintenance of robust national database and the key stakeholders playing the active roles are involved on a daily basis. The stakeholders comprise of the government agencies handling the identity scheme on behalf of the government, the private sectors like banks, mobile service operators, legal representatives of the government in case of arising legal issues to address among others.

2.2.2   Digital identity as a platform for national development

National identification system provision and management for citizens have been traditionally linked to the government, however, the advent of technological innovations has created series of unprecedented opportunities for the government to comprehensively run various digital or e-ID programmes with the primary target of identifying their citizens and building a robust national database. The essence of government administration which has become complex in modern times in most developing countries suffers from the existence of different databases of citizens' information which cannot be easily harmonized. In the wake of digital identity solutions as experienced among developed countries, their government were able to perform functions such as health care services, education, implementation of knowing your customer rules for the financial institution and other public services electronically with ease as a result of a sound national database of citizens 'identity (Gelb & Clark, 2013).

Another cogent factor to note is that digital identity provides an avenue and a cross-segment stage on which to set up a vigorous and robust identification system in a country, on a fast timetable, and empowers benefits across areas to be conveyed electronically. Such development can be transformational for a nation, offering gains in government efficiency and effectiveness, private sector development, and national development. Drawing from examples both in developed countries and few developing countries who had taken the appropriate steps in the right direction towards digital identity provision for citizens and rendering of digitalized public services, Estonia, Finland and Sweden are great examples while in India where the government introduced the Aadhaar program to assigned unique identification numbers to citizens without any physical card, planning and policy formulation were effective for the government(World Bank Group 2014).

Identity management serves as a good foundation for wide digital signing implementation in Estonia (Pappel et al, 2017). Based on the strong identity management level in Estonia, digital document exchange rate rose up to 93% in the public sector (Draheim et al, 2016), in summary, it is pertinent to note that identity management helps to move towards paperless management in public agencies and enhances efficiency and effectiveness.

2.2.3   Lessons from Developed Countries with Successful E-ID Implementation

Learning from the experiences of the developed countries where the implementation of digital identity and e-ID has been successful is paramount in order to carefully examine and evaluate their objectives, policy considerations, factors that shape their objectives, and most importantly, factors responsible for their success. According to Ducastel 2015, many countries possess peculiar motives for opting to adopt and implement digital and e-ID technology, and these motives are dependent on national differences and challenges. To further evaluate the above statement, five countries would be selected and evaluated in detail according to the United Nation 2018 Online Service Index, these countries were considered due to their OSI, which is above 0.75. These countries strive to improve public service delivery, stimulate the digital economy and electronic identities for citizens and businesses (UN Survey 2016).

AUSTRIA

The main policy consideration for embarking on a national e-ID scheme in Austria was to make public services easily available, and the policies were made open to all while ensuring that technology used is neutral (Ducastel 2015). The scheme was introduced in the year 2000, and the ID card was not mandatory for citizens to use, which is more of digital by default principle of e-government principle. According to the Austrian General

Administrative Act, it is required for daily public administration. The strategy used was that of a multi-means where the e-ID means incorporated other forms of electronic cards like student ID, ATM cards, and other government cards. The government made it possible for both private firms as well as the public agencies to play their respective parts in achieving their objectives, later in 2009, mobile solutions were also incorporated to further enhance the usability and convenience (Aichholzer & Strauß, 2010). It should be noted that the e-ID model provided and promoted interoperability with other existing E-ID, software needed for using the e-ID card was made available to citizens freely and for developers as well. The Austrian government encouraged and promoted the e-ID by providing the software free of charge for citizens and developers, involved the banks in the model, and the banks were authorized by law to generate electronic signatures for online transactions.

ESTONIA

According to Europe's Digital Report of 2016, Estonia was recognized as one of the foremost countries to adopt and successfully implement e-ID, the country's pragmatic approach and strategy towards the usage of e-ID card paid off as it has the highest ranking in terms of digital public services across the EU. The policy consideration behind her e-ID schemes launched in 2002, known as 'Digital Estonia' was that of digitalizing public services such as submitting tax returns, accessing medical services, signing of public documents. Also, the primary function of the Estonian e-ID card is to digitally recognize Estonians in a digital environment, and across the EU, however, the immense roles of the digital documents have gone more than its primary objectives over the years. Internet voting, e-prescriptions, generation of digital signatures, registration of childbirth online, among others, are possible in Estonia. The key success factors to digital identity scheme in Estonia are the legal and regulatory framework which supported the mandatory use of e-ID cards, digital signatures, data protection and data privacy, effective leadership and competent public sector, adequate funding as ICT expenditure provision in the annual state budget(Digital Single Market, 2015). The public-private partnership proved to be a focal point of the e-ID as strong alliance was formed between a government agency, banks, and telecommunication firm, the country has one of the most advanced national e-ID card systems due to the presence of highly sophisticated technological infrastructure like the X-road for interoperability (Capgemini, 2007). In conclusion of the Estonian experience and success story on the e-ID scheme, the country prides itself as a tech-savvy

state with a higher percent of tech-savvy citizens, which played a huge role in the gradual adoption of the current digital movement in the country.

SWEDEN

Similarly, in comparison to Estonia's strategy and policy consideration, Sweden, as a country, involved both public and private channels towards their digital identity project by the creation of an open market for all. The main objective is to provide digitalized services by government and electronic means of identifying citizens as of 2001, when Sweden held the presidency position in the EU (Söderström, 2016). The banks were mostly trusted with the authentication and validation of electronic services while the government's responsibility was to govern through legislation and requirements in procurements, known in Sweden as 'frame agreements' (Melin, Axelsson, and Söderström, 2016). The country's approach was more of tapping into the existing capacities of banks who provide electronic and digital services to the people with a huge customer base, therefore opening the chapter of citizen-bank-government relations towards building an efficient and trusted national identification scheme. The giant stride made in Sweden was back in 2011 when the banks introduced the Mobile BankID, and the use of mobile BankID among adults in Sweden rose to 73 % users in 2017 (Davidsson and Thoresson, 2017). This development evidently made it possible for the people to embrace digital means of identification, using government means or bank means as the case may be, little wonder then, during a crisis in 2018 regarding identity thefts in the banking sector, the people still trusted the banks and subsequently, public e-ID were also incorporated.

DENMARK

Denmark is among the Scandinavian countries with fast-growing and advanced e-government ambitions. In 1992, the government took the first step towards attaining its objectives for e-government by formulating an e-government strategy calling for an e-ID solution; however, it took over ten years for her to launch the first national digital identity scheme (Castro 2011). Regarding the present state of digital identity in the country, the policy consideration of the government was a pragmatic approach with sincere intent to provide digitalized services and maintain the digital identity of citizens. Due to the lack of knowledge and expertise of the government to implement e-ID, the government never delved into the adoption of a national card-based e-ID, rather private firms were contracted to come up with solutions and the birth of NemID in July 2010, a new e-ID solution was recorded in the country. NemID has since then become a commonly used log-in

solution for internet banking in Denmark among banks, some other private firms, and government websites as well. With regards to the funding of this e-ID solution, the government provides an annual budget to cover for one-third of the project for five years and currently continues to do so according to the five years life cycle and renewal of the contracts. According to the Danish model, the high-level e-ID market for e-government services is insufficiently mature and cannot do without government stimulation, due to its e-government ambitions, e-ID in Denmark is a tale of public-private partnership that has come to stay over the years, the government seized the opportunity of involving private actors for the establishment of digital infrastructures (Grasman, Faulin & Lera-Lopez, 2008)

GERMANY

Germany's policy consideration towards e-ID adoption, unlike other developed countries, was to fully digitalize public services and swiftly adopt technology in the area of citizens' identification, among others. Germany launched her e-ID in 2010, and the government approach made use of public identification means to monitor privacy and safety. However, there were series of concerns and doubts about this as citizens nursed fear of intensive privacy invasion that may arise from e-ID adoption due to its Nazi and Stasi past where the government stored data about its citizens. Some private actors participated in the production of the German e-ID, although with a minimal amount of governmental control. The German card is a contactless smart document, and like the case in Estonia, the citizens pay for the card while the government makes provision for some financial costs related to the production and the IT infrastructures that enable the smooth usage of the cards as well in her annual budget. The latest event in the scene of digital identification in Germany shows the widespread of mobile IDs among the people whereby the mobile phone functions as a card reader for the e-ID card.

2.2.4 Significant Success Factors Among Early Adopters

With a view to drawing up key lessons common among the developed countries examined above, it is pertinent to note that each country has specific approach based on their peculiarities in terms of technological expertise, funding, legal framework, historical past, public administration style to mention a few and at the long run all these shaped their respective policy consideration and approaches towards adopting digital or electronic identity schemes. The table below will highlight this success factors and how they were ensured among the reviewed countries.

Table 2:Notable Success Factors of Digital Identity Scheme in Developed Countries

Success Factors	Specific steps taken or measures put in place
Provision and Presence of Adequate IT Infrastructure	• Huge investment in IT infrastructures is required for embarking on a large-scale e-ID scheme, however not all countries have been able to achieve that after legal provision for such scheme (Castro 2011). Estonia invested in this area by the creation and maintenance of the highly rated X-road that enhances interoperability. • In Sweden and Denmark, private actors dominated the scene in providing required IT infrastructures to propel the growth and adoption of the e-ID scheme
Strong Public-Private Partnership	• Innovation is key in the development and implementation of e-ID solutions, public agencies seek to benefit from the establishment of PPP arrangements in implementing public policies. The numerous benefits of PPPs include increased efficiency in project management, cost reduction, risk sharing, improvement of service quality, and enhanced technological innovation (Cheng &Yu 2010; Maskin & Tirole, 2008; Ng, Wong & Wong, 2010) • There is a need for a strong partnership between the public and private sector as notable in Estonian and Danish situations, models where banks and telecommunication service providers were actively involved in the successful implementation of their respective e-ID schemes.
Adequate Funding	• This poses a big threat to any project either in the public or private sector, however, to implement a large-scale e-ID scheme is no exception, enough funding is required for the procurement of necessary IT solutions and maintenance of the scheme continuously. Since the government is mostly in charge of e-ID projects, it is justifiable enough for them to see to the provision of funding for such projects. • It is evident enough in the case of Estonia whose government provides annual state budget for IT infrastructures and maintenance, similarly, the case in Austria, Germany, and

		Denmark where the government still allocates a portion of the state budget to e-ID maintenance.
Legal Regulation and Support		• Legal framework is a crucial element of any successful public policy and as such becomes mandatory for the government to put this in place, these laws might be new ones or in form of modifications to existing ones to accommodate new technologies and their possible challenges in the event of their implementation and use by the people. • the UN 2016 index also specified that "Increased integration of e-ID technology requires building appropriate legal frameworks and security systems to guarantee the privacy and confidentiality of personal data" (UN Survey, 2016). • The legal framework in Estonia influenced the usage and acceptance of the e-ID compared to Austria and Danish case where the government did not legally mandate citizens to adopt e-ID usage but made certain legislation that mandatorily put the citizens in a position to use them in order to access digital services(Castro 2011)

2.2.5 Barriers to Effective Implementation of Digital /E-Id Schemes in Developing Countries

In the previous headings, the focus has been on the developed countries and how they have been able to successfully implement digital identity schemes regardless of their peculiar structures, past, resources, political status, and technical expertise, among others. It should, however, be noted that the focus of the research is on Nigeria which is regarded as a developing country in the world, there exists a need to distinguish in detail the different scenarios in which both categories of countries find one other in order to establish a true picture of the latest narratives with regards to e-ID and digital identity scheme implementation in developing countries. It would be ideal to briefly examine the difference between these categories of countries of the world, namely developed and developing countries.

According to the UN website, the main indicator of countries status being classified as developed, developing and under-developed is based on various factors among which is

the main determinant known as Human Development Index (HDI), it is a product of comparative measure of literacy, life expectancy, poverty, the standard of living, employment rate and other key factors responsible for people welfare in a country. Developed countries are countries with a high standard of living, developed industrial base and HDI while on the other hand, developing countries possess low living standard, underdeveloped industrial base and HDI (UN Website).

According to the comprehensive study involving national identity schemes and initiatives of 48 countries conducted by the International Telecommunication Union in 2016 with over 90percent of countries are developing countries, the study outcome and conclusion revealed the factors and obstacles working against the successful implementation of national identity schemes in developing countries. The notable obstacles would be thoroughly examined below.

Issue of Data Management

The foundational element of any successful identity management scheme is a sound data management practice, and this is a prerequisite for building comprehensive data registries and databases of people in a country. Clark in 1994 noted that data registries are an essential pillar of identification systems without which a functional national identity scheme can never be achieved. Data management, as defined in the ITU study, refers to the ability to establish, maintain, and secure updated citizen registries within a central database. Countries like Bangladesh, Burkina Faso, Ghana, Guatemala, Indonesia, and Mali reported challenges about data management and maintenance. Ghana situation was revealed by the completion of the central database infrastructure five years after the data capturing of citizens began which led to a discrepancy in the number of citizens registered for the programme and data recorded, out of the fifteen million people registered with the national civil registry, only nine million citizens were imputed into the central database (Akrofi-Larb,2015)

Privacy Concern

Privacy and data protection concerns are surfacing as fusing biometric includes in national identity projects have quickly expanded. While biometric highlights can possibly reinforce national security and reconnaissance, they may likewise encroach on existing protection privileges of residents, bringing up issues on the best way to shield residents

from the misuse (Malik, 2014). The ITU report revealed that four countries specifically reported privacy challenges with evidence that potential breed fear of data abuse among the people, the countries were China, India, Philippines, and Sri Lanka. This concern is not peculiar to developing countries alone, for example in China where evidence shows the increased ability of the police to monitor the lives of the people including their movement, political and religious activities due to their ID programme (Chen,2013). Numerous nations are adopting information and data protection laws alongside their ID projects in order to allay the fear of security concerns associated to widespread and easy access to personal information across government agencies, this is notable in India where strict clearance level is required in order to gain access to the Universal ID database, in Pakistan, the software was put in place to help citizens monitor government agencies and organizations using their data or access their data.

Accountability Issues and Lack of Transparency

The absence of accountable and transparent institutions of government undermines the successful implementation of any public policy at any level of governance either in developed or developing countries, however the need to ensure that budgeted resources are effectively utilized in achieving the set objective of public policy is key. The ITU study revealed the presence of this obstacle in countries like Malawi, Mozambique, Nepal, Thailand, Guatemala, and Uganda, where corruption was noted surrounding tenders and contracts among their respective officials in charge of procuring and managing the funds for the project. The situation in countries stated above led to delays in the implementation of their identity program and eventually made it practically impossible to adhere to the policy timeline (Anderson 2015)

Interoperability Concern and Harmonization of Existing ID Programmes

Interoperability enhances effective data management and exchange among databases and fosters secured information management balance due to the ability of the individual databases to communicate effectively. In practice and theory, it is required to note that ID programmes in countries of the world are either implemented in order to establish the first official identification system in a country or create a uniform and comprehensive database of citizens. Many developing countries of the world operate on fragmented identity schemes at various levels of government, and private sectors like banks also have theirs, to mention a few. According to the ITU review of 48 countries, the issue of interoperability was evidence in Nigeria, India, and Afghanistan as there exist huge

difficulties in harmonizing their existing identity schemes due to the absence of clear legal frameworks and lack of delegation of responsibilities by government agencies in Nigeria and India. Nigeria, as a case study for this research, has this as a major challenge for NIMC as their efforts towards harmonization of existing identity schemes in the country remain unsuccessful now.

Inadequate Funding and Cost

In contrast to developing countries where annual budgetary provisions are ensured as noted in countries like Austria, Estonia, and Denmark for IT expenditures and maintenance, developing countries are not privileged to adequately provide the required funds to complete and maintain successful ID programmes. Capital and funds insufficiency challenges arising from e-ID schemes are mostly related to delays and suspension in the enrolment process and production of cards in Malawi, Tanzania, Uganda, Cambodia, and Cote d'Ivoire (Anderson,2016). Cost difficulties stretch out past operational deferrals, and the ITU study discovers proof that constrained monetary assets to influence the overall capacity of a nation to arrange the subtleties of national identity programme configuration, as found in three nations (Mozambique, Niger, and Uganda). While innovation costs are falling, creating recognizable proof frameworks with biometric innovation is expensive (Gelb and Clark, 2013). The various sources of funds according to the report among the developing countries revealed that key stakeholders like MDBs, NGOs, and other development partners play crucial roles in ensuring financing possibilities for E-ID programmes except countries like Pakistan under NADRA and RENIEC in Peru who internalized their enrolment cost and card productions, charge fees and ended up generating their own revenues(Malik 2014).

Enrolment Challenges

According to the digital identity life cycle, the first stage is the enrolment of people after which other activities and stages come to life for any identity scheme implementation or progress. Regarding challenges, the inability of the enrolment process to be successfully carried out undermines the coverage of the e-ID programme because there would be a huge identity gap in the long run. Enrolment for e-ID enrolment is another factor that was revealed by Anderson et al. (2016), as a factor constraining viable enrolment crusades in a few e-ID programmes. As indicated by him, this challenge is brought about by lacking assets, for example, "broken or inadequate gear and materials as on account of Nigeria, Peru, Cambodia, Thailand, Ukraine" (Biometric Passport). They likewise noticed that

under-prepared staff, for the most part, hindered in talking neighbourhood lingo particularly in a multi-ethnic state with various cultures, can constrain relation and subsequently stand a barrier to the enrolment strategy as relevant in Indonesia, Peru, Sri Lanka, Uganda. Different factors about enrolment challenges as indicated by them are an absence of strategic help, rules, or open mindfulness with respect to the enrolment procedure and this is apparent in nations like Algeria, Indonesia, Nigeria Bank Verification Number (BVN) card Nigeria (e-ID) card and Zambia (NRC).

2.2.6 The roles of banks in digital identity management

Identity management has been a daily routine for financial institutions due to the enormous data in their custody as a result of their dealings with the public in utmost trust. According to the white paper submitted to BBVA in 2018 on the current state of digital identity in the world, the banks were clearly seen as a custodian of digital identity verification due to their long-standing experience when it comes to validating identities, provider of trust and are used to the regulated environment for daily transactions with both public and private sectors. The bank plays a crucial role in promoting economic development in a country and globally by rendering more advanced financial services in the modern world driven by technology and the needs to examine and point out their potentials in making the world a better place where the digital economy thrives is of great paramount to this studies as well.

Birrell & Shneider, (2013) and Pang & Lips (2008) noted regarding economic development implications of identity management that there exists an interdependent relationship between economic activity and identity management infrastructure investment at country levels.

To further buttress the potential influence of banks in promoting and maintaining effective digital identity management in a society or country as the case may be, the table below would highlight typical examples from developed countries of the world whose digital identity management has experienced tremendous growth and fit as a result of banking institutions involved in the process.

Table 3: Digital Identity and Financial institutions' involvement

Country	Description	Parties involved	Present status

UK	GOV.UK was launched by the Digital Government Services to allow citizens to access public services digitally, during this process, an individual is mandated to register with an identity service provider and verification is carried out by such before the individual is allowed to access services online via the tool using API. A financial institution, Barclays, is certified by GOV.UK to verify identities. When the user chooses Barclays, he is transferred to the Barclays Identity Service where their identity can be verified.	The Government and Barclays Bank.	2016 and still operational to date.
Germany	A project was launched by the bank in the form of an alliance between several firms in order to create a global digital identity in Germany. The idea was to create a single sign-on digital identity valid across different banking and other services platforms	Deutsche Bank and other private firms but regulated to an extent by the government.	Proposed in 2017 and launched fully in 2018
Canada	The Canadian government launched the digital identity project called SecureKey and leading banks in Canada were required to manage the	National Bank, Scotia Bank, Tangerine Bank, and government	2012 and currently moving towards

	identification process for government services online by means of a network called Secure Key Concierge.		blockchain solution.

(Adopted from WORKING PAPER Digital Identity: the current state of affairs by Ana I. Segovia Domingo & Álvaro Martín Enríquez,2018)

2.3   Theoretical Framework

The theoretical framework, in simple terms, represents the structure of the main concept or concepts relevant to a study and the way these concepts are put together. The theoretical framework is the blueprint or guide for research because of its components ranging from theoretical principles, ideas, and concepts (Grant & Osanloo,2014). The theoretical framework serves as a map for research or travel plan for researchers as the map naturally guides the path of the researcher and study (Sinclair 2007). Theoretical frameworks are important irrespective of how big or little the researcher's span of thinking is, he or she knows the subject, it is, however, paramount to note that it is impossible for a personality's being to not have preconceived notions, whether they are of a general nature or not. Adom et al., (2018) further noted in their study that the incorporation of a theoretical framework or conceptual framework in research inquiries enriches the robustness of research in all aspects.

Identity Theory

Identity theory has developed over the years as a significant collection of interrelated concepts within sociological social psychology whose roots can be traced back to symbolic interactionism. The central ideas of this theory include identity, identity verification, and the bases of identities. Identity gives a form of recognition to an individual in a society that is unique in terms of person, and others can be role and group identities (Burke 2012). Also, according to Burke & Harrod, 2005, identity verification is essential to maintaining the existence and authenticity of a person or group of persons in order to ensure effective interaction in the society and among social institutions like the government. The relevance of identity theory to this research study is key as human identities are involved, and the aim of global digital societies and economies is to serve the people.

Technology Acceptance Model

This popular theory, as introduced by Davis in 1986, is one of the most widely used models of evaluating and examining the acceptance level, and behaviour of people or society at large when it comes to the introduction and acceptance of new technology. TAM is grounded in social psychology generally and the theory of reasoned action by Fishbein & Azjen in 1975 which postulated that the beliefs of the people greatly shape their attitudes and therefore determine their behaviour in responding to changes. TAM aids the evaluation of accepting new technologies by people using the constructs of perceived usefulness, perceived ease of use, attitude and behavioural intention to use, however, perceived usefulness and perceived ease of use determines people belief on technology and in this manner anticipate their mentality toward the technology, which thus predicts its acceptance. TAM has been studied widely and verified by different studies that examine individual technology acceptance behaviour in different information systems constructs. The relevance of TAM to this study cannot be neglected as the whole idea of digital identity and e-ID centres on the people and the relationship between their acceptance and behavioural pattern, which determines the success or failure of most national identity schemes.

Theory of Collective Action

Another relevant theory to the purpose and objective of this study is the above theory, which gives a broader lens through which collective efforts of actors are required in achieving or implementing a new project in order to establish a common goal and objective. Both government and private sector actors do have different interests, objectives, and tendencies to rely on each other's effort; however, the theory highlights how best this situation can be approached. This theory was first postulated by Olson in 1965 and has been referred to by other scholars like (Pettigrew 1985) and (Ostrom,2014) in the field of social sciences, which centres on collective action as a way of managing groups of people towards achieving governance of the collective. The focal link of this theory to our study is premised on the emergence of shared responsibilities between the government, private sector actors, and the people towards building an effective e-ID policy and digital infrastructures for the country at large.

Lewin's Change Management Model

This is one of the most popular theories of change management as postulated by Kurt Lewin in 1947, the model advocates for the significant stages involved in change management of an organization or a group of people. Furthermore, three stages were established, according to Lewin, which is synonymous with the changing states of a block of ice. The unfreeze or the first stage of the change process basically involves the recognition of needs for change and preparation for the change, the second stage connotes the phase of real transition or change itself, and at this stage, the people spend time in embracing and accepting this changes, good leadership and communication is key to ensure this stage while the refreeze is the last stage of the change process where both the people, process and the organizational leadership are stable once again after embracing the change (Hussain et al.,2016). This model is relevant to this study in the area of managing the change process of digital means of accessing public services as there is need for adequate management of the stages involved in accessing public services digitally among the people, the government agencies need to effectively communicate the process to the people, and also the employees of these agencies require training and purposeful direction of effecting the change.

Accountability through Good Governance

Good governance in the parlance of public administration represents the way of measuring the extent to which public institutions and agencies manage public resources and coordinates the affairs of the people in such a manner that resources are effectively and efficiently utilized to produce the desired results that complement the needs of the society. Among the pillars of good governance is accountability, which could be state centred or social accountability (Brinkerhoff, 2005). Accountability basically relies upon the willingness and capacity of the public institutions to comply with statutory legislation, minimize abuse of power and report to the public on a daily basis regarding their affairs and operations in order to build public trust and confidence in the system. This concept is relevant to this study from the perspective of implementation from new public policy, the government and the respective agencies involved in identity management schemes in any country is expected to be accountable to the people, manage the resources effectively and communicate effectively to the stakeholders and people daily in order to ensure successful implementation of their identity schemes.

2.4 The Nigerian Case of Implementing a Sustainable Identity Management Scheme

Nigeria is the most populous country in Africa and currently seventh in the world, according to the United Nations Statistical data released in January 2020. According to World Bank Data (2019), Nigeria situates in sub-Saharan Africa, and she is a developing country with a lower middle income. The history of identity management scheme can be dated back to the military regime of Major General Yakubu Gowon who was the then head of state of Nigeria during and after the civil war in 1967 when he proposed the idea to establish a means of identifying the remaining Igbos who never returned to the East during the civil war (Weekly Trust 23, October 2000). It should be noted that this was a mere idea, and it was envisaged but never came to reality due to lack of direction and thereby no implementation of the proposal was made.

The most recent establishment of the government charged with the responsibility of championing the vision of the Federal government of Nigeria till from 2007 to date is NIMC, National Identity Management Commission, which was established through Act No 23 of 2007. NIMC took over from the DCNR and managed all the assets and offices in all states and local governments across Nigeria. According to Section 1, 2, 5, and 6 of NIMC Act No 23,2007, the commission is charged with the responsibility of maintaining a national digital identity management system and database of Nigerians. NIMC commenced its' first main task of enrolling and issuing of National Identity Cards to citizens; the exercise was in line with the genuine objective of the government to defeat the failures of the past schemes and achieve objectives such as being a tool to control illegal immigrants in the country, validating other civic documents such as the traveling passports, setting up a reliable personal identification system for securing commercial transactions with financial institutions (Olaleye and Agbota 2009).

Earlier this year, the National Identity Management Commission took a greater step towards achieving its objectives by announcing their partnership with other public and private sectors service providers including federal, state local government Ministries, Departments and Agencies (MDAs), Civil Society Organizations. also as qualified private vendors for the supply of information collection services and issuance of the National Identification Number (NIN) under the National Identity Management System & NIMS programme. The Digital Identity Ecosystem is a system including the NIMC working with the private and public sector to set up an enabling environment for the effective and proficient mass enrolment of citizens and legal residents in Nigeria into centralized and

secured national identity database where computerized characters are given to everyone as the National Identification Number (NIMC

website). The initiative aims to enhance identity authentication of citizens and make all identity-related transactions safe within and outside the country. It should be noted that this project is specifically funded by the World Bank, European Union, and Agence Française de Développement (AFD), a French developmental agency.

2.4.1 Access to Online Public Services in Nigeria

The provision of effective and efficient public services by the government and its respective agencies is a driver of good governance and socio-economic growth and development. In the same vein, the government in both developed and developing countries of the world acknowledge the significance of the effective delivery of public services to the attainment of their respective social and economic objectives (Nti,1996). Effective identity management regarded as an essential vehicle in the acceleration of e-government objectives in Nigeria (Dauda, 2014). Different government agencies providing public services do have their various respective identity management schemes for verifying citizens either physically or online. The growth of digital public services in Nigeria is notably among federal agencies and few states pursuing the e-government agenda; however, use of various identity means is prevalent due to the lack of a comprehensive database of citizens and legal residents in the country as noted by (Deborah et., al 2017).

According to the respective websites of FIRS, LIRS, INEC, FRSC among others, none of the NIN or NIC is incorporated as a means of accessing public services except their respective means of identifications ranging from unique numbers to usernames and PINs which leads to management of various databases of the citizens by the government. NIN's objective, according to the NIMC website, is to unify these databases so that each citizen has one means of identification but has not gone beyond accessing these public services using NIN.

2.4.2 Present State of Digital Identity Narratives in Nigeria

According to the latest NIMC report for 2019, the efforts and strategies are still in place to effectively manage the identity management activities of Nigerians by the government. The federal government recently unveiled a committee on Citizen Data Management and Harmonization which is chaired by the Minister of Interior, this committee is set up in order to review the harmonization project aimed toward consolidating all multiple data sources into the National Identity Database (NIDB) owned and managed by the national

of Nigeria through the NIMC. The committee is made up of Ministers of Communication, Finance, and Budgets, Justice, Police Affairs, Director Generals of Population Commission, State Security Services, Immigration Service, NIMC, and Governor of Central Bank.

Among various efforts of the current government in Nigeria towards building a comprehensive database, establishing a unique form of identity, and providing electronic services are the ones highlighted above. Despite the huge commitment of the government to issue National Identity cards to citizens and issuance of National Identity Numbers to Nigerians and other legal residents, there exist various fragmented identity schemes and projects championed by most various agencies (Ayamba & Ekanem, 2016). There exist over 10 identity schemes in Nigeria at federal, state and local government levels even possess more, some of these identity schemes are briefly examined below,

Bank Verification Number (BVN)

This an initiative of the federal government through the Central bank of Nigeria that was launched in 2014 which is mandatory for all bank account holders to have regardless of the number of accounts an individual has in various banks (Munis,2015). It is a unique non-intelligent number that serves as the universal identity number for the banking industry in Nigeria (NIBSS website). It was specifically introduced in order to combat financial frauds, protect customers' accounts, and, most importantly, promote digital access to a wide range of financial services once identity is successfully verified. Currently, BVN has recorded massive success in the financial sector, and interoperability was made possible courtesy of the IT architecture provided by NIBSS whose is solely responsible by law to manage BVN issuance and maintenance of the database that allows banks to exchange information about various customers.

Permanent Voters Card (PVC)

PVC was first introduced during the preparation of the 2015 general election in Nigeria by INEC Independent National Electoral Commission, it is a smart document issued by INEC, PVC contains biometric components such as facial image capturing and fingerprints of eligible voters (Nwagwu,2015). PVC never lived up to expectation as inadequate technologies like smart card readers rendered it useless during the election, where eligible voters were not verified in the long run disenfranchised.

National Driver's License card

The biometric driver's license card was officially launched the Federal government through the Federal Road Safety Commission, FRSC registers citizens who intend to drive with the smartcard after carrying out biometric registrations. According to the Identity Ecosystem roundtable report (2016) and the agency's website, it has 140 offices with 179 enrolment stations all over the country.

National Health Insurance Scheme Card (NHIS)

NHIS card is also a form of identity scheme in Nigeria that allows mostly working-class citizens to access health care services in designated Primary Health Care provider of choice or according to proximity to the place of residence (Maruf, Binuyo, Gambo, & Jimoh, 2016). Before the card is issued, biometric registration is mandatory for intending individuals, and other personal details are submitted during the registration process.

Sim Card Registration

The registration was introduced in early 2015 by the federal government and was mandatory for all citizens using mobile phones and other mobile services. The initiative was managed and supervised by the National Communication Commission. The registration process was done by the telecommunication service providers in Nigeria like MTN, GLO, AIRTEL, among others, biometric capturing of fingerprints and facial images of citizens were required to complete this registration. Various telecommunication providers operate different registration strategies to capture the details of their customers, and there exists no uniform database of mobile service users in the country.

Lasrra Card

This was an innovative initiative of the Lagos state government in Nigeria, due to the cross metropolitan nature of Lagos, the government in 2011 initiated the identity scheme to monitor residents of

Lagos state, to enable the services provided by the government to be fully utilized, and furthermore, give an exact picture for state planning and policy formulation. The Lagos State Residents Registration Agency (LASRRA) was established in 2011 for the purpose, and a similar concept of biometric registration was involved. All residents were mandated by law to register and get the unique number and card, which is also a smart identity document.

National ID-Card

The national e-ID in Nigeria was introduced by the government in 2014, managed by NIMC and till date, NIMC still manages the issuance of the card and as well the National identification Number (NIN) which is believed to be the only legally assigned numbers which are uniquely assigned to citizens and residents in Nigeria. According to the NIMC website.

National Identification Number

The NIN consists of 11 non-intelligible numbers randomly generated and assigned to people in Nigeria after enrolment completion is achieved by the individuals, and these details are stored in the National database managed by NIMC. The enrolment involves the recording of demographic data and biometric capturing of individuals' fingerprints and facial images.

In summary, it is pertinent to note that these identity management schemes in the country have not yielded the projected objective of the government coupled with the existence of multiple databases managed by the government agencies and the harmonization efforts are currently not effective, the need to investigate the challenges and offer steps to improve identity management and investigate BVN usage to access public services online is paramount to this study.

3 Methodology

3.1 Introduction

This chapter focuses on detailed accounts of the chosen research design, parameters and conditions chosen under which the research analysis is to be performed. For clarity purpose, this chapter is divided into five sections, the first part will cover the detailed explanation of case study research, it's types, merits and limitations as this is the selected research design for this study and lastly examine the rationale behind the decision to choose this research design in line with the central objective of the study ,and how answers can be generated to the research questions. Interview would be discussed in the second section while section three will lay emphasises on web survey and document reviews as both data collection tools were employed in gathering data for this study. The section four explains the reliability and validity assessment of data gathered and section five of this chapter will give provide a summary of the whole chapter.

3.2 Case study research design

A case study can be defined as an approach to research that enhances the investigation of a phenomenon within its setting using a variety of information sources. This guarantees the phenomenon is not investigated through one perspective, but instead an assortment of focal points which considers numerous aspects of the phenomenon to be uncovered and comprehended (Baxter, P., and Jack, S. (2008). It allows the researcher to investigate people or associations, basic through complex interventions, connections, communities, or programmes (Yin, 2003). This qualitative case study is an approach to research that facilitates the exploration of a phenomenon within its context using a variety of data sources (Baxter & Jack, 2008). Case study methodology has two key approaches that guide it; one proposed by Robert Stake (1995) and the second by Robert Yin (2003). Both authors seek to ensure that the topic of interest is well explored and that the essence of the phenomenon is revealed but they use different approaches and ways to achieve it. To the researcher, it is recommendable to understand both approaches to choose the one that

feels more convenient and comfortable to be used in the research process. Both authors defend that the truth is relative and depends on one's perspective. This paradigm identifies the significance of subjective human formation, however, does not dismiss some thought of objectivity. Pluralism, not relativism, is emphasized around the circular dynamic pressure of subject and object (Miller and Crabtree, 1999, p. 10).

As indicated by Yin (2003) a case study design ought to be considered as when: (a) the focal point of the investigation is to answer "how" and "why" questions; (b) you cannot control the conduct of those involved in the study ; (c) you need to cover logical conditions since you believe they are pertinent to the phenomenon under investigation; or (d) the limits are not satisfactorily clear between the phenomenon and context (Baxter and Jack, 2008). There are several types of case study methods ,however, the method to be selected depends on the nature of the question being asked and the goals of the researcher. According to Runeson et al., (2012), case study research is mostly explorative by nature due to the fact that it sets to investigate one or more research questions which are relevant to the study, in the same vein, this study tends to explore the Nigeria case of digital identity management.

In addition, there are different types of case study designs, and these include; single and multiple case studies. A single case study design focuses on studying phenomena of interest while making use of a single subject, abounded case, or a small group to illustrate the issue under study (Nock, Michel, & Photos, 2007). On the other hand, a multiple case study research design is almost similar to the single case study design, the only difference here is that for the multiple case study design, the researcher employs the use of various subjects or bounded cases to illustrate the phenomenon being studied (Gustafsson, 2017).

The case study design has a lot of benefits for researchers, Tellis (1997) and Yin (2009) identified that case study affords the researcher and research ability to gather data from a wide range of sources such as archival records, interviews, documentation, direct and participant observations among others and data can be quantitatively or qualitatively analysed. Another notable advantage argued for cases study was revealed by Zainnal (2007) which states that case study provides a comprehensive qualitative account of a phenomenon in its natural environment and this broadens the understanding of the complexity of the environment covered by the study, unlike experimental research which encourages isolation of the phenomenon under study from its natural environment.

On the other hand, with regards to case study limitations, Yin (1984) revealed that the research design lacks rigour, researchers tend to be sloppy and allows biased views to influence the direction of the findings and conclusions while Tellis 1997) argues that case study research design is microscopic in nature and does give little support for scientific generalization due to the fact researches in this category are only conducted with one subject.

3.3   Data Collection Method

The research procedure for our study involves the detailed steps taken to collect data, analyse these data using various analysis tools. In our study, there is one main research question with four sub-questions, these questions are specially formulated in order to cover various areas of our investigation for the research and as such, a mixture of web surveys and the expert interviews were employed to answer these questions. The nature and significance of these questions determined the data collection techniques, the expert interview was employed for expert related questions while the more general questions related to people's perception, opinions and experience of BVN and identity management in Nigeria, questionnaire (see Appendix 1) in form of the survey was used to collect these data.

Subsequently, BVN and identity management schemes are the main phenomena under study and the government agencies in charge of overseeing these respective projects were considered in order to collect expert opinion. Expert interviews were conducted with the Head of IT Department and Database for NIBSS and NIMC and senior database specialists in both agencies to provide professional and experience opinion on how the respective government agencies operate in line with their set objectives, the expert interviews were conducted electronically. This study employs the use of secondary data in form of literature review and primary data in form of interviews and surveys to collect data needed to analyse and answer the research questions towards achieving the overall set objectives of the research. These data collection tools are examined below.

3.3.1   Document review

Document review is a technique of collecting information by reviewing existing documents related to the study or research. Yin (2009) noted that document review is a data collection method that centres on reviews of documents such as written reports,

proposals, progress reports, newspapers, online academic articles appearing in mass media and peer-reviewed journals relevant to the study.

In our study, documents reviewed are scholarly articles, reports from international bodies like world bank group and GSMA, working paper from BBVA, and OECD, newspaper publications from Nigeria sourced online among others. The information gathered from these documents provided the structure and compositions of the literature for our study such as the conceptual definitions, roles of banks in digital identity management, lessons from early adopters of e-ID, critical success factors for the early adopters, barriers to the successful implementation of e-ID schemes in developing countries. For an in-depth understanding of the Nigerian case of identity management, document review was employed to discuss the history of identity management scheme in Nigeria, current narratives on digital identity management in Nigeria, and BVN and its potentials.

3.3.2   Interviews

The proposed interview questions were used to kick-start the interview process and were not be limited to these questions alone as it is in the case of the formally structured interviews. Additionally, the selected interview questions were designed to contain questions and categories that are of crucial importance to this research. It is good to note here that the stated interview questions were to ensure that the main research purpose was covered and not selected based on theory. It should be noted that this study employ expert interview type which is strictly for experts and professionals in the field of identity management scheme in Nigeria, a total of four interviews were conducted to provide answers to some of the pertinent questions relevant for the provision of empirical answers to the research questions for our study.

Table 4: Distribution of respondents for interview

No	Agency	Position
1	NIBSS	Head of IT and BVN Project Officer (Lagos Office)
2	NIBSS	Senior Database Specialist
3	NIMC	Head of Database Department and IT (Headquarters, Abuja)
4	NIMC	Head of Database Department and IT (Lagos Annex Office)

(Author, 2020)

3.3.3   Survey

A survey as a method of data collection comprises a predetermined set of questions administered to a representative sample that is representing a larger population of interest. It provides a means of measuring and evaluating a population's characteristics, observed behaviour, attitudes and opinions, needs, and awareness of programmes. According to Runeson et al., (2012), a survey was regarded as a pivotal research approach used in the case of study design after action and experiment research, it provides standardized information from a specific population or sample selected for studies. The survey comprised both open-ended and closed questions which give the opportunity to the respondents to influence their answers and have their answers controlled respectively. Due to the large population size of Nigeria, the researcher narrowed down the study population using the sampling techniques. Fricker et al.,(2012) defined sampling technique as the selection of a subset of a larger population and in this regards, the respondents were limited to those with the least educational qualification in Nigeria which is SSCE till the highest qualification Ph.D., the essence of this selection is to end up with valid responses from the sample population that understand the phenomenon under study and understand the need for the research, at the end of the survey,200 respondents participated.

3.4   Data Analysis and Procedure

The collected data from the experts of NIBSS and NIMC will be analysed using RQDA, which is an open-source qualitative data analysis software commonly used by researchers. The use of RQDA as a data analysis tool accompanies some advantages outside being a free tool and its compatibility with various operating systems as opposed to other CAQDAS software. RQDA allows the textual data analysis of either primary or secondary data and serves as an analytical tool which meets the need of most qualitative research. This software is user friendly in terms of design and functionality and allows novice researchers with little or no programming knowledge to analyse interview scripts with statistical analysis of codes. The interviews' audio clips would be transcribed into text formats and analysed using this software. In order to thoroughly conduct the data analysis, the six steps guide promoted by (Maguire and Delahunt, 2017) would be adopted, for this research, the guide serves an analysis procedure and provides a step by step illustration of how data can be analysed using RQDA. The phases of the data analysis

are described in six steps which are familiarizing oneself with the interview scripts, at this stage the researcher read through the interview data several times in order to build an overview knowledge of the information contained in the scripts, at this stage noted would be made regarding observed repetitions of ideas, notions, impressions and other key points relevant to possible results of the research. The second stage involved codes generation after the careful organization of data is completed in an organized manner according to their relevance to defined research questions. The third phase comprises of categorization of codes or selection of themes based on similar patterns of describing significant topics relevant to providing answers to research questions. Selected themes are carefully reviewed at the fourth stage while the final themes would be defined at the fifth stage using related codes under chosen themes. The result would be presented in the form of report writing at the last phase according to the logical arrangement of the final themes.

3.4.1 Reliability and validity assessment of data

To test and guarantee the quality of a study, the use of reliability and validity assessment is essential and commonly adopted procedure to achieve the objective. Furthermore, validity and reliability are key aspects of all researches, where meticulous attention to these two areas provides a yardstick to differentiate between good research and a bad one (Brink & Harold 1993). These two concepts would be carefully examined below as they relate to our study.

3.4.2 Validity

This concept focuses on measuring the trustworthiness of results derived from a study based on the researchers' subjective opinion (Yin 2003), this implies that the result should be free from any form of bias from the researcher to the respondents. It should be noted according to Runeson et al., (2012) that validity check must be ensured by the researcher at all the stages of a study in order to guarantee the worthiness of the study at the end. There exist construct validity, internal validity, and external validity, however, this research would employ the construct validity which tends to establish a common understanding between the researcher and interviewees, this is achievable by ensuring the existence of a logical connection between the research objectives and research questions. This study employed multiple sources of data in order to ensure the validity of the findings at the end of the study.

3.4.3 Reliability

This test guarantees the rightness and dependability of data gathered by the researcher, it aims to reduce or minimize possible bias and errors that might be associated with the research or study. The goal is to guarantee that if the research is conducted once more by a subsequent researcher, following the same procedures as portrayed by the primary research, the subsequent researchers should arrive at similar discoveries or findings and conclusions. To approve this accuracy and unwavering quality of this postulation, the rules and procedures in conducting case study-based research created by Yin,2003 was employed.

3.5   Summary

This chapter focused on comprehensive discussion of case study design, various types, advantages and limitations of using this research design. It further elaborated on the data collection methods and instruments such as interviews, survey and document review, also discussed were the research approach for this study, data analysis procedure and lastly the reliability and validity assessment of the data collection instruments employed for this study. The next chapter will present results of findings from the above activities and form the basis for discussions of findings.

4 Presentation of results

4.1 Introduction

This chapter will present the outcome and analysis of the web survey conducted in this study and discusses the findings from the expert interviews conducted after using RQDA to analyse the qualitative data gathered during the interviews. The web survey outcome will be described and analysed using charts, graphs and percentage analysis, these statistical analyses would form part of the basis upon which the findings would be discussed along with the RQDA outcome later in this chapter.

4.2 Interview outcome on BVN adoption and Improvement of IDM

In this section of the study, the results of the expert interviews will be presented and discussed in detail after the completion of the analysis activities using the open source data analysis software as noted in the previous chapter. With regards to the procedure for carrying out the thematic analysis, the six steps guide was employed which are familiarization with the interview transcripts, generating initial codes, searching for themes, reviewing themes, naming and defining themes or codes categories and last stage step was producing the report. Several codes were identified and created from transcripts, the codes were later categorized into themes in such a way and manner that they are related to one another accordingly. It should be noted that table 5 below presents the selected themes which helps to provide answers to research questions of out study.

Table 5: Themes for Analysis

Themes/ Codes categories
BVN possibilities and security of its database
Level of acceptance of digitalized public services
Challenges of current IDM schemes
Legislation and enforcement requirements
Level of private sector participation

Source**: (**RQDA analysis from author, 2020)

From the table above indicating the code categories created from the transcript codes, the themes provide evidential bases to make logical deductions and inferences according to the gathered data from transcripts.

4.2.1 BVN Possibilities and Security of its Database

As an investigative approach, this theme or code category draws from the responses of respondents to thoroughly evaluate its potentials and security status of its database.

All four respondents arrived at a common conclusion that BVN has been successful in the area of digitally identifying Nigerians, prevention of frauds, reduction in identity theft, and made it possible to access banking services digitally from any part of the world. In the words of one of the respondents, ''BVN has prevented fraud, unauthorized access to customers' accounts, prevented money laundering because if you move money from Nigeria to other countries during fraudulent activities, it can be easily identified because of the centralized database.''

Another respondent went ahead to state the level of success attained by the BVN scheme since inception with regards to the integrity and reliability of its data and database, as this respondent put it '' I can confirm to you as a reliable source form Nigerian Interbank Settlement System that NIMC which is a body that is introduced by the government to capture all citizens details that they are currently tapping from our BVN database to integrate other identity schemes which tells you that BVN is useful data for enrolment of NIN. In conclusion, both Nigerians abroad and in the country can carry out banking transactions digitally with the aid of the BVN which made it possible for their identity to be recognized and verified in a digital environment''

With regards to the security of the BVN database and its link to any government agencies, it was revealed that the BVN database is centrally managed and maintained by NIBSS while the ability to exchange data so far is only enabled among the banks in Nigeria without any government agencies, as stated by one of the respondents ''Regarding the IT architecture that enables the exchange of data among banks, it is simply a layer of centralized database which access to communication and data exchange was granted to the 22 registered commercial banks in Nigeria, each bank does have their various BVN officers at branch offices, they also have their lead project supervisors who are IT personnel's and IT heads of their banks at their respective headquarters monitoring these data exchange at respective levels.''

Three of the four respondents believed that BVN do have the potentials to digitally identify Nigerians beyond the banking industry as it is experienced in developed countries but admitted would require a lot of effort in terms of supportive legislation, training of public service providers and provision of adequate IT infrastructure and strengthen PPP by the government. The fourth respondent suggested that such idea should be implemented in a verification capacity to assess public services, he puts it this way; ''From an expert perspective, it would be best to test run such idea of BVN to access public services from a verification angle and capacity, meaning BVN can be linked to verifying citizens identity online before accessing the public services of their choices online in Nigeria.''

4.2.2 Level of acceptance of digitalized public services

The essence of public services provision is to enhance the wellbeing of the people and most importantly increase efficiency and effectiveness of the public agencies of the government. This theme aimed at evaluating the existing opinions of the people and their notions on digitalized services either provided by the government or private firms in the country. According to the general responses of the respondents regarding digitalized public services , three of the four respondents were on the same page in terms of people expectations when it comes to enjoying essential public services online and accessing these services using various means of identification and verification like personalised username, PINs, tokens, USSD codes among others just like the way banking services are accessible online in Nigeria. In the words of one of the respondents, ''the growth of digitalised services has been in Nigeria for a while, especially among the banking institution and other financial related institutions, Nigerian prefers to use or carry out their banking transactions online these days and their identities are smoothly identified, verified and authenticated.''. One of the respondents, however, raised questions in the area of inequalities when it comes to access to internet facilities, trust in the system, adequate training of public service providers in transforming some of these public services to digital platforms before this can be embraced by the majority of Nigerians, it was also revealed that few agencies of the government currently provide people to access some public services online with the use of special usernames and passwords which they manage as individual database owners but likewise noted that majority of Nigerians are not aware of these, in his words '' the sensitization level with regards to the usage of digitized public services in Nigeria is low and many factors are responsible for this'' which were highlighted above.

According to two of the respondents, the careful re-examination of the NIN programme objectives can as well influence the majority of Nigerians to enrol and accept digital means of accessing public services as it is currently in existence for the purpose of identification of citizens and unifying their existing data from various government agencies databases, as one of them stated '' I believe the goal is carefully re-examined towards enabling digitized public services using the NIN just perhaps then more Nigerians might be convinced to enrol for the NIN.''

Conclusively, the acceptance level of the people towards digitalized public services delivery and access in Nigeria is considered higher as all respondents sounded positive towards such idea and revealed how transformation can be adequately spread among the majority of Nigerians who are already used to such services from banking institutions among others.

4.2.3   Challenges of Current IDM Schemes

According to all the respondents, it was revealed that the major set of problems peculiar to identity management schemes in Nigeria currently is lack of IT infrastructures, inadequate technical know-how and existence of various databases of the government managed by different government agencies. The current NIN scheme of the government lacks the IT capacities to process huge data, enrol and capture the teeming population of the country at the moment, one of the respondents went further to give an analysis of the number of enrolment centres in each local government area of the state which is relatively low in terms of proportion to the number of people residing in the area under the enrolment exercise. Another respondent clearly revealed the lack of quality biometrics captured by the existing schemes, personnel to process huge data and inability of the agency in charge of NIN to harmonize the existing databases of other government agencies. In the words of a respondent, 'The key sets of challenges encountered now to link existing databases of the government are IT infrastructural challenges to process huge data, skills and personnel deficiency for large data processing, poor quality biometrics captured by various agencies, absence of central ID authentication and verification service, legal issues and disparity in the number of data fields captured by different agencies.''

Furthermore on the challenges of the current identity management schemes in Nigeria, in terms of harmonization of these existing databases, two of the respondents raised a concern regarding poor data management and deficiency in legislation which has downplayed the significance of the identity schemes as people do believe that the

government keeps on requesting them to provide their details at every point in time for various reasons and purposes. It was revealed that the main objection of the current NIN scheme in the country is to tie the data of citizens together across all the fragmented databases of the government while the NIC was just basically aimed at identifying Nigerians by means of issuing a smart document. Two of the respondents believed that the harmonization approach of the existing databases in the country through the issuance of NIN would not improve the identity management scheme and objective of the government as one of them categorically stated; 'My answer as a database expert is a NO because of issues like poor data management, no common standard in demographic and biometric data captured among different agencies, skills and personnel deficiency for large data processing, no central reference database for decision making, absence of central ID authentication and verification services.''

The financial implication of implementing identity management schemes is paramount to achieving smooth implementation as this is visible among developed countries of the world as discussed in the literature section of our study. According to three of the respondents, the inadequate finding of the present schemes plays a negative role in achieving the predicted target of the scheme four years ago, absence of transparency and accountability related matters were revealed to be part of the waterloos of the existing schemes. Also, lack of trust in the system put together by the government was revealed by two of the respondents stating that the people in the rural areas especially believed that the government requests their data for purpose of elections even though there are no intentions of such from the government, a lot of them enrolled for voters card registration every four years before the general election in the country, and also due to their demographic location in the country in the villages, enrolment for the identity schemes has been a nightmare in terms of accessing the limited enrolment centres which are located in the local government areas in the cities and more urban locations across the country.

This section also delved into investigating the relationship between the current schemes and digitalised public service delivery, according to two of the respondents, the main objective of NIC and NIN has been to assign unique identity elements to people in form of national identity cards and unique numbers, None of these schemes was designed from the initial stage to facilitate citizens' accessibility of public services online because few agencies of the government like FIRS and LIRS do have their unique identity numbers for members of the public interacting with them online. According to one respondent; ''With regards to NIN's objective of the government, it was primarily introduced to

digitally recognise Nigerians and enhance the e-government project of the federal government, however, it has not been incorporated by design in terms of IT and connectivity to public agencies to render services digitally at the moment.''

4.2.4   Level of private sector participation

Economic growth and development of a nation depend on the policy direction of the government in keys areas of the economy among which is the involvement of private sector firms towards building a successful partnership to achieve the goals and objectives of the government. According to the respondents with regards to Nigerian case of present identity management schemes implementation, it was revealed that limited and guided roles were extended to the private sectors like the banking firms participation restricted to BVN, telecommunication firms in the area of registration of mobile phone users among others. All the respondents agreed at some point that the private sector plays active roles according to how the government policies afford them, however, innovations and resources management capacities of the private sector can be tapped into to further improve identity management schemes of the government in the country. One of the respondents was of the opinion that the government can take advantage of the many channels and avenues within the capacity of the private sector to enrol more Nigerians for the identity schemes especially those currently encountering enrolment challenges due to limited enrolment centres, he puts it in this manner; ''If the NIMC can strengthen the public-private partnership in the issuance of NIN by making some of the private firms like banks an avenue to enrol for NIN, it will go a long way in capturing more Nigerians and improving our identity management.''

This theme was able to evaluate the level of government under-utilization and engagement of the private sector potentials in the area of expanding the enrolment avenues for citizens and other innovative capacities the sector could provide the government with at the long run in the identity management schemes journey.

4.2.5   Legislation and enforcement requirements

The findings according to this theme supports the legal requirement and supports expected to be in place and ensured by the developed countries to successfully identify their citizens in a digital environment and access public services online.

From the results, the respondents reacted to the notion of legal provisions regarding changes or formulation of new ones to be essential in order to transform public services delivery to a digital environment where people can access them online. If BVN is considered worthy as a means of accessing digital public services, NIBSS and the bank

do have roles to play and legislation can guarantee the responsibility sharing in this regard, according to one respondent; ''Certainly, the legislation would need a modification that will allow a form of a responsibility-sharing with NIBSS which oversees and issuance of management of Bank Verification Number. Secondly, if BVN is to digitally identify citizens of Nigeria and legal residents when accessing public services here in Nigeria, I think the bank would also have to be enabled by law to play the verification role in the process.''

With very few words, two respondents expressed the lack of interest of the people in partaking in the current identity management schemes due to lack of legislation that enforces them to do so unlike the BVN scheme when the government-mandated citizens and non-citizens with banks account to enrol with set deadlines without which access to their bank accounts would be denied. Secondly, one respondent believed that the way around this legislation would be for the government to introduce such laws that emphasize values to citizens access to essential public services and NIN schemes so that they can be more encouraged to enrol in the nearest future.

Another area of legislation that requires changes and modification according to two respondents was data protection laws in Nigeria, the existence of legislation protecting the lives and properties in the country was cited by one respondent from the constitution of the country, but pointed out the inadequacy of existing law to protect the rights of citizens 'data usage by authorized agencies and entities of the government, in cases where the government agencies breach the data protection agreement signed with the citizens during enrolment of identity management schemes in the country. In the word of the respondent, ''For instance, at the point of NIN registration citizen signed the disclosure that information given is accurate and not falsified. However, no form of penalty is provided in written form by law to enable citizens to challenge the authority for misuse of their data.''

4.3   Survey outcome on BVN adoption and Improvement of IDM

A total of 200 respondents participated in the carefully administered web surveys specifically designed to investigate and gather information relevant to providing answers to the research questions. According to the structure of the web survey (see Appendix 2), there are three sections and based on this arrangement, the data was presented in three sections. Section one focused on the general information and background details of the respondents as a means of ensuring the validity of the responses, section two centred on

specific questions related to BVN while section three focused on Nigerian's perception on digital public services. Afterwards, each analysis is followed by statements explaining the responses and observations. A simple percentage calculation formula is employed as shown below;

Formula: Total number of responses   X   100

            Total number of respondents

Question one centred on finding the ratio of the respondent according to their occupation or field of expertise, this was later categorized into IT industry, Service industry, Financial Industry, Student and others. The distribution of the (200 respondents) are as follows; IT industry (59 respondents), Financial industry (42 respondents), Service industry (65 respondents), Students (11 respondents) and others (23 respondents). From this distribution above, general participation of Nigerians can be deduced as it cut across all aspects of professions or occupation among Nigerians (see Appendix 3, Figure 1)

Question two was aimed at capturing the educational backgrounds of the respondents that participated in the web survey. The purpose of this question is to evaluate the education level of the respondents and ensure that they are well informed to understand the survey questions in general and give reasonable responses, it described the educational background of the 200 respondents in the following order; SSCE certification 5.5% (11 respondents), OND certification 4% (8 respondents), HND certification 8% (16 respondents), B.Sc./ B.A certification 38% (76 respondents), M.Sc./M. A certification 42% (84 respondents) and lastly PHD certification 2.5% (5 respondents). It shows according to the combined 82.5% of graduate and post-graduate degree holders that participated in this survey that 165 respondents are knowledgeable and well versed to answer the survey objectively (see Appendix 3, Figure 2).

Question three was aimed at ascertaining when each respondent enrolled for BVN and in order to assess their knowledge of BVN and their experience so far with its usage. The responses were in the following order; 62.5% (125 respondents) shows the ratio of respondents who enrolled for BVN since five to 6 years ago when it was introduced into the Nigeria banking sector which implies that as at the first two years of its introduction, 32% (64 respondents) shows the ratio of those they enrolled for BVN later after years of its inception within three to four years ago, 4.5% (9 respondents) shows the ratio of the respondents that just enrolled for BVN with the last two years while 1% (1 respondent)

shows the proportion of the respondents that enrolled for BVN this year. What can be deduced from these ratios is that larger percentage of Nigerians with active bank accounts enrolled for BVN at the early stage within the first few years of its introduction while others registered earlier last year and this year. Also, going by these ratios, it indicates that a larger percentage of the respondents have adequate experience with how BVN works, their bank accounts and financial transactions respectively (see Appendix 3, Figure 3).

Question four aimed at confirming the main objective of BVN according to the NIBSS and the federal government of Nigeria when it was introduced in 2014 and evaluate the knowledge of Nigerians regarding BVN and its purpose. The respondents reacted to the question in the following order: 89% (178 respondents) agreed that BVN is designed to protect bank customers and reduce fraud, 7% (14 respondents) disagreed to this claim of BVN objective while 4% (8 respondents) did not show any knowledge regarding the question (see Appendix 3, Figure 4).

Question five focused on investigating if the adoption of BVN as a digital identity in Nigeria could improve identity management in Nigeria. According to the statement of the problem for this study, it was revealed that there exist challenges in the area of identity management in Nigeria till date due to various existing identity schemes. The respondents' reactions for the question are as follow;89% (178 respondents) thought that BVN adoption as a form of digital identity can improve identity management in Nigeria, 9% (18 respondents) do not think in that direction that BVN can improve identity management in Nigeria while 2% (4 respondents) did not indicate their position or thought regarding the question. (see Appendix 3, Figure 5).

Question six aimed at seeking the opinion of the respondents regarding the success of BVN in the banking industry if it can be substituted for existing fragmented identity schemes in Nigeria, the respondents reacted to the question in the following order;80% (160 respondents) agreed to the opinion that BVN can substitute for the existing fragmented identity schemes in Nigeria,16% (32 respondents) disagreed to the opinion while 4% (8 respondents) did not indicate their view (see Appendix 3, Figure 6).

Question seven was designed to investigate if Nigerians have been accessing public services digitally with the use of NIC or NIN in the past or present. The followings were the reactions of the respondents, 84% (168 respondents) confirmed that they have never

accessed public services digitally using the NIC or NIN, 12.5% (25 respondents) shows that they have used either NIC or NIN to access public services digitally while 3.5% (7 respondents) indicated their lack of knowledge regarding the question. (see Appendix 3, Figure 7).

Question eight focused on assessing the willingness and acceptance level of Nigerians towards digitalized public services like the citizens of developed countries of the world. This question is key to the main purpose of this section of the survey, the reactions of the respondents to the questions are as follows; 90% (180 respondents) are willing and prefer to access public services digitally in Nigeria, 9% (18 respondents) indicated their unwillingness and lack of preference towards accessing public services digitally in Nigerian while 1% (2 respondents) remained uninformed about the question (see Appendix 3, Figure 8).

Question nine which is the last question of the survey aimed at investigating possible reasons why Nigerians might not want to access public services digitally. The idea behind this question is to ascertain the possible challenges of identity management and verification peculiar to Nigeria. According to the respondents, the most sets of reasons and barriers affecting the decision of the respondents not to think of accessing pubic services digitally are lack of a harmonised database of citizens (67 respondents), poor data management framework (59 respondents), lack of stable internet accessibility (41 respondents), lack of trust in the system (32 respondents) and cybersecurity reasons (21 respondents). Other factors do have 12 respondents and less who believed they are guided by those barriers for their decision (see Appendix 3, Figure 9).

In the conclusion of this chapter, the results collected from respondents both from the web surveys and interviews proved their knowledge of BVN and expertise in the field of identity management in Nigeria respectively, providing not only notions and responses which aid the investigative approach of this research but also new insights to the study which would help in formulating good recommendations. In a nutshell and most importantly, the results provide a proper analysis of what BVN can achieve beyond the banking industry in Nigeria, revealed the challenges of existing and current identity schemes in Nigeria and perception of people in the country towards acceptance of digital means of accessing public services online.

4.4   Discussion and Summary of Findings

The section gives a detailed record of how the research questions are answered by comparing the results of this study with existing theories and works from other studies and researchers related to identity management schemes.

The overall research question and objective of this study is to investigate the possibility of using bank verification number as a form of digital identity in Nigeria to access public services and recommend how BVN can improve identity management in Nigeria. A review of literature, especially on the successful digital identity management schemes among advanced countries of the world, revealed the efforts and roles played by the banking institutions and government towards the application of technological solutions and yielded massive results in the area of identifying citizens, maintaining a comprehensive database and accessing public services online by their citizens. Also, the success of BVN in the financial sector to prevent unauthorized access to bank accounts, prevention of fraud and enabling citizens to access banking services online from any part of the world was discussed in the case description chapter, bearing all these in mind, we decided to answer the research question by confirming if BVN can be used to access public services online and improve identity management in Nigeria and evidence from the survey and expert interviews disclosed the followings:

- BVN can be used in identification and verification capacity to access one public service as a form of a pilot approach before making it a possibility for most public services.
- BVN cannot substitute for the existing NIN currently managed by NIMC on behalf of the government since its central database is currently managed by NIBSS who grants access to only commercial banks in the country now.
- Nigerians are of the opinion that the success of BVN in the financial sector can transcend beyond to other sectors if well managed and banks can play a great role in monitoring the identities of people accessing public services online as they do for their banking services online as well as it is possible in countries like Estonia, Sweden and Austria.

The first research question aimed at ascertaining the level of acceptance of Nigerians towards accessing public services online or digitally. Although literature did not give us any facts or clues about the acceptance pattern of Nigerians when it comes to accessing public services online, however, it was revealed from the expert interviews that an

average Nigerian prefers to carry out banking transactions online than visiting the banks and do have access to a mobile phone either smartphones or regular ones that enables usage of internet and USSD codes to complete banking transactions. The perceived usefulness and ease of use for predicting new technology acceptance by people according to TAM is validated from the results of the study from the survey as the majority of them responded positively to accessing public services digitally or online as experienced in other advanced countries of the world. In conclusion, findings under these research questions revealed;

- Majority of Nigerians are willing to embrace digital means of accessing public services online. (see Appendix 3, Figure 8)
- The rate of awareness of online public services is low in Nigeria and the existing ones do not incorporate NIC or NIN on their websites. To verify this, the researcher registered on services.gov.ng web portal and checked the FIRS website to verify the means of identifying people before any service can be requested, however, there exists a separate log in the approach of username and passwords, TIN but not NIN.

The second research question focused on evaluating the security status of the BVN database and investigate how the banks in Nigeria can communicate using the database. According to the interviews from the experts in NIBSS and survey question on the success of BVN so far in Nigeria, the followings below were revealed;

- The BVN database is managed by NIBSS and each bank does have BVN officers and IT personnel that monitors enrolment and other activities.
- NIBSS granted access to all commercial banks in Nigeria with regards to data exchange and communication on the BVN database managed by them.
- Majority of Nigerians agreed that BVN met up with its main objective of reducing frauds, preventing unauthorised access to their accounts. (see Appendix 3, Figure 4)

The third research question was directed towards discovering the current barriers of existing identity management schemes in Nigeria, notably NIC and NIN. Lessons from early adopters in the literature chapter discussed the barriers to effective implementation of digital identity schemes in developing countries of the world and the results from the survey and interviews support most of these challenges revealed as well and it should be

noted that Nigeria is classified as a developing country as well. The findings revealed the following barriers encountered in Nigeria currently;

- Inadequate IT infrastructures have hindered the inability of the NIN and NIC to achieve their respective targets of enrolling millions of Nigerians. The existence of multiple databases of the government with different databases made it a daunting task to achieve unifying each Nigerian data across all databases using NIN without the right IT infrastructures that support interoperability. Also, insufficient IT equipment and a lack of central ID authentication and verification facilities.
- Inadequate funding.
- Poor data management from previous failed schemes and current Voters card were notable examples.
- Enrolment challenges like limited enrolment centres and the inadequate number of competent enrolment officers.
- Legal issues among existing agencies and harmonization teams of the government, data protection, and privacy matters.
- Lack of trust in the system by the people.

The fourth research question aimed at the legislative and regulatory supports required to be in place before adopting BVN as a digital means of accessing public services in Nigeria. Since this question is specific to Nigeria, there exists no literature discussing this, however, in the literature chapter under the success factors of digital identity schemes in developed countries, legal regulations and supports were noted to have contributed to the successful implementation of identity schemes and transforming public services online by the government. The interview outcome supports the claim that adequate legal requirement is mandatory for successful adoption of BVN as a digital means to access public services and ensure the success of the existing identity schemes in Nigeria. The key findings revealed the followings below;

- Inadequate data protection law and enforcement.
- Lack of legislation to guarantee penalty for data breach by government agencies.
- Need for modification of existing legislation to accommodate institutional changes.

5 Recommendations

5.1 Introduction

From the previous chapter, presentation of results and analysis of the findings from the surveys and interviews revealed the potentials of BVN beyond the banking industry in identity management, how secured its database managed by NIBSS and the peculiar challenges of the current identity management schemes of the government in Nigeria. This chapter aims to propose a set of recommendations for the Federal government of Nigeria to incorporate BVN as a digital means of accessing public services online, and practical steps to be taken to improve the identity management schemes in the country. The chapter comprises sections namely recommendations and discusses the matter in relation to the research findings. These recommendations are supporting the results based on what a framework for the Nigerian identity management is proposed.

5.2 Recommendations for IDM improvement

After careful review of the outcomes and notable findings from the survey and interviews, as well as reviewed pieces of literature among early adopters of digital identity and digital means of accessing public services (Austria, Estonia, Sweden, Denmark, and Germany) in the literature chapter of this study, the researcher agreed to the fact that there are existing challenges of IDM schemes in Nigeria and there is need for the government and its agencies managing identity schemes to re-evaluate the current identity management scenario in Nigeria in order to improve the current situation for the better and guarantee an improvement in years to come. This, the researcher proposed a framework that would guide this re-evaluation process by stating in detail the steps to be taken in order to benefit from BVN success in the financial sector and procedures to be taken to defeat the current challenges of NIN and NIC for identity management improvement in the country. (see Figure 1 below)
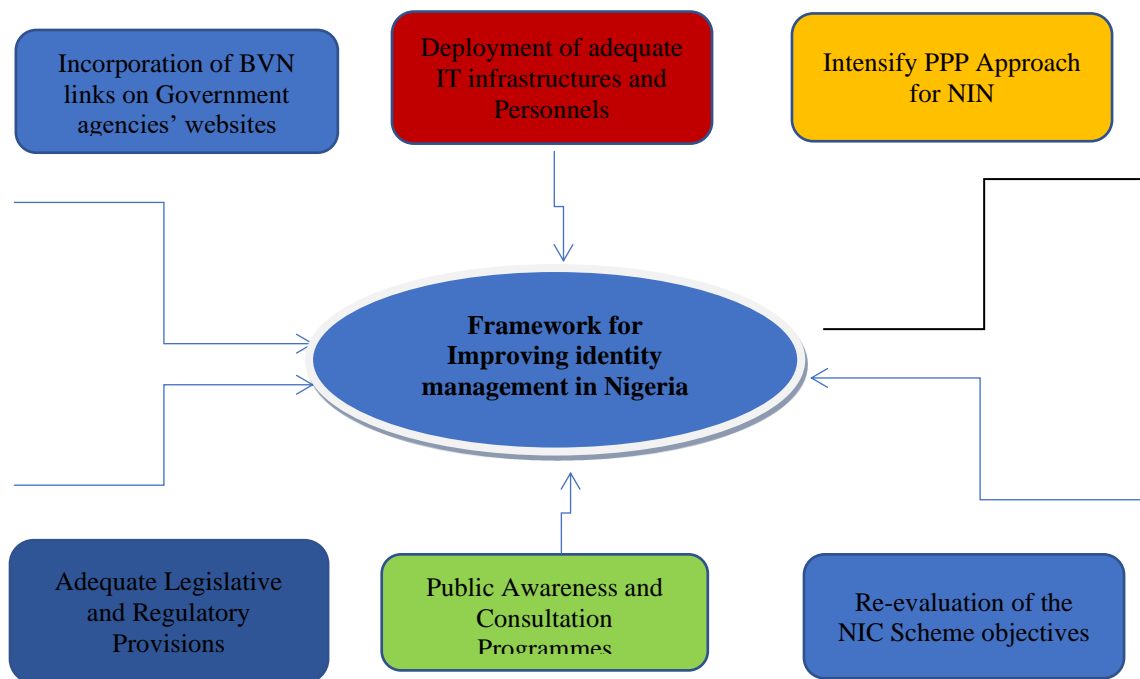
Figure 1. Framework for Improving Identity management in Nigeria

5.2.1 Incorporation of BVN links on Government agencies' websites

Identity management is a key aspect of governance and public service providers are faced with daily activities of identifying individuals. With regards to BVN adoption as a form of accessing public services online and clues from countries as best practices for identifying citizens digitally and citizens accessing public services online, we could see that each country has a unique identifier that made it possible for services to be rendered digitally by the government. In the Nigerian case, such a unique identifier is the on-going NIN whose objective is to unify citizens' data across other government databases. BVN can serve this purpose for citizens having one and willing to access public services online in the capacities below;

- **Identification and Verification:** BVN link should be included on websites of government agencies providing public services to the citizens for citizens to access such services thereby making it possible for them to identify and verify their identities before requesting desired services online. This link can redirect the person who desired to access the website to his or her bank apps or regular mobile phone for USSD codes verification. This is a possible scenario in Estonia where citizens and legal residents are presented with bank links to log onto government websites to request public services online.

- **Authentication:** This is a key area of digitalized services and the need to ensure that the rightful owner of the identity is the one requesting and finalizing a service request must be ensured. Citizens performing online banking transactions do have two PINs either on bank apps, online banking on USSD with regular phones, this can be repeated in the same scenario when an individual is about to finalize the request of public services online using BVN as login identity.

- **Database Accessibility shared beyond the banks:** Head of Database of the government agencies would be responsible for maintaining the data exchange infrastructure between NIBSS and their respective agencies.

5.2.2   Deployment of adequate IT Infrastructures and Personnel

To improve identity management in Nigeria and overcome the series of challenges associated with the NIN and harmonization efforts of NIMC. the three steps need to be addressed;

- **Investment in IT infrastructures Procurement:** The area of funding is key in providing the needed IT facilities and equipment for enrolment purposes, harmonization, and maintenance of citizens' data and the existing databases of the government. Countries with successful digital identity implementations for their citizens invested heavily in acquiring and maintaining their IT infrastructures like X-road Estonia, and Sweden with annual budgetary provisions for this purpose.

- **Training of Personnel:** Expertise is paramount when dealing with technologies and the right skills must be embedded in the workforce of the government agencies handling identity schemes in a country. Training should be conducted on a regular basis for newly recruited and existing staff in charge of enrolment at every location in the country in order to make the best use of the technologies.

5.2.3   Intensify Public Private Partnership Approach for NIN

This is crucial for developed countries of the world as the government maintains a strong partnership with private sectors and firms in maintaining and successfully managing innovations in which digital identity management is no exception. For Nigeria, a strong partnership must be pursued by the government to avoid the under-utilization of private sector capacity in improving identity management in the country. In the areas below;

- **Grant access to private enrolment centres:** NIN enrolment centres are limited in the country as they are found in local government areas across the country, this limits the enrolment of persons not favourably located demographically. Banks

and other private outlets can be used to enrol more persons for NIN in order to reduce the burden on the existing centres and individuals ready for enrolment.

- **Responsibility Sharing:** The government through NIMC can request for private firms like telecommunication service providers, banks, and identity verification firms in the country to help in identity validation and authentication activities in the harmonization process rather than taking charge of these activities with limited resources and IT facilities.

5.2.4 Adequate Legislative and Regulatory Provisions

In the wake of examining the legislation already in existence regarding identity management in Nigeria, some areas still need re-enactment and other forms of enforcement to achieve the desired objectives of NIN and NIC implementation in the country. As experienced in countries like Estonia and Denmark where legal frameworks put in place by the government influenced the acceptance and usage of digital identity means of identifying citizens, and accessing public services and protects the data of citizens in line with GDPR. For the Nigeria situation, the followings below are expected to be put in place by the government;

- Intensify data protection law and enforcement among its agencies in charge of gathering and managing citizens' data, the government can amend existing Act in accordance with international standard and current trends of technology users around the world.

- NITDA should sensitize the members of the public on existing regulations with regards to the rights as data owners and what provisions are in place in the event of data misuse by the government agencies. This will enlighten the people on the relevance of their data and gradually eliminate the lack of trust in the system as indicated from the outcome of the study.

- Modification of exiting legislation regarding identity management in Nigeria to facilitate institutional changes that would legally empower other private sector firms to contribute towards improving identity management of citizens in Nigeria.

5.2.5 Public Consultation and Awareness Programmes

The public policy and programmes of the government are designed for the people and it is crucial for the people to be kept abreast regarding the policy directions. The peculiarity of Nigeria situation revealed that members of the public are not aware of the importance of NIN, NIC and harmonization efforts of NIMC, to remedy this situation aside from the

use of mass media and other social media platforms, NIMC can partner with local government agencies and other willing private firms at the grassroots to sensitize the members of the public on the need to enrol for the NIN schemes. If this is put in place, majority of Nigerians will be aware of the essence of NIN which goes beyond just identification but rather unifying citizens' data across existing databases of the government.

5.2.6   Re-evaluation of NIC Scheme

The NIMC and Federal government of the country is encouraged to return to the drawing board and carry out an objective evaluation of the national identity card issuance which is yet to produce cards for the teeming population of the country. In doing this, key areas that should be re-examined are listed below;

- Low ID cards issuance to citizens as majority enrolled for years without been issued one.
- NIC is a smart document, it supports all forms of electronic authentication however it has not been fully implemented to access public services digitally.

6   Conclusion

The primary purpose of this study was to investigate the adoption of BVN as a digital means of accessing public services and improving identity management in the country as it is noted that technology had become a force to reckon within the area of public services delivery and popular among countries of the world (Lin & Zhou, 2015). Other specific objectives were to evaluate the perception of people in the country on accessing public services digitally, current challenges of existing identity management schemes in order to propose a framework to improve identity management and BVN usage beyond the financial sector in the country. Based on the results, the research questions are answered, and main keywords, aspects, and outcomes can be brought out as follows;

Overall research question focused on investigating the adoption of BVN as a digital identity means of accessing public services and improving identity management and based on findings it can be emphasized that BVN has great potential beyond the financial sector as it can be test run as a pilot approach to access one public service in an identification and verification capacities. BVN adoption would improve identity management as its data remained reliable for other usages by the government and helped in reducing fraud and identity theft in the financial sector.

Research question one centred on evaluating the acceptance level of Nigerians towards accessing public services digitally and based on the findings, people are willing to access public services online. The majority of Nigerians are used to accessing banking services digitally by the use of mobile apps, internet banking, and USSD codes. The perceived usefulness and ease of use from the Technology acceptance model was validated by the findings.

The second research question focused on ascertaining the security level of BVN's database and interoperability, and based on the findings from the study, its database is secured, and access to data is highly monitored and regulated by NIBSS. In terms of interoperability, the BVN database is centrally managed, and information sharing access is presently granted to all the 22 commercial banks in the country.

Research question three centred on identifying the challenges of current IDM schemes in the country and based on the findings, it can be emphasized that inadequate IT infrastructures, inadequate funding, poor data management, and enrolment challenges have hindered the successful implementation of an effective identity management scheme in the country. Also, legal issues and lack of trust in the system have affected the IDM schemes. The revealed challenges validate the established sets of barriers encountered by

developing countries in implementing digital identity, as discussed in the literature chapter of the study.

The fourth research question focused on identifying regulations and legislation requirement for BVN adoption and improvement of identity management and based on the findings, it can be stated that data protection and the issue of data privacy needs urgent attention in order to overcome the obstacles of current IDM schemes. Laws are also required to accommodate institutional changes for BVN to be adopted as one of the digital means of accessing public services online.

With a view to providing the needed direction based on the findings, the researcher has proposed six main steps of actions in the form of a framework to improve identity management in Nigeria and test run BVN as a digital identity means of accessing public services in Nigeria (see Figure 1, chapter five, page 61). The proposed framework will guide the government in buidling digital identity management strategies and plans towards national development. Lastly,the prosposed framework serves as a roadmap for the government and its agencies to re-evaluate the current IDM schemes in the country beyond identification purposes, and also to enhance digital access to public services in the country.

6.1   Limitation of Study

During this study, it was revealed that identity management schemes in Nigeria encountered series of sets back, harmonization of the existing databases of the government agencies downplays the successful improvement of identity management in the country. This study focuses on investigating the use of BVN as a digital identity means of accessing public services to improve identity management, however, there are other existing opportunities that can be investigated using the NIN or NIC. Secondly, due to constraints in time and resources, the research coverage was limited to two hundred Nigerians and four experts from NIBSS and NIMC since both agencies handle the enrolment and issuance of BVN and NIN and NIC respectively.

Lastly, studying the potential limitation of the chosen research design for this study, the case study design possess limitation in generalizability and lack of rigour (Krusenvik, 2015), in terms of generalization, conducting interviews with a respondent from a particular organization is not acceptable because it is assumed that too much reality remains unknown. Also, large sample surveys can fail to collect required information needed for gaining a deep understanding of phenomena under study (Hyde et al., 2012),

to elaborate on this, case study design offers advantages and possesses it sets of disadvantages which put this research to further scrutiny.

6.2   Future Work

In terms of suggesting future research related to this study based on the findings and limitation of the study itself, future work can be embarked on to investigate the effectiveness of adopting the proposed framework in building digital identity management strategy by the Federal government of Nigeria. Other areas are highlighted below;

NIC can be investigated to access public services digitally in Nigeria as the smart document supports most of the electronic authentication methods according to the ISO standard, why it has not been incorporated and what needs to be done to improve its usefulness to Nigerians holding one.

Secondly, the reliability of the methodology used in this research should be put to test by reinvestigating by a different researcher, using both qualitative and quantitative research methodology to provide diversification of responses and at the end of such research, results are compared against each other.

Also, a future study can be in the area of appraising the effectiveness of the NIN and NIC in identity management as this study mainly focused on investigating BVN adoption to access public services online and evaluating the current challenges of identity management schemes in the country in order to proffer recommendations for improvement.

In conclusion, the study opens an area of research to evaluate the impact of BVN links to government agencies' websites on public service delivery and effectiveness if the first recommendation is implemented for at least in one of the government agencies.

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Appendix 1   Interview Questions

1) Identity management is a key activity that requires continuous strategy, on the part of the government, can you describe in detail steps taken in the past few years of NIMC involvement.

2) In advanced countries of the world, the issue of digital identity has gone beyond just enrolment of citizens for the sake of having one, however important objective like easy access to public services and promoting digital economy have been the narrative, how do you elaborate on NIN objective as a key figure in its implementation?

3) Harmonisation of the fragmented databases of the citizens in Nigeria is key, do you think that is the way forward to achieving a common digital identity and comprehensive database?

4) With relevant statistics, the success of NIN issuance is minimal compared to the vision and predictions as it 2016 when it was launched, what are the factors responsible for this?

5) How passive or active has the private sector contributed in the past and currently to the government attempts with regards to identity management? For instance, the banks that have been able to manage digital identity of customers and reduce fraud through the adoption of BVN?

6) In terms of IT architecture, is NIMC fully equipped to link all the existing databases of government agencies and achieving an accurate and comprehensive database of citizens?

7)   With regards to existing regulations on identity management in Nigeria, if Nigeria is to stick to BVN as a digital identity, would there be modification or enactment of the new laws and regulations? (RQ5)

8) Data protection laws in Nigeria exist according to the amended 1999 constitution, however there exist no in-depth protection for data breach and misuse of citizens' data by government agencies and ministries, which direction would you suggest the government can follow towards improving this aspect of the data protection law?

Interview Questions (NIBSS)

1) Identity management is a key activity that requires continuous strategy, on the part of the government, can you describe in detail steps taken in the past few years of NIBSS involvement through the BVN Scheme.

2) Since BVN inception in 2014, how would you scale the success so far against its objectives such as protection of customers identity, reduction of fraud and identity theft?

3) According to statistics available online on NIBSS website, would you agree to the fact that BVN has more coverage in terms of digitally identifying Nigerians and non-Nigerians living in Nigeria than other fragmented identity scheme of the government?

4) To a more technical question, can you give an overview of the IT architecture that has made it possible for interoperability among the various databases of banks in Nigeria in such a way that one individual has one BVN regardless of the number of bank accounts owned in different banks

5) How secured is BVN so far and what are the challenges associated with maintaining the sustained growth and success of this great digital identity in the banking industry?

6) From your practical experience of BVN enrolment so far, what would be your assessment of Nigerians with regards to digital identity form of accessing banking services, secondly, do you think this can transcend to public services as well?

Appendix 2 - Survey

Dear Participant,

REQUEST FOR COMPLETION OF QUESTIONNAIRE

I am a master's student of e-Governance Technologies and Services at Tallinn University of Technology in Estonia. I am conducting a research study on **Bank Verification Number as a Possible Foundation for Digital Identity Strategy in Nigeria.**

The questionnaire attached is intended to help me obtain vital information for the research.

Kindly answer each question to the best of your knowledge. Your responses will be kept in strict confidentiality as it is only for academic work.

Thank you very much.

SECTION A: GENERAL INFORMATION

Please complete the following questionnaire items in each section by ticking (_) in the brackets or fill the most appropriate category that best represents your opinion
(1) Occupation

………………………………………………………………………………………………
……

(2) Educational Qualification

SSCE (_) OND (_) HND (_) B.Sc. (_) M.Sc. (_) P. HD (_)

(3) When did you enrol for Bank Verification Number (BVN)?

Less than 1 year (_) 1-2 years (_) 3- 4 years (_) 5-6years (_)

SECTION B: Please tick "Yes or No "or "No idea."

How can BVN adoption improve identity management of citizens in Nigeria?

(4) Can you confirm that BVN is designed to protect bank customers and reduce fraud?

Yes (_) No (_) No idea (_)

(5) Do you think the adoption of BVN as a form of digital identity in Nigeria would improve identity management in the country?

Yes (_) No (_) No idea (_)

(6) In your opinion, would you agree that BVN can substitute for the various fragmented identity management schemes due to its success so far in the banking and financial sector?

Yes (_) No (_) No idea (_)

SECTION C: Please tick "Yes or No "or "No idea."

(7) Are Nigerians willing to accept digital means of accessing public services?
Have you ever accessed any public services in Nigeria using the current NIN issued by NIMC or National Identity Card exclusively online without visiting the government offices?

(8) Public services can be accessed digitally in advanced countries of the world like Estonia, Germany, Finland among others and this has enhanced effective and efficient public services delivery, would you prefer to experience this in Nigeria?

Yes (_) No (_) No idea (_)

(9) If No, can you assert by ticking the possible reasons for your answer. You can tick as many options as possible.

S/n	Question	Yes	No	No idea
A	Lack of harmonized database of citizens			
B	Lack of stable internet accessibility			
C	Cyber security reasons			
D	Poor data management framework			
E	Personal and Cultural belief/Principles			
F	Digital Divide among Nigerians			
G	Political reasons			
H	Lack of trust in the system			

Please mention other reasons here…………………………….......................

Appendix 3 - Results of the Survey
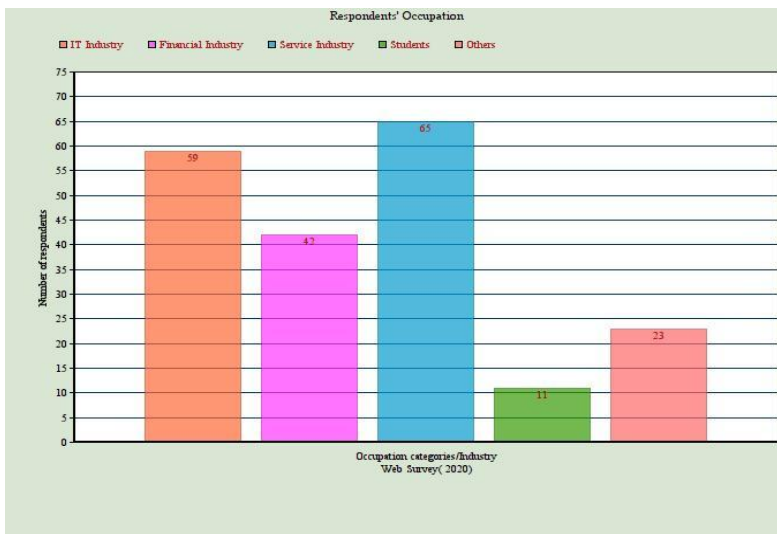
(1) Occupation

Figure 1: Answers to Question 1
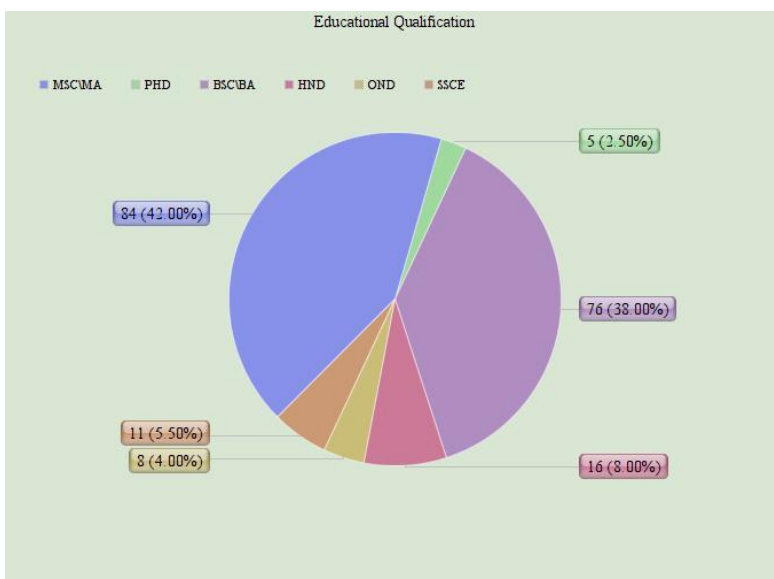
(2) Educational Qualification

Figure 2: Answers to Question 2

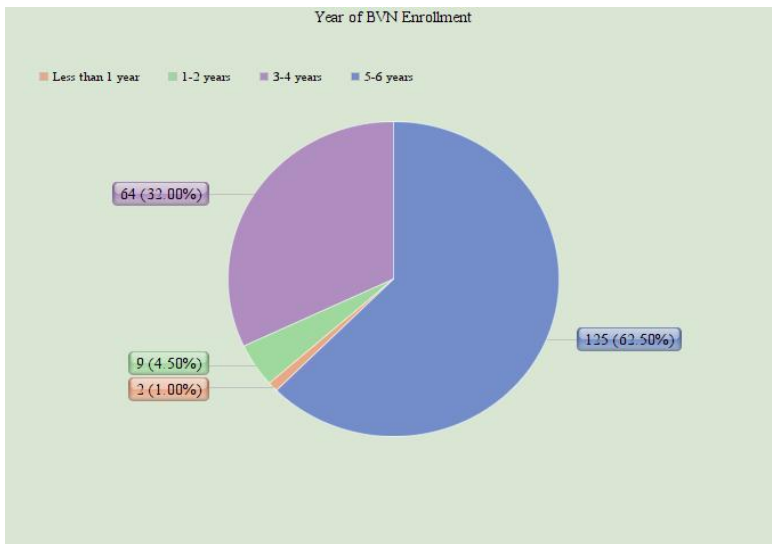**(3) When did you enrol for Bank Verification Number (BVN)?**

Figure 3: Answers to Question 3

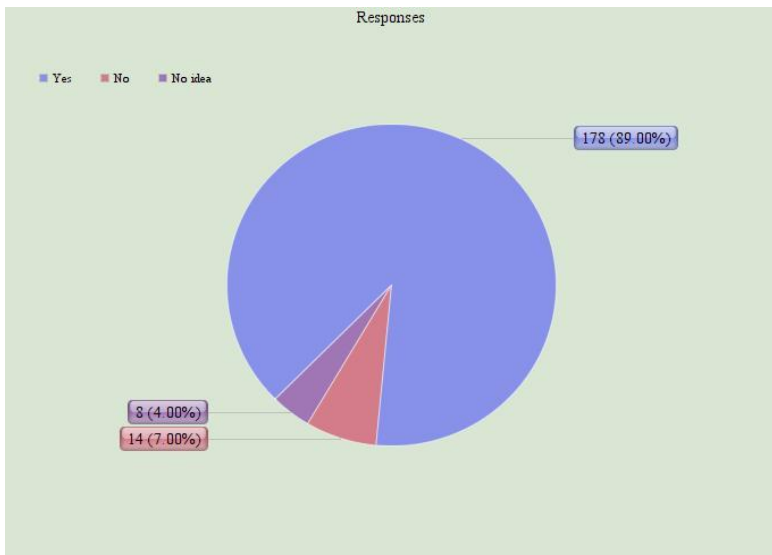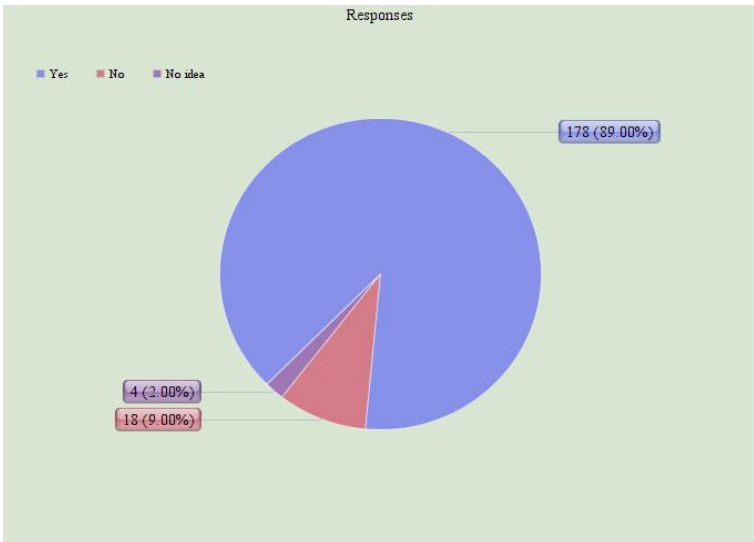**(4) Can you confirm that BVN is designed to protect bank customers and reduce fraud?**

Figure 4: Answer to Question 4

(5) Do you think the adoption of BVN as a form of digital identity in Nigeria would improve identity management in the country?

Figure 5: Answers to Question 5

(6) In your opinion, would you agree that BVN can substitute for the various fragmented identity management schemes due to its success so far in the banking and financial sector?
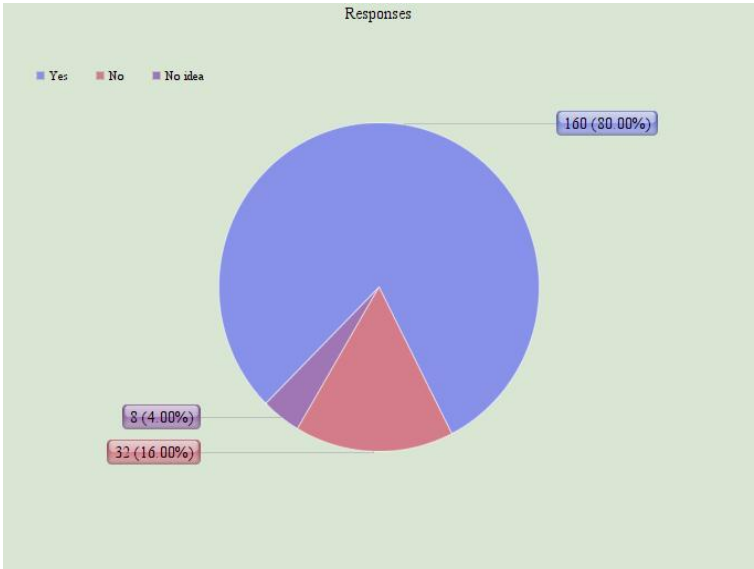

Figure 6: Answers to Question 6

(7) Have you ever accessed any public services in Nigeria using the current NIN issued by NIMC or National Identity Card exclusively online without visiting the government offices?
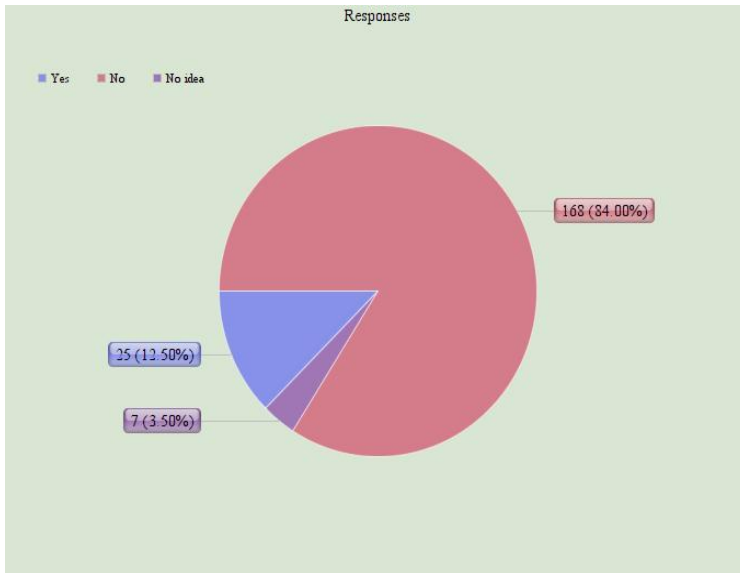
Figure 7: Answers to Question 7

(8) Public services can be accessed digitally in advanced countries of the world like Estonia, Germany, Finland among others and this has enhanced effective and efficient public services delivery, would you prefer to experience this in Nigeria?
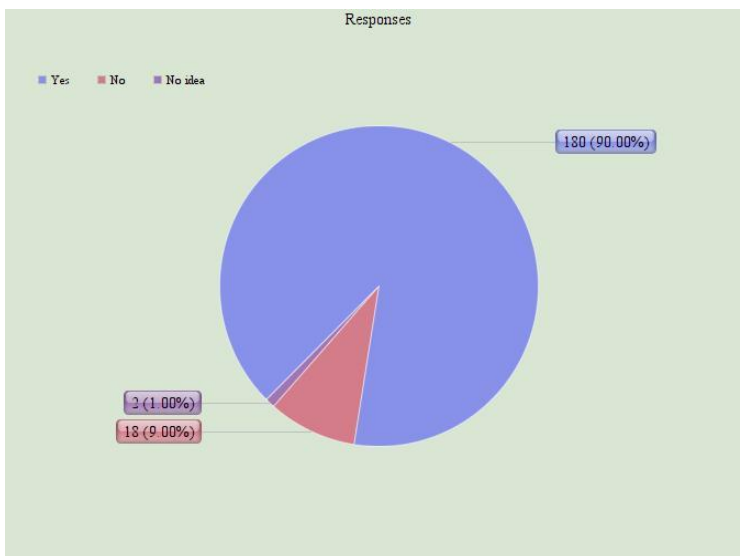

Figure 8: Answers to Question 8

(9) If No, can you assert by ticking the possible reasons for your answer. You can tick as many options as possible.
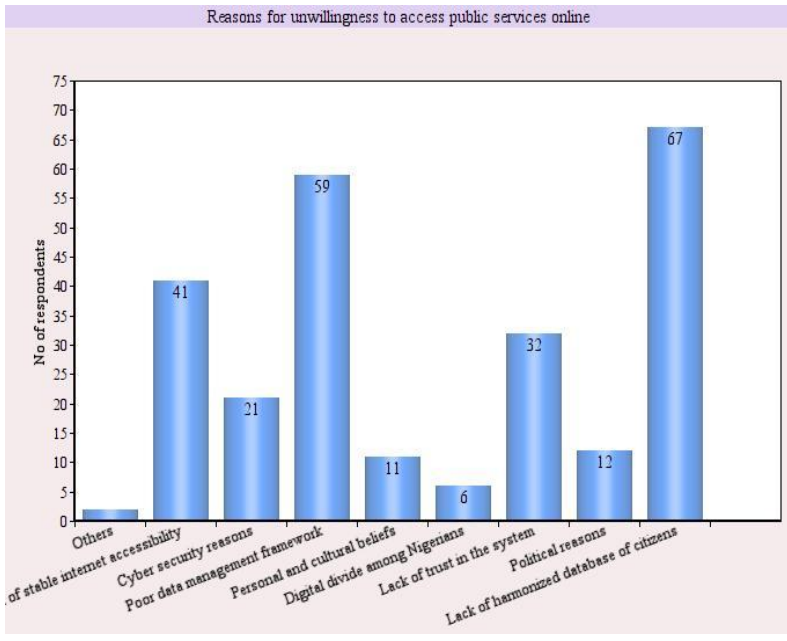
Figure 9: Answers to Question 9

Appendix 4 - Link to the interview

Click the link provided below:

https://drive.google.com/open?id=18d2irv0r_OpVcV0AumAYjOVbIenblrDE

Appendix 5 - Thematic map of all categories and codes