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An Appraisal of Legal and Institutional Framework of Corruption Eradication in Nigeria

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Abstract

Over the past few decades, Nigeria have had a number of laws and institutions for the eradication of corruption, but little has been achieved in the fight for corruption as the monster is fast spreading. This paper appraises the laws and institution for corruption eradication with a view to identify the factors that militate against the ineffectiveness of these laws and institutions in Nigeria. The paper utilizes a secondary source of data collection and an analytical method of data analysis. Analytical findings shows that, duplication of duties, and some lapses in some of laws were some of the factors that rendered these laws and institutions ineffective. This paper, therefore, suggest that, to make these laws and institution more effective the following measures must be taken, which include merging of some similar institutions, and rectifying lapses that characterized some of the laws.

Keywords: Appraisal, Corruption, Eradication

1. Introduction

For a large part of the 21th century, both developed and the developing countries around the world were perturbed with the pace at which corruption is spreading, affecting virtually all aspect of the social and economic development of such countries. Even though, a lot has been written and said in both academic and professional domains about the evils of corruption especially to the development and growth of nation, corruption continue to spread like hurricane, defying all the strategies against its spread (Okekecha,2013; Morris,2019). Consequently, a renew global fight to curtail the spread of corruption within nations and internationally is ensued, where Interpol and other International security agencies are collaboration to curtail the menace. The fight against corruption should not be limited to one country, as the effect of corruption is globally felt as 16 billion dollars which will have been used to develop infrastructural facilities in some of the countries in the world was lost to corrupt individuals (Waziri, 2009).

In Nigeria, the fight against corruption has not been a new phenomenon, it started during the colonial era and immediately after independence, where inquiries and panels were constituted to investigate allegation of corruption majorly election rigging (Joda, 2011). However, a noticeable fight against corruption was stated during General Murtala regime, where several public officials were convicted on corruption charges (Iroanusi, 2006; Ijewereme, 2015). The establishment of a formidable institution for fighting corruption was done during Shagari
where Code of Conduct Bureau and Code of Conduct tribunal were established. In 2004, Obasanjo established Economic and Financial Crime Commission (EFCC) and was saddled with the responsibility of eradicating corruption in all its various forms (Ribadu, 2012).

Based on this backdrop, this paper examines the various institutions of fighting corruption in Nigeria with the view of appraising their strength and weakness for a possible solution to enhance their performance. The paper uses secondary source of data for the study and analytical method was utilized as the tool for data analysis.

2. Literature Review

The term corruption was derived from the Latin word “corruptus” meaning to destroy. The word is used in this sense to indicates the destructive nature of corruption that affect every fabric of society where it is perpetrated (Nicholls, 2006). Corruption is a complex phenomenon and various factors and forces have conspired to cause it and spread it everywhere (T I, 2011). Studies from development studies perspective has attributed the failure of certain low-income countries to develop to corruption, and there are recent empirical studies which substantiate the link between corruption and lower investment, and growth in some developing countries (Mauro 1995; World Bank 1997). Despite the volumes of studies on corruption, yet, there is scanty empirical study that establish the main causes of corruption due to contextual differences, however, from the little studies that examine the causes of corruption, moral decadence is single out to be one of the main causes of corruption (Iroanusi, 2006).

Other studies on corruption such as Farrales (2005), and Wasow (2011) indicated that, greed and the desire for power as well as the wish to advance oneself in society are primary reasons for corruption. Similarly, corruption usually prosper in societies which places high value on money, power and status in life (Akpa, 2018). As asserted by Joda (2011), apart from greed, the fall in education standard, poor maintenance culture, indiscipline, lack of patriotism, unhealthy competition for power and resources among politician, long military rule, civil upheaval, poor sectoral linkages, dishonesty, and mis-presentation were some of the causes of corruption in Nigeria. Relatedly, Idris (2016) traced the causes of corruption to moral decadence, the decay in moral base of most Nigerians is obviously an underpinning factor for the growth and spread of corruption in Nigeria. In the same vein, Iroan (2006) submit that, the absent of moral behavior among leaders and the followers, prone people to compromises and once you compromise your values for greedy gain, the consequences transcend beyond taking bribe, and stealing, it goes to truncating the society’s growth and development. From the perspective of systemic corruption, Stanley (2010), attributes the causes of corruption to discretionary power given to politician and bureaucrat which provide them with discretion over creation and interpretation of regulation which they manipulate for their personal gain.

3. Analysis of Financial and Legal Institutions for Eradication Corruption


The Failed Bank (Recovery of Debt and Financial Malpractice in Bank Act 1991 and was amended in 1994 to recover overdue loan and stolen fund. As was empowered by the Act, the CBN revoked the licenses of 26 Banks with effect from January 16, 1998. Other power of the Act includes:

- To recover the remaining outstanding as at the date the bank is closed or declared a failed bank by the Central Bank of Nigeria;
- To try the offences specified in part III of this Act;
➢ To try the offences specified in the Banks and Other Financial Institutions Decree 1991 and the Nigeria Deposit Insurance corporation Decree 1998; and
➢ To try other offences relating to the business or operation of a bank under any enactment.
➢ The Tribunal shall, exercise exclusive jurisdiction over all ancillary matters, including remand, bail and any other preliminary issues connected with an offence or hearing over which the Tribunal has jurisdiction.

3.2 The Advance Fee fraud and Other Related Offences Act 1995

Advance Fee Fraud and other Fraud Related Offences Decree of 1995 was originally enacted during the military regime but was repeal by an Act during the civilian rule as Act 2006 of Advance Fee Fraud and other Fraud Related Offences of the Federation of Nigeria (Okekeocha, 2013).

Offenses under the Act include:
➢ Obtaining property by false pretense, etc
➢ Use of premises
➢ Fraudulent invitation.
➢ Receipt of fraudulent document by victim to constitute attempt.
➢ Possession of fraudulent document to constitute attempt.
➢ Laundering of fund obtained through unlawful activity, etc.
➢ Conspiracy, aiding, etc.
➢ Conviction for alternative offences.
➢ Offences by bodies cooperate.
➢ Restitution.

Under this Act the court has the following jurisdiction:
➢ Jurisdiction to try-offences, etc.
➢ Possession of pecuniary resources not accounted for.
➢ Power to control property of an accused person.
➢ Power to make order of forfeiture without conviction for an offence.
➢ Power to arrest and to grant bail.

3.3 The Corrupt Practices and Other Related Offices Act ICPC 2000

In order to cleanse the public sector of corruption in Nigeria, Obasanjo initiated the establishment of the Independent Corrupt Practices and Other Related Offences Commission (ICPC) in September 2000 (Salihu 2007, 10 January).

The commission was given the authority among other things to:
➢ To receive and investigate reports of corruption
➢ To prosecute the offender(s),
➢ To examine, review and enforce the correction of corruption prone systems and procedures of public bodies, with a view to eliminate corruption in public life,
To educate and enlighten the public on and against corruption, and related offences with a view to enlisting and fostering public support for the fight against corruption.

To order or assist any officer as well as agency or parastatals on strategies through which corruption of any kind may be eradicated or reduced.

To advise chief executives of government parastatals to make changes in practices, systems or procedures which will enhance effectiveness of the public bodies, in discharging their duties so as to block all possible loopholes where bribery, corruption, and related offences exist.

### 3.4 The Money Laundering Amendment Act 2003

Nigeria being one of the signatories to the Vienna and the Palermo convention was duty bound to initiate and implement the money laundering counter measures that was contained in the provisions of FATF. In Nigeria, the Vienna Convention was not fully initiated and implemented as was then under a military regime. Although, the military regime has subsequently ratified the instrument as contained in the convention, there was nothing tangible on anti-money laundering laws until 1995 when the Money Laundering Decree was promulgated. Due to the inadequacy of the degree, in 1995 the degree was replaced with an Act in 2003, and in order to improve the Act to meet the international standard, it was amended in 2004, and subsequently in 2011 with (Money Laundering Prohibition 2011 Act) (Nasir, 2017).

In 2016, a new bill was before the national assembly for enactment which provide for more purposeful fight against corruption and money laundering. The bill will repeal the Money Laundering (Prohibition) Act, 2011 and enact the Money Laundering Prevention and Prohibition 2016 Act which will provide for measures for the prevention and prohibition of money laundering in Nigeria and for other related matters. The new bill will provide for a single set of money laundering offences which will be applicable throughout Nigeria to the proceeds of all crimes, as well as providing a disclosure regime, which will make it an offence concealing knowledge or suspicion of money laundering (Nasir, 2017).

### Powers and Functions of the Authority

- The Authority shall act as the agency responsible for receiving, analyzing, obtaining and disseminating information which relates to or may relate to the proceeds of the offences under this Act and the Proceeds of Crime Act No. 10 of 1993 or any enactment replacing it.
- The authority shall collect, receive and analyze reports submitted to the authority by financial institutions and businesses of a financial nature under this Act and Proceeds of Crime Act No. 10 of 1993 and information received from any Foreign Financial Intelligence Unit.
- Enter into the premises of a financial institution or business of a financial nature during normal working hours and inspect a transaction record kept by the financial institution or business of a financial nature;
- Require the production of such information that the Financial Intelligence Authority considers relevant to the fulfillment of its functions;
- Ask questions relevant to a transaction record inspected under paragraph (b);
- Make notes or take a copy of part or all of the transaction record inspected under paragraph (b);
- Instruct a financial institution or business of a financial nature to take steps as may be appropriate to facilitate an investigation by the Financial Intelligence Authority.
Issue from time to time guidelines to financial institutions or businesses of a financial nature as to compliance with this Act and regulations made under the Act;

3.5 Economic and Financial Crime Commission (EFCC)

In order to curtail the sporadic spread of corruption in Nigeria, Obasanjo initiated the establishment of the anti-graft commission in 2003 which is called the Economic and Financial Crimes Commission (EFCC). The main function of the commission as a law enforcement agency was to investigate financial crimes such as Advance Fee Fraud (419 fraud) and money laundering. While ICPC focusses on corruption in the public sector, especially bribery, gratification, graft, and abuse or misuse of office, the EFCC on the other hand and as sister commission has a wider scope where the commission was given the authority to investigates people in all sectors who appear to be living above their means, and the commission is also empowered to investigate and prosecute money laundering and other financial crimes, the commission also tracks illicit wealth accruing from abuse of office, especially those who attempts to integrate such wealth into the financial system (Ribadu, 2012).

The commission was given the power among which to:

- To ensure the enforcement and the due administration of the provisions of the Act.
- To investigate all financial crimes including advance fee fraud, money laundering, counterfeiting, illegal charge transfers, futures market fraud, fraudulent encashment of negotiable instruments, computer credit card fraud, and contract scam,
- The co-ordination and enforcement of all economic and financial crimes laws and enforcement functions conferred on any other person or authority.
- The adoption of measures to identify, trace, freeze, confiscate or seize proceeds derived from terrorist activities.
- The adoption of measures which include co-ordinated preventive and regulatory actions, introduction and maintenance of investigative and control techniques on the prevention of economic and financial related crimes.
- The facilitation of rapid exchange of scientific and technical information and the conduct of joint operations geared towards the eradication of economic and financial crimes.
- The examination and investigation of all reported cases of economic and Financial crimes with a view to identifying individuals, corporate bodies or groups involved.
- The determination of the extent of financial loss and such other losses by government, private individuals or organizations.
- Collaborating with government bodies both within and outside Nigeria carrying on functions wholly or in part analogous with those of the Commission

3.6 The Code of Conduct Bureau

The Nigerian Code of Conduct Bureau was originally military imitative of General Murtala administration but was constitutionally established in 1979 by the Shagari administration. The Bureau members were selected and inaugurated on 30 July 1980. The Code of conduct bureau got its legitimacy from the 1979 constitution and its functions were clearly stated as follow:

- To receive declaration of assets of public officers made pursuant to the code of conduct
- To retain custody of such declaration and make them available for inspection by any citizen of Nigeria on such items and condition as the national assembly may prescribe.
To examine the declaration and ensure that it comply with the requirement of the code of conduct bureau and of any law for the time being in force.

As from 1999 to 2007 out of the 4 million eligible public officers only 784,000 public officers returned their completed assets declaration forms (CADFs) representing 19.6% rate of compliance which indicate the low performance of the Bureau in terms of enforcing the law (Audu, 2012). Similarly, out of the number of complaints received by the CCT, only 11,640 were referred to the CCT for trials, out of which only 3,304 attended to and the remaining were either adjourned until it died down or struck out for lack of merit (Audu, 2012).

3.7 Fiscal Responsibility Act 2007

The Fiscal Responsibility Act 2007 was enacted in 2007 which paved the way for the creation of the body known as the Fiscal Management Council that will serve as a regulatory and supervisory body in the public sector (Vincent, 2007). Under the Act, a commission will be created which comprises the Fiscal Responsibility Council and the Governing Board. The Council is charged with the responsibility of monitoring and enforcing the provisions of the Act to ensure accountability, transparency and prudence in the management of the nation’s resources by all tiers of government, government corporations or companies and agencies. The Fiscal Responsibility Act (2007) is a law to redirect government at all levels to imbibe a fiscal behavior that will promote prudence and sound financial management in the system as well as acting as watch dog on the activities of the public office holders and as checks on financial encroachment between and among tiers of government which is assumed to bring sanity and responsiveness into the public sector and among the various tiers of government in Nigeria (Vincent, 2007).

Powers and Functions of the Commission

➢ To compel any person or government institution to disclose information relating to public revenues and expenditure.

➢ Initiate an investigation into whether any person has violated any provisions of this Act.

➢ The Commission shall forward a report of the investigation to the Attorney General of the Federation for possible prosecution.

➢ The Commission shall monitor and enforce the provisions of this Act and by so doing, promote the economic objectives contained in section 16 of the Constitution;

➢ Disseminate such standard practices including international good practice that will result in greater efficiency in the allocation and management of public expenditure, revenue collection, debt control and transparency in fiscal matters.

➢ Undertake fiscal and financial studies, analysis and diagnosis and disseminate the result to the general public; d. Make rules for carrying out its functions under the Act; and e. Perform any other function consistent with the promotion of the

From the above analysis, it is seen that, Nigeria has a good number of institutions and anti-corruption laws on the book that essential can eradicate corruption, but the reality is that, despite all these laws and institution, corruption is in the increase stagnating and derailing the Nigerian quest of being among the 20th economy in the world. The continue blossoming of corruption in Nigeria cannot be attributed to lack of laws or institutions, but lack of integrity, sincerity, honesty, patriotism, fear of God, and the lack of courage on the side of the government and its anti-graft agencies in eradicating corruption (Ribadu, 2010).
Similarly, Akpa (2018) had identified institutional framework, lack of political commitment and willingness on the part of the political leadership as factors responsible for the ineffective performance of these institutions and Acts. For example, in the past three years, more than fifteen ex-Governors, who were alleged to have embezzled public funds estimated at one hundred and seventy-two billion naira have been arrested and charged to court, but only one governor was prosecuted recently, while the rest were moving about freely. Again, on duplication of duties, the chairman of the ICPC Ayoola, has complained about overlap between ICPC, EFCC, and Transparency Monitoring Units (TMU). This kind of duplication of responsibilities tends to create tension among these institutions thereby fueling hatred which invariably demoralize those institutions in discharging their responsibilities. For instance, in September 2009, a Federal High Court judge refused a request to issue a mandamus order compelling the ICPC and the EFCC to investigate and prosecute the FCT Minister, Senator Adamu Aliero, over alleged diversion of N10.2 billion public funds while he was the governor of Kebbi State. The court explained it did not have the authority to compel the agencies to act. Furthermore, of the petitions that the ICPC received which total 942 petitions, about 400 of the petitions were under investigation, and 60 were at various stages of prosecution (Olajuwon, 2009, 25 June).

After the first 12 years of existence, the ICPC had failed to make any major convictions despite the huge number of cases, this is because as at 2015, the ICPC had a list which contained 267 criminal cases, between 2001 and 2015, and 142 civil cases between 2007 and 2015. Another lapses of the ICPC was, the excuse it gave on its inability to treat the several petition it received against state governors by claiming that, it doesn’t have the power to investigate state governors, but the ICPC has the power to ensure that governors declare their asset on assumption of office and when going out of office, which the ICPC failed to do and has allowed the governors to embezzled public fund (Usman, 2011; Akpa, 2018). On the money laundering Act, there are some lapses which criminal individual could exploit such as section 15 subsection 14 Bill, which listed some transactions that qualify as an arrangement, the information provided is limited to legal practitioners, it does not cover other professionals and corrupt institutions who intend laundering money through the structure may use this loophole for their money laundering (Esoimeme, 2017).

4. Conclusion

From the analysis as highlighted by this study, it has been established that, Nigeria has a good number of laws and institutions for fighting corruption, but despite these laws and institutions corruption has remained unabated in the society. One of the plausible reasons for the ineffectiveness of the laws and the institution in curtailing corruption was the inability to deficiency of the laws which allow individual exploit in carrying out their dubious activities. Another reason for ineffectiveness of these laws and institutions was duplication of duties which led to rivalry amongst the institutions.

5. Remedies

In order to strengthen the laws and institution for eradicating corruption this study suggested some ways which include:

- Rebuild the moral base of Nigerians, where the culture of integrity, honesty, sincerity, hard work, love for others and dedication will be the other of the day.
- Institutions and Act that are performing almost the same functions should be merge to together to avoid duplication of duties and unhealthy rivalry.
Acts pertaining to corruption should be revisited to identify areas where there are lapses and make adjustment.

Rather than having strata of laws and anti-corruption institutions, effort need to be channel toward enforcing the existing law and powering the institutions to do their assignment without fear and favor.

References


Okekeocha C. (2013). A case study of corruption and public accountability in Nigeria (Master’s thesis). (Department of Political Science and International Affairs, College of Humanities and Social Sciences, Kennesaw State University)


Analysis of Electricity Billing System in Corporate Buildings in Lagos, Nigeria

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Abstract

Purpose: This research is set to the electricity billing system in AHCN Tower, Ikeja, Lagos State with a view to providing a sustainable and efficient electricity billing system to be adopted in the facilities management of multi-tenanted buildings.

Design/methodology/approach: Relevant data for the study were gathered through an interview conducted on the stakeholders responsible for the management of the property and the occupants. The collected data were analyzed using inferential statistics.

Findings/Discussion: The result revealed that the introduction of automated prepaid meters reduces the difficulties encountered in the manual system while apportioning electricity bills among the tenants.

Conclusion: The study, recommends that since information technology is now global, the stakeholders in facility management practice should collaborate to secure an application program that will serve for the management of commercial buildings.

Keywords: Automated, Billing system, Commercial property, Electricity, Facility Management, Lagos

1. INTRODUCTION

The management of commercial buildings requires expertise in facilities management. In line with the quest for efficiency and improved environment, the management of facilities installed
in multi-tenanted commercial properties becomes a necessity. This is very essential as the building aesthetics is paramount to its value and potentialities. Therefore, the task of managing and administering service charge on a multi-tenanted property comes to regulate physical and functional obsolescence whilst enhancing the utility value of the service jointly benefitted by the tenants to bring it to an acceptable standard. According to Christudason (2004), multi-tenanted complexes are distinguished by three characteristics: individual ownership of a unit, shared ownership of common property, and collective membership in a corporate body that assumes responsibility for the management of the development. Buildings, specifically commercial buildings, account for a significant proportion of the overall electricity used globally.

Shared living spaces are a special case, whereby the problem of personal electricity apportionment is relaxed to an extent that the personnel typically occupy different rooms and hence room-level electricity apportionment is enough to achieve the desired results. Such room level electricity apportionment will also then allow for billing each occupant for their own electricity consumption, thus motivating electricity conservation behavior. This scenario of individual apportionment is important for increased transparency in the actual energy consumption of rooms in commercial buildings. Bedwell et al., (2014) revealed that a building user’s electricity consumption is a socio-technical system, a function of workplace systems, equipment and culture which can be altered through interferences. Emerging technologies and understanding make it increasingly possible to deliver specific feedback where energy consumption data are apportioned to occupants, or to spaces and systems, to encourage efficiency and conservation. The increase in electricity consumption has been an ever-growing concern for the past several decades (Thakur et al., 2014). However, measuring the electricity usage of an individual, within a multi-occupant home, is very crucial as it requires monitoring at a much finer-grained level. It entails having the information about what the user is doing when he is doing it, where is he doing it and so on.

Accurate energy accounting is a difficult problem to solve using only a single smart meter. Increasing energy consumption of commercial buildings has motivated numerous energy tracking and monitoring systems in recent years. An area that is less explored in this domain is that of energy billing whereby total energy usage of a commercial building is disaggregated and accurately attributed to each of the occupants. The power supply is very crucial to every business operation. The failure of power supply in Nigeria in recent times has crippled many businesses within the country. In Nigeria, electricity consumers are often faced with the problems of inaccurate, irrational and delay in monthly billing due to the drawback in reading pattern and human errors (Adegboye et al., 2013). There is arbitrary and lack of transparency in the method used by energy provider to cost and assess the customer energy consumption. Such dark practices manifest through estimated billing systems and irregularity in metering. It is noted that the bill for any current month is prepared when the period has not ended, sometimes, in discriminatory charging due to loss of revenues incurred by distribution companies (Jain & Bagree, 2011; Ofonyel & Eguabor, 2014). The use of a centralized meter servicing all tenants in the commercial properties has also not helped matters. Some tenants claim that others have more gadgets in their offices than they do and believe they should pay less. Occupants in these buildings typically occupy their individual spaces but the apportionment at the end of any given time does not yield their actual energy consumption, resulting in either excessive payment for the unit not consumed. Sometimes, the sum apportioned to each occupant may not cumulate up to the total charges for electricity in the building. Even if the property owner would want to do separate billing for each room, complex electrical infrastructure together with high metering costs makes it prohibitive.
The time frame used to resolve such matters leads to delay in payments which have often led to disconnection of service to the property. This equally means the continuous running of the generator which results to pressure on diesel usage bearing in mind that it is quite expensive (Achoru, 2005). Thus, it is essential to have an efficient and effective system for such purposes via an electronic platform with consideration to proximity. This study seeks to answer questions on what factors influences the electricity billing system and of what effect does the electricity billing system has on the facility management.

2. ELECTRICITY BILLING SYSTEM

According to Makanjuola et al., (2015) energy meter is a device designed to quantify or measure the volume of electricity consumed at a given point in time by an electrically powered device, residence, commercial premises or an industrial complex. Typically, electricity meters are calibrated in billing units of kilowatt hour [kWh]. The electricity meters are read periodically to establish billing cycles and energy used during the cycle. The distribution companies use a monthly billing system in which the unit consumed in a previous month is paid in the succeeding month. In a typical bill, there are eight columns which contain: Descriptions, tariff code, read date, present reading, previous reading, multiplier, consumption and current charges. Under the descriptions columns there are always two rows which are energy charges and fixed charges. There is a number in the consumption column which is calculated by subtracting previous reading from the present reading. However, sometimes you can see a number with “E” by the side under the consumption column like 150E. This means that the consumption figure is not gotten from the meter reading but an estimate figure. The current charges obtained by multiplying the consumption figure with the energy multiplier charge which is dependent on the classification of the premises (i.e. R1, R2, R2SP, R2TP, C1SP) and so on. For the electricity billing, Current charge = (consumption x energy multiplier charge) plus fixed charge plus VAT in Nigeria, where the fixed charge always includes the meter maintenance charge, and in R2SP premises, fixed charge is #750.00 (Ofonyelu & Eguabor, 2014; Ohajianya et al., 2014). There are three basic ways of charging electricity customers for the consumption of energy: Postpaid metering system, Estimated billing system and Prepaid billing system.

2.1. POST-PAID AND ESTIMATED BILLING SYSTEMS

Post-paid involves the payment of electricity bills after consumption by the customers; this has led to drastic increase in non-payment of bills by customers of the Power Holding Company of Nigeria (PHCN). While Estimated billing system is said to be analogous to fraud where consumers are mandated to pay far above what they consumed monthly. Most of the customers under this system are without meters and the residences are never visited to track the energy utilization over the period charged. Provision of meters to individual client may not totally eradicate this menace, however it is a good step forward to the means. PHCN bills consumers who were on direct connection (otherwise known as without meter) and those on post-paid meters with estimated bills. The main problem with billing by estimate had been the tendency to overcharge electricity users and provoke payment apathy.

In the past five years, over 80% of complaints received by NERC from consumers had been centered on issues of estimated metering, excessive tariffs with the metering methodology and poor metering infrastructure (Okafor, 2013). Defaults in payment of electricity bills by consumers arise a protest to perceived exploitation and negligence to complaints made to the PHCN authority. The problem with out-of-the-meter billing has been that its bill does not tally with the exact amount of energy consumed (Abubakar, 2009). The estimated bills are always dependent on the approximation of the PHCN. Under such instances, consumers who are
already disconnected or had changed their metering plan continued to be billed with the old platform. The common feature of the estimated billings approach has been that the bills were always overpriced; amount charged sometimes remain constant over time even when electricity is rarely consumed and billing were sometimes discriminatory depending on the location of the consumer, the bill may merely require consumers to pay a specific monthly amount which was not dependent on the units of electricity supplied, consumed or the size of the building for which the bill was generated. Among all the classes of consumers, the bills of those that were on estimated tends to be higher compared to that of their counterparts whose consumption were read and metered.

About 6 million electricity consumers in Nigeria were noted to have no meters to monitor their electricity consumption monthly. This encourages estimated and fixed charges allocated to the consumers, but this results in defrauding acts by the consumers not paying anything out of the over blotted bills, the distribution companies incur great debt as a result, unable to pay the energy bought from the Generation Companies and invariably lack of enough power generation. The low power generated in Nigeria is being wasted by customers assisted by the default or the estimated/ postpaid billing systems adopted by distribution companies, they encourage power wastage and lead to breakdown of power distribution and transmission equipment (Ohajianya et al., 2014). These systems are known to be exploitative and destructive hence should be outlawed and replaced by prepaid. Estimated billing system affords opportunity for over pricing of energy consumption to the detriment of consumers. The distribution companies charge the utility by direct billings for the unmetered that are on direct connection, and postpaid for people with meters using estimated billing system.

Amadi (2013) observed that the issuance of estimated bills by the electricity distribution companies gives room to cheating the consumers. He opined that metering all electricity consumers would assist the customer to effectively monitor their electricity usage, as well as enable the distribution companies determine their revenue. The prepaid metering platform was aimed at addressing the asymmetries from both the sides of the consumers and the PHCN. While the general consensus of the consumers supports the introduction of the prepaid meters, the PHCN officials seemed averse to the development, owing to their preference for the distribution of the analogue than the prepaid meters.

2.2. PRE-PAID METERING SYSTEM

Prepayment metering is a well-established technology being introduced by more and more utility companies. According to Kettless (2004), prepayment metering system is a system where a customer pays for energy before using it which comprises a system master station (a computer that administers the whole system), a vending machine (where customers buy their electricity) and prepayment energy meters (or dispensers, which dispenses the electricity to the customer). This meter has an interface to the customer for managing the transfer of credit and to display the meter and credit status.

Prepayment method involves consumers to possess a credit in their electricity account before the usage of the service, when such credit is depleted, supply is remotely disconnected. Electricity prepaid billing system was first used in 1980s with the motives of providing electricity to the low-income earners of the community at affordable rates (Carolyne et al., 2013; McKinze, 2013). PHCN faced a daunting consumer debt profile as well as revenue collection difficulties, led to the introduction of pre-paid system in 2016 (Carolyne, et al., 2013). This step was believed to boost revenue collection. The act of making advance payment to energy service is gradually taken over, it is a new way and growing trend of charging electricity consumers in the developed world like US. Prepaid services connote that the customers pay for electricity in
advance while their meters track the spending because of energy consumption and give the amount of energy remain in their account (LIHEAP, 2014).

2.3. AHCN TOWER ELECTRICITY BILLING SYSTEM

The Association of Housing Corporations of Nigeria (AHCN) Towers uses automated electricity billing system. The property makes use of Electricity Control Management Interface otherwise known with the acronym (ECMI). This is a window-based management system (Application Program) that is designed to compete with other existing management system and improves on their deficiencies. This is a system where an occupant pays for energy before using it which comprises a system master station (a computer that administers the whole system), a vending machine (where customers buy their electricity) and prepayment energy meters, (which dispenses the electricity to the customer). This meter has an interface to the customer for managing the transfer of credit and to display the meter and credit status. More importantly, in AHCN Towers there exist a Customer Sales Point (CSP) Operator responsible for the operation of the Consumer Sales Point Server, who with the aid of the information provided on the system by the Electricity Control Management Interface can sell and or make available tokens to the occupants on request within the premise. However, both energy from power holding company of Nigeria (PHCN) and the one from the premise generator are been purchased through this system.

The ECMI is an Executive Information System (EIS) that determines the consumed power per unit time and performs its computation based on the sale rate of power per unit time and other parameters. Advalorem (2009) revealed that the importance of power billing system cannot be over emphasized because its calculation reflects the exact power consumption for the prospective consumers, and in monitoring the billing details of the electricity consumers. The application provides an environment to maintain the consumer details starting from getting new connection, payments, access to performance information by the management (Seshanna et al., 2006). It functions on an Intranet network and Internet domain and ensure timely availability of status parameters. The ability to view the reports online ensures access to the report from PC terminal or devices VLAN and WAN network with internet connection. Customers can lodge complaint or deal with new connections just by logging into the system. The ECMI helps to measure and monitor the electricity consumed by occupants in the building and transmitting the measured reading between the consumer and utility. This system helps the Electricity Board to access all data regarding the consumed power in AHCN Tower. It also possesses the ability to synchronize the existing database with management system without any loss of data and keeps track of customer details against their substation(transformer). The system provides complete solution to both STS and ARM STS meters. Moreover, it incorporates a scratch card vending solution (ability to recharge prepaid meter via mobile phones).

3. METHODOLOGY

Alawusa, commonly known as Alausa is a principal district in Ikeja, the state capital of Lagos State. It is the seat of the Lagos State Secretariat and offices of the Governor and Deputy-Governor of Lagos State. Alawusa also has a vibrant and growing Central Business District with several multinational business concerns like Cadbury Nigeria Plc and many others having their offices located in the area. It also has many low-density residential estates like the Cornerstone Estate; MKO Abiola Gardens located within it. This is a descriptive survey research, aimed at analyzing the electricity billing system in AHCN properties in Lagos State. A design that minimizes bias and maximizes the reliability of data collection and analysis was employed. Interview was conducted on the occupants of the commercial properties while questionnaires were used to collect data. Both primary and secondary data were collected to gather reliable
facts about the electricity billing system in the property. The target population for the study include:

i. Occupants of AHCN Tower in Alausa CBD, Ikeja Lagos; and

ii. The Facility manager involved in its management.

The total occupants in the property were sampled and they were forty-seven (47) occupants. Due to the small number of occupants, the total population was sampled. The questionnaire contained questions on the apportionment system used in the commercial properties. Both descriptive and inferential statistics were used in analyzing the data.

The dependent variable and its associated independent variables to be applied for the multiple regression analysis in the achieving of this research is outlined in the operationalization of variables section. Tables 1 showed the variables and its associated scale of measurements to be employed in achieving these objectives.

<table>
<thead>
<tr>
<th>Definition of Variables</th>
<th>Variable Code</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effect of ECMI on the facility management</td>
<td>EFFECMI</td>
<td>Highly significant effect (5), Significant effect (4), Average effect (3), Little effect (2), No effect (1)</td>
</tr>
<tr>
<td>Independent Variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of prepaid meters</td>
<td>AOPREP</td>
<td>Actual in years</td>
</tr>
<tr>
<td>Availability of skilled operator</td>
<td>AVSOPE</td>
<td>Yes (1), No (2)</td>
</tr>
<tr>
<td>Availability of internet services</td>
<td>AVINTER</td>
<td>Yes (1), No (2)</td>
</tr>
<tr>
<td>Effectiveness of info. storage and retrieval</td>
<td>EFINFOSTOR</td>
<td>Highly effective (5), Effective (4), Neutral (3), Less effective (2), Ineffective (1)</td>
</tr>
<tr>
<td>Effective response to issues</td>
<td>EFRESI</td>
<td>Highly effective (5), Effective (4), Neutral (3), Less effective (2), Ineffective (1)</td>
</tr>
<tr>
<td>Level of ECMI application to electricity supply</td>
<td>LECMIAPP</td>
<td>Highly employed (5), Employed (4), Neutral (3), Less employed (2), Not employed (1)</td>
</tr>
<tr>
<td>Level of smartphone application to recharge</td>
<td>LSMARTPHONES</td>
<td>Highly employed (5), Employed (4), Neutral (3), Less employed (2), Not employed (1)</td>
</tr>
<tr>
<td>Networking of sales point to office units</td>
<td>NETSALPOINT</td>
<td>Yes (1), No (2)</td>
</tr>
<tr>
<td>Availability of constant electricity</td>
<td>AVALKELECT</td>
<td>Yes (1), No (2)</td>
</tr>
<tr>
<td>Effectiveness of generator &amp; PHCN</td>
<td>EFELECCCTGEN</td>
<td>Highly effective (5), Effective (4), Neutral (3), Less effective (2), Ineffective (1)</td>
</tr>
</tbody>
</table>

Source: Author’s compilation, 2018
4. RESULTS AND DISCUSSIONS

Analysis of the factors influencing electricity billing system in AHCN Towers

Table 2: KMO and Bartlett’s Test of Sphericity

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</th>
<th>Bartlett's Test of Sphericity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Approx. Chi-Square</td>
</tr>
<tr>
<td></td>
<td>.857</td>
</tr>
</tbody>
</table>

Source: Data Analysis, 2018

The Bartlett’s test of Sphericity was used in the test for the appropriateness of the sample from the population and the suitability of factor analysis. It tests for the adequacy of the sample as a true representation of the population under study (Alese & Owoyemi, 2004). The Bartlett’s test in Table 2 shows a chi-square of 1179.058 and a significant level of 0.000, which is an indication of the adequacy of the sample. The Kaiser-Meyer-Olkin (KMO) test is another measure of sample adequacy. It is an index for comparing magnitudes of the observed correlation coefficients between all pairs of variables. It is small when compared to the sum of the squared correlation coefficient. A KMO value of 1 represents a perfectly adequate sample. A KMO of 0 represents a perfectly inadequate sample. The KMO value in Table 2 is 0.857, which shows that the sample is reasonably adequate.

Table 3: Component Matrix

<table>
<thead>
<tr>
<th>Factors</th>
<th>Component 1</th>
<th>Component 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Sales Point Server</td>
<td>.927</td>
<td></td>
</tr>
<tr>
<td>Customer Sales Point operator</td>
<td>.843</td>
<td>-.424</td>
</tr>
<tr>
<td>Electricity charges</td>
<td>.937</td>
<td></td>
</tr>
<tr>
<td>Vending machine</td>
<td>.937</td>
<td></td>
</tr>
<tr>
<td>Facility manager</td>
<td>.867</td>
<td></td>
</tr>
<tr>
<td>Lack of expertise</td>
<td>.913</td>
<td></td>
</tr>
<tr>
<td>RESTR</td>
<td>.954</td>
<td></td>
</tr>
<tr>
<td>Pay before use</td>
<td>.880</td>
<td></td>
</tr>
<tr>
<td>Respond to complaint</td>
<td>.711</td>
<td></td>
</tr>
<tr>
<td>Standalone sales point</td>
<td>.662</td>
<td></td>
</tr>
<tr>
<td>Corrupt practices</td>
<td>.829</td>
<td></td>
</tr>
<tr>
<td>Incompetent resident engineer</td>
<td>.600</td>
<td>.511</td>
</tr>
<tr>
<td>Poor health and safety</td>
<td>.875</td>
<td></td>
</tr>
<tr>
<td>Manipulation of charges</td>
<td>.929</td>
<td></td>
</tr>
<tr>
<td>Overbilling</td>
<td>.978</td>
<td></td>
</tr>
<tr>
<td>Restriction to personal engineer</td>
<td>.538</td>
<td>.453</td>
</tr>
<tr>
<td>Delay</td>
<td>.765</td>
<td></td>
</tr>
<tr>
<td>Eigen value</td>
<td>11.571</td>
<td>1.791</td>
</tr>
<tr>
<td>Percentage of variance explained</td>
<td>68.066</td>
<td>10.533</td>
</tr>
<tr>
<td>Cumulative % of variance explained</td>
<td>68.066</td>
<td>78.599</td>
</tr>
<tr>
<td>Rotation Sums of Squared Loading</td>
<td>9.172</td>
<td>4.190</td>
</tr>
<tr>
<td>Percentage of variance explained</td>
<td>53.953</td>
<td>24.646</td>
</tr>
<tr>
<td>Cumulative % of variance explained</td>
<td>53.953</td>
<td>78.599</td>
</tr>
</tbody>
</table>

Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 3 iterations
Extraction Method: Principal Component Analysis

Source: Data Analysis, 2018
The criticality of the seventeen (17) identified factors from the literature was also explored using Factor Analysis. Factor analysis was used to assess the multivariate relationship among the factors influencing electricity billing system in AHCN Tower in Lagos State based on frequency of occurrence. The analysis was conducted using Principal Component Analysis (PCA) (extraction method) to determine possible cluster relationships of the factors influencing electricity billing system and Varimax with Kaiser Normalization (rotation method) to make factors easily interpretable. The number of factors to be retained was specified based on social science rule which state that only the variable with a loading equal to or greater than 0.4 in absolute terms and percentage of Variance greater than 1 should be considered meaningful and extracted for factor analysis. The result presented in Table 3 below was obtained based on this rule. All factor analysis produced two factor groupings with Eigen values of 1.79 to 11.57 while the variance cumulative percentage is 78.599% as shown in Table 3 above. Rotation converged in 3 iterations. The factor loadings in Table 3 shows that all the variables of factor 1 contribute 53.95% to electricity billing system, while customer sales point operator, delay in rectifying issues, incompetent resident engineer and restriction to personal engineer factors contribute 24.65% respectively. The two factors contribute a total of 78.60% while the remaining 21.40% is accounted for by extraneous factors which are unique to the variable and other variables outside the control of the research.

5. EFFECT OF THE ELECTRICITY BILLING SYSTEM ON FACILITY MANAGEMENT PRACTICE

The effects of AHCN electricity billing system were assessed on facility management practice, using multiple linear regression statistics. In this study, the dependent variable is effect of ECMI while the independent variables are age of prepaid meters ($X_1$), availability of skilled operators ($X_2$), availability of internet services ($X_3$), effectiveness of information storage and retrieval ($X_4$), effective response to issues ($X_5$), level of ECMI application to electricity supply ($X_6$), use of smartphones for recharge ($X_7$), networking of sales point to office units ($X_8$), availability of constant electricity in the office complex ($X_9$), effectiveness of combining both power from PHCN and generator ($X_{10}$).

<table>
<thead>
<tr>
<th>Table 4: Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

Source: Data Analysis, 2018

The data in Table 4 showed the model summary of the regression statistics. The model summary shows that the coefficient of correlation (R) is 0.925, thus indicating a strong positive correlation between the dependent variable and the independent variables. This implies that an improvement in any of the independent variables will lead to a corresponding improvement on the effect of ECMI on facility management practice. The R square value of 0.855 indicates that the regression model explained about 86% of the total variation in ECMI (dependent variable) as accounted for by the independent variables under consideration.
Table 5: ANOVA test for statistical significance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>10.042</td>
<td>10</td>
<td>1.004</td>
<td>21.232</td>
<td>.000b</td>
</tr>
<tr>
<td>Residual</td>
<td>1.703</td>
<td>36</td>
<td>.047</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11.745</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Data Analysis, 2018

The ANOVA (Table 5) shows that the model is statistically significant since Sig. was .000b, for f <0.05. The test statistic F, calculated value is 21.232, the degree of error is 36, and degree of freedom is 10 at α is 0.05 and this gives a table value of 2.11. This reveals that the F calculated value is higher than the table value which implies that the ECMI is significant to AHCN facility management. The F-value of 21.232 is significant at 0.05 level. Since the co-efficient of determination is (86%) and significant, the model is believed to be good and useful for predicting the effect of ECMI billing system on AHCN Tower in Alausa CBD, Ikeja Lagos.

Table 6: Beta coefficients of the variables

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>3.325</td>
<td>.676</td>
<td>4.917</td>
<td>.000</td>
</tr>
<tr>
<td>AOPrepaid</td>
<td>.039</td>
<td>.051</td>
<td>.071</td>
<td>.757</td>
</tr>
<tr>
<td>AVSOPE</td>
<td>-.093</td>
<td>.180</td>
<td>-.91</td>
<td>-.513</td>
</tr>
<tr>
<td>AVINTER</td>
<td>.055</td>
<td>.187</td>
<td>.055</td>
<td>.294</td>
</tr>
<tr>
<td>EFINFOSTO</td>
<td>-.253</td>
<td>.045</td>
<td>-.729</td>
<td>-5.644</td>
</tr>
<tr>
<td>EFRESPO</td>
<td>-.189</td>
<td>.075</td>
<td>-.528</td>
<td>-2.504</td>
</tr>
<tr>
<td>LECMIAPP</td>
<td>-.461</td>
<td>.159</td>
<td>-.961</td>
<td>-2.896</td>
</tr>
<tr>
<td>LSMARTPHONES</td>
<td>-.020</td>
<td>.046</td>
<td>-.039</td>
<td>-.436</td>
</tr>
<tr>
<td>NETSALPOINT</td>
<td>-.228</td>
<td>.165</td>
<td>-.219</td>
<td>-1.387</td>
</tr>
<tr>
<td>AVACONSTELECTRI</td>
<td>.537</td>
<td>.229</td>
<td>.491</td>
<td>2.341</td>
</tr>
<tr>
<td>EFELECCTGEN</td>
<td>.050</td>
<td>.084</td>
<td>.079</td>
<td>.600</td>
</tr>
</tbody>
</table>

Source: Data Analysis, 2018

The standardized beta coefficient compares the strength of the effect of each independent variable to the dependent variable. The standardized beta coefficient as shown in Table 6 enables a comparison of the contribution of each ECMI variable (to the effect on real estate practice) to be made. From the Table 6, it was revealed that the level of ECMI application to electricity supply (ignoring the negative sign) in facility management transactions made the strongest contribution to explaining the effect of ECMI on facility management practice in AHCN Tower. It had the highest beta coefficient (0.961). Also, the p-value (as seen in the last column of the Table) tell whether the contributions of the respective independent variables to the dependent variable are significant. The variables whose p-values were less than 0.05 implies
such variables contributes significantly to ECMI effects on facility management practice in the study area.

6. SUMMARY OF FINDINGS
   a. The research revealed that the electricity control management interface used in the study area has great impact facility management practice, hence it is crucial to our practice
   b. The use of automated prepaid meters with application programs reduces the stress accumulated by resident facility managers.
   c. Disputes that often arise over apportionment of electricity charges was eliminated from the commercial property
   d. Transparency exist in the electricity billing system of the study area.
   e. The use of the application program avails the occupants the opportunity to purchase token at any time when the purchasing power is available without any constraints.

7. CONCLUSION AND RECOMMENDATIONS
Prospective office space clientele in recent times source for well-organized facility management properties to avoid unnecessary disputes. The electricity billing system overtime has had its ugly effect on both the facility management firms and occupant of various commercial properties in different forms which has resulted into different arbitration and court cases. In this sense, application program should be introduced to electricity billing system in multi tenanted buildings to effectively carryout their responsibility in the management of these properties. This research examined electricity billing system in commercial properties, using AHCN Tower, Alausa CBD, Ikeja as a case study. Regardless of the commercial property been considered, it is of utmost importance to identify the fact that the electricity billing system has great influence on facility management practice. Subsequently, with the advent of information technology in recent times, it is important that facility management firms should give room for result driven system to averts the norms of apportionment system in electricity billings. The following recommendations are made:
   a. Facility management firms should endeavor to introduce the use of automated prepaid meter with application program to their commercial properties to minimize disputes that arises from the apportionment of electricity bills.
   b. Facility managers should be transparent in all their dealings.
   c. Stakeholders in the facility management should collaborate to procure an application program that will suit commercial properties.

REFERENCES


Participation of Rural Residents Implementation of Infrastructure Development Criteria in New Rural Construction in Vietnam

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National Academy of Public Administration

Abstract
The role of the residents has been proved through many activities of social life. Since the implementation of the national target program on new rural construction, thanks to active participation from the people, our country has experienced significant changes, the production and living conditions of the people have been increasingly renewed. Modern rural infrastructure gradually plays an important role in improving the quality of life and promoting socio-economic development in rural areas. In the process of implementing new rural construction, rural residents are becoming more and more aware of their own social responsibility for rural infrastructure development. Therefore, this article focuses on research some theoretical issues participation and practicality of participation of rural residents to implement criteria for rural infrastructure development promote their participation to implement infrastructure development criteria in the process of building new rural areas in Vietnam.

Keywords: participation, rural residents, new rural

I. INTRODUCTION

In the theory of community development, the beginning of people's participation appeared from the early 1940s in the first British colonies from very simple initiatives to help people improve their lives. The actual implementation process has brought about significant efficiency when there is a positive contribution of local people to improve their own lives.

Afterwards, Arnstein 1969 presented the fundamental theory of people's ladder of participation. Since then, studies of community participation have become more and more popular and studied in many different areas. Chadwick (1971) argues that participation in decision making, the public will recognize the importance of their participate in deciding their future (Marzuki, 2015, p. 21). Participation means that people are closely involved in economic, social, cultural and political processes that affect their lives (UNDP, 1993, p. 21). Participation is broader, including: participation in policy making and decision making in important areas affects their lives (Gaventa & Valderrama, 1999, p. 4). The participation of local people and other stakeholders in the creation, implement content and conduct a program or policy designed to change their lives (Jenning, 2000, p. 1). Participation can be expressed in terms of: resource contribution; management and coordination efforts; participation in the program (Zomorrodian et al., 2013, p. 318).
National Targeted Programs for New Rural construction in Vietnam to implement the Central Executive Committee Resolution 26 on August 5, 2008 and the Action Program of the Government on develop comprehensively and comprehensively economic, political, socio-cultural and ecological environment in rural areas. The new rural construction program in Vietnam refers to 5 issues that need to be done in rural areas in Vietnam: planning, rural infrastructure, rural economy, culture - society - environment and the political system in rural areas. After 8 years of development, the role of the rural residents is emphasized, especially the positive of rural residents in implementing rural infrastructure development criteria. At many localities, rural residents actively discussed and co-opted with the Government to decide on infrastructure development plans to implement infrastructure criteria in new rural construction...

Therefore, studying the participation of rural residents in implementing the criteria of infrastructure development in new rural construction in Vietnam plays an important role to explore the relationship between the participation of rural residents with the results of implementing infrastructure criteria in new rural construction to promote the role of the rural residents in implementing the national target program on new rural construction in Vietnam.

II. RESEARCH OVERVIEW

Rural infrastructure is an important condition for the developing rural economic, improving the quality of life of the people, is the basis for rural modernization. Rural infrastructure is the first factor to encourage and attract economic activities to rural areas. The role of rural residents in the development, use and protection rural infrastructure was proved by World Bank (1994) through the participation of rural residents in developing infrastructure in Africa, Asia, Nepal, Latin America and Malaysia. Research has shown that using more community resources will be more sustainable efficiency, following that there are three key reasons for efficiency: participation of direct beneficiaries; looking for the initial consensus of direct beneficiaries and mobilizing cash or contribute in kind. After that, Laah’s research (2013) continues to assess the extent of the participation of rural people in maintaining rural infrastructure, assess the impact of communities involved in developing sustainable infrastructure, evaluating the challenges to join the infrastructure development community in the context of the Riyom region - Nigeria’s plateau. With other arguments, Gabriel's research (2015) make two hypotheses: “Government interventions in Ogoniland have no significant impact on basic infrastructure in Ogoniland; the interventions of Ogoniland oil companies impact on basic infrastructure in Ogoniland do not have much.” to proving that the role of rural residents is important for developing sustainable rural infrastructure, according to the author's study, rural households can contribute significantly to infrastructure development plans in their communities. Research works of Nurlaila and colleagues (2015) on the basis of identifying public participation in developing village energy with the behaviour changes of local communities and analyzing the actual implementation of village programs, self-sufficiency energy to recommend energy policy to stimulate local community contributes to developing rural infrastructure in general and energy infrastructure in particular. In Vietnam, contributing opinions, contributing labor, rural people have been very enthusiastic to participating and be awaring the ownership and ownership of infrastructure works, thereby providing better efficiency with the maintenance and regular maintenance of works (3rd quarter ISG Newsletter in 2016).

III. RESEARCH METHODOLOGY

The first concept used in this study is: The results of implementing the criteria of infrastructure in new rural construction in Vietnam with the targets achieved are adequate rural infrastructure, synchronous and convenient, serving better the demands of social life in rural
areas, rural residents’ satisfaction on rural infrastructure. The second concept is the participation of rural residents to implement the criteria of infrastructure in new rural construction in Vietnam, which is understood as the fact that rural residents have to perform specific tasks in the development process and benefit from such activities. Rural residents need to take an active social responsibility in grasping information and giving opinions, participate in the decision-making process, make decisions and they are beneficiaries of the benefits of the new rural construction program.

The participation of rural residents is reflected in the fact that they are allowed to attend meetings, explained and provided with sufficient information about programs and projects (Hourdequin, 2012, p. 38). Participation of rural residents in the comments on the plan (planning scheme, list of works, etc), discussion, decision on contribution level, work performance (Finsterbusch, 1987, p. 10). The participation of rural residents is demonstrated by exercising the right to monitor the organization process, implementing infrastructure criteria for new rural construction (Conrad, 2011, p. 283; Danielsen, 2009, p. 39).

Research using quantitative method by direct interview and taking questionnaires for rural households in communes that have completed the national target program on new rural construction in the 2010 period – 2018, through the application of the scale of previous studies on participation of people in community development, in rural development, the author hypothesizes that research is the participation of rural farmers has a relationship with the results of implementing infrastructure criteria, specifically:

Hypothesis: The participation of rural residents has a positive impact on the results of implementing infrastructure development criteria in new rural construction.

Research using convenient samples was interview and collected questionnaires of 300 households living in new rural communes. The survey questionnaire consisted of 6 independent factors (the scale of participation to the results of new rural construction) with 17 observed variables evaluated by 5 levels according to Likert scale.

Based on familiar relationships, the author directly distributed 400 votes in 5 newly recognized rural communes in 4 different provinces (Hanoi, Quang Ninh, Thai Binh, Ninh Binh). Filtering less than 100 unsatisfactory responses, 300 valid votes are used for data analysis. Steps to analyze data include: testing the reliability of scale by Cronbach Alpha method, factor analysis to draw potential factors from a set of smaller observed variables and single multivariate regression analysis to test research hypotheses.

**IV. RESULT**

The Cronbach alpha method is used to evaluate the reliability of the scale, the results of running Cronbach alpha scales of reliability requirements. Specifically, the participation of rural residents measured by 6 scales with Cronbach alpha is greater than 0.6, indicating that these scales ensure good quality.

Next, the exploratory factor analysis (EFA) method used to evaluate the convergence and discrimination value of the scale, the implementation of EFA shows that KMO = 0.617, satisfying the condition of 0.5 < KMO < 1, factor analysis is appropriate for actual data (Table 1).
Table 1. Testing of KMO and Bartlett

<table>
<thead>
<tr>
<th></th>
<th>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</th>
<th>.617</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Approx. Chi-Square</td>
<td>1664.727</td>
</tr>
<tr>
<td>Bartlett's Test of Sphericity</td>
<td>df</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

The variance method is 70.7% at the eigen-value of 1,119 and the measurement variables are highly weighted (> 0.55) on the concepts they measure, low on the concept they are not measured. Therefore, the scale of the concept of the above research has achieved convergence and discrimination value (Table 2, Table 3).

Table 2. Total variance extracted explained

<table>
<thead>
<tr>
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<th>Rotation Sums of Squared Loadings</th>
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Extraction Method: Principal Component Analysis.
Table 3. Factor Rotations Matrix

Rotated Component Matrix

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</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

So, after verifying the quality of the scale and EFA tests, identify 6 scales representing the participation of rural residents and 1 scale for the implementation of infrastructure criteria in construction new rural with 20 typical variables (Table 4).

Table 4: Model adjustment for cronbach Alpha and exploratory factor analysis

<table>
<thead>
<tr>
<th>No</th>
<th>Scale (F#)</th>
<th>Variable characteristic</th>
<th>Explain</th>
</tr>
</thead>
<tbody>
<tr>
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<td>YK (F1)</td>
<td>YK1, YK2, YK3</td>
<td>Discussed and contributed ideas</td>
</tr>
<tr>
<td>2</td>
<td>TN (F2)</td>
<td>TN1, TN2, TN3</td>
<td>Received information</td>
</tr>
<tr>
<td>3</td>
<td>GS (F3)</td>
<td>GS1, GS2, GS3</td>
<td>Monitoring during the implementation of infrastructure criteria</td>
</tr>
<tr>
<td>4</td>
<td>DG (F4)</td>
<td>DG1, DG2, DG3</td>
<td>Participate in material contributions</td>
</tr>
<tr>
<td>5</td>
<td>CQ (F5)</td>
<td>CQ1, CQ2</td>
<td>Participate in upgrading and creating landscapes</td>
</tr>
<tr>
<td>6</td>
<td>SD (F6)</td>
<td>SD1, SD2</td>
<td>Use and protection of works</td>
</tr>
<tr>
<td>7</td>
<td>KQ</td>
<td>KQ1, KQ2, KQ3, KQ4</td>
<td>Results of implementation of infrastructure development criteria</td>
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</table>
To consider which scale of participation affects the performance of infrastructure criteria in new rural construction will be implemented by linear regression equation:

\[ KQ = b_0 + b_1F_1 + b_2F_2 + b_3F_3 + b_4F_4 + b_5F_5 + b_6F_6 + \epsilon_i \]

The variables included in the regression analysis are determined by calculating the points of the factors. The regression results show that all variables have Sig smaller than 0.01, indicating that F1, F2, F3, F4, F5, F6 correlate significantly with KQ (results of implementing infrastructure development criteria in new rural construction). Durbin Watson is 1.673 so there is no superlative string correlation in the model. R2 calibrated as 0.307 means that 30.7% of changes in the results of implementing infrastructure development criteria in new rural construction are explained by independent variables of rural residents’ participation. This is completely true to the reality of implementing the criteria of infrastructure development of rural residents with the results of rural infrastructure criteria achieved in the past time.

V. CONCLUSIONS AND DISCUSSION

This study examines the relationship between the participation of rural residents and the results of implementing infrastructure development criteria in new rural construction.

Theoretically, this study answers the question of how is the involvement of rural residents affected to implement the criteria of infrastructure development in new rural construction in Vietnam?

In practical terms, the results of this study discuss the responsibility of rural residents to participate in rural infrastructure development work, discussing the role of the rural residents in taking appropriate measures, help to effective use local resources and promote the highest participation of rural residents to implement the criteria of infrastructure development in new rural construction. There are 16 scales tested in practice, the participation of rural residents to implement of infrastructure development criteria and 4 measurement scales on the results of implementing the criteria for infrastructure development in new rural construction.

Previous studies have assessed the level of participation of rural residents in rural infrastructure development and examined the impact of community participation on the sustainability of rural infrastructure (Laah, Adefila, Yusuf) 2013; Gabriel, 2015). This study applies the theory of participation, the participation of rural residents in rural development and the practice of participation of rural residents in rural infrastructure development to continue verifying and proposing the relationship between the participation of rural residents and the results of implementing infrastructure criteria in new rural construction in Vietnam. The article discusses the content of rural residents to implement the criteria of infrastructure created by localities in promoting the role of the subject of rural residents to create high consensus and effectively mobilize resources at places like: rural residents actively carry out works on infrastructure development, are willing to donate land and exchange land for the construction of public works (expanding roads, schools, irrigation, clean water supply works, clinics,…); renovate, repair and upgrade the works of the family and villages more spacious and clean.

However, in order to participation of rural residents to be applied to the implementation of infrastructure criteria in new rural construction, the Government at all levels should facilitate rural residents in the direction of:

First, create a real democratic mechanism in all the work of the process of implementing rural infrastructure criteria so that rural residents know and participate. Consultation and publicity will create a mechanism for people to exercise their mastery and promote community responsibility so that rural residents can contribute practically to the locality.
Second, should have a mechanism to promote the internal resources of the local community. The Government needs to effectively implement the key role of policy mechanisms as a motivation for localities and communities to plan their work related to their interests.

Third, create conditions to improve the capacity of rural residents to participate through the methods of improving intellectual standards, means and science and technology to support the community to participate in specific tasks of the process of implementing criteria for rural infrastructure development;

Fourth, reducing the Government’s public investment in rural infrastructure to eliminate the need to rely on the Government’s investment and create a mechanism for farmers to be forced to have the responsibility to rise to develop family economic

Fifth, having a strict monitoring mechanism for accountability, decentralize to local communities and communities according to the provisions of law helping them implement better the mobilization of resources and transparency of all activities in new rural construction

REFERENCES


The Effect of Education on Agricultural Productivity: Implication for Rural Development

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Public Administration Department  
Faculty of Social and Management Sciences  
Umaru Musa Yar’adua University Katsina

Rozita Arshad  
School of Government, University Utara Malaysia

Abstract
Agriculture provide 60 percent of the world population with food for survival and play a vital role to the economic and social development of low-income countries. The purpose of this study was to examine the effects of education on agricultural productivity in Katsina State Nigeria. The study adopted survey approach and 434 questionnaires was distributed to the selected respondents from 6 local government areas of Katsina State. A total of 400 useable questionnaire was returned accounting for 92 percent rate of returned, which was utilized for analyzing the data using PLS statistical tool. The main findings of the analysis revealed that, education has a significant effect on agricultural productivity.

Key words: Education, Agricultural Productivity, Rural development.

Introduction
The issue of agricultural productivity in the world is so paramount, and topical that it has occupied a front burner in food security discourse as well as in development discourse. According to Food and Agricultural Organization (FAO), agriculture provide 60 percent of the world population with food for survival and play a vital role to the economic and social development of low-income countries (FAO, 2018).

A Sustain food provision for 90 percent of the world population who are not farmers need a viable mechanism that will facilitate high agricultural productivity. The importance of agriculture to the life of any economy cannot be over-emphasis, as it is the backbone of our economic system. Apart, from the provision of food and other vital raw material for the industries, agriculture provides employment opportunities to a significant number of people in both rural and urban areas of a country.

For decades, agriculture had been synonymous with the production of basic food crops, but recent trends had reinvigorate agriculture and allied it with other occupations to be recognize as part of agriculture such as forestry, fruit cultivation, dairy, poultry, mushroom, and bee
keeping, as well as marketing, processing, and distribution of agricultural products are all accepted as a part of modern agriculture.

Education had been identified as most viable mechanism for enhancing agricultural productivity as shown by some studies. For example, in a study by Das (2012), it was found that an additional one year of schooling increases agricultural output. Similarly, in another study by Bandiera and Rasul, (2006), it was found that literate farmers, with secondary school education, were 26 percent more likely to venture into cash crop farming, than those with primary school education.

However, despite the importance role play by education in enhancing agricultural productivity, little effort has been paid to enhance the knowledge base of farmers, especially those from the rural areas where more than 70 percent of the people rely on agriculture for their livelihood. This paper, therefore, examine the effect of education on agricultural productivity, the paper uses empirical approach as such the data was generated through questionnaire and PLS was used as tool for data analysis.

**Literature Review**

Ferreira (2015) examined the relationship between education and agricultural productivity in Malawi and the result of the analysis reveals a positive significant relationship between education and agricultural productivity, especially in maize production, and all other product. This result is consistent with the findings of Afari (2001) in Ghana, where educational attainment of the maize farmers has positive effect on the productivite level of maize production.

In a similar study, Yasmeen (2011) examined the impact of education on farmer’s agricultural productivity. The result from the analysis reveals a positive significant relationship between education and agricultural productivity in all agricultural product. This result is also consistent with findings from Ferreira (2015) in Malawi, where it was found that, literate farmers tends to use new farming techniques and fertilizers than the illiterate ones.

Similar, Djomo (2012) examined the effect of human capital on agricultural productivity in Cameroon focus on the impact of human educational attainment on agricultural productivity. The result from the analysis reveals that, additional year of experience and schooling increases agricultural productivity. The study further found that, an additional year of experience reduces the level of inefficiency, and additional one year of education reduces the level of inefficiency. Furthermore, the study found that, an additional year of schooling and experience increase farmer’s income.

Similar, Ndour (2017) examined the effect of human capital on agricultural productivity in Senegal. The study revealed a significant relationship between human capital and technical efficiency. In the same vein, Fielke (2014) examined the importance of farmer’s education in relation to agricultural productivity in Australia. The study found that, education in general contributes to higher thinking regarding the social and environmental outcomes of individual agri-businesses actions.

In the same vein, a study conducted by Klasen (2011) found that, education increases earning of farmers, which in turn, improves their well-being significantly. In another study by Tersoo (2014), it was found that farmers with numerical ability tends to interpret and respond to new information pertaining to new discovery in the field of farming, and that education has the capacity to improve the farmers productivity level through the use of modern technology, which could assist them in overcoming poverty.
Similarly, in Nepal, studies have found that, farmers that had obtained a complete primary education qualification were likely to adopt to soil conservation techniques by 26 percent, and they are likely to be more conscious of taking proactive measures in preventing erosion than those with no education (Admassie, 2008).

Based on the analysis of the research findings above, in which it was found that, there exists a relationship between education and agricultural productivity, this study postulates the that says:

\[ H1: \text{There is significance relationship between Education and agricultural productivity} \]

**Methodology**

This study adopted survey method, and the data for the study was obtained through questionnaire which were distributed to 434 respondents selected from six local government areas in Katsina State using Multi-stage sampling techniques. A total of 400 useable questionnaires were returned accounting for 92 percent rate of returned, and PLS statistics was used as a tool for data analysis.

![Figure 1. Research Framework](image)

**Data Analysis**

The statistical tool adopted for this study is PLS-SEM as it’s one of the most widely used tool for analysis in social and behavioral sciences disciplines. The PLS-SEM is among the most recently found accurate tools in analyzing relationship between and among complicated variables. Additionally, PLS exhibit strong statistical accuracy and reliability than other statistical tool having the power to run multiple regression analysis simultaneously (Tabri, 2012).

**Result and Discussion**

The result and discussion of the analysis of the relationship between the construct of this study will be in two segments, the first part will discuss the result of the measurement model analysis which deals with reliability and validity of the instrument, while the second part, will discuss the result of the analysis of the structural model which deals with testing of the hypothesis.

**Measurement outer model**

The assessment of the measurement model was done in steps, in the first step, the internal consistency of the items was determined where each item indicate a significance contribution in measuring the variable or construct, and in the second step, the measurement model was verified through construct reliability test (composite reliability, convergent validity, and Cronbach Alpha). In order to meet the requirement for reliability and validity criteria, it is essential in quantitative research to carry out construct reliability test (Hair, 2014).

**Measurement validity**

For this study to meet the measurement validity requirement, convergent validity was carry out by assessing the loadings, average variance extracted (AVE) and composite reliability (CR) as well. As indicated in table 2, the loadings were all above the standard value of 0.4 (Hair, 2014). The CR, CA, and rho- were all greater than 0.6, similarly, the AVE value was greater than the threshold of 0.5 (Hair, 2014).
Table 1: Reliability Test

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</table>

Figure 1: Measurement Model

As suggested by Fornell (1981), Loading and cross loading techniques was used by this study to assess the discriminant validity of the construct using AVE-SE, and Hererotrait (HTMT) matric. Table 3 indicates that, the constructs have achieved the discriminant validity test as the diagonal values of the construct were greater than the horizontal and vertical values.
Table 3: Fornell Larker Discriminant Validity Criteria

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</table>

In order to assess the item level, discriminant validity was utilized using cross loadings, and for discriminant validity to be achieved, the loading of the items in each construct must be greater than its loadings (Sekaran, 2016). As for this study, the discriminant validity has been achieved as each item in the loading (bold) were greater than its cross-loading as indicated in table 4.

Table 4: Loading and Cross Loading

<table>
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<tr>
<td></td>
<td>AG11</td>
<td>0.873</td>
<td></td>
</tr>
</tbody>
</table>

This study assessed HTMT by adopting a threshold of 0.85 as suggested by Tabri and Elliott (2012), and any value less than the adopted value indicates discriminant validity. As shown in table 2, this study has achieved discriminant validity as the highest value in the matrix is 0.461 which is less than the adopted threshold of 0.85.

Testing of Hypothesis

This study determined the direct relationship between education and agricultural productivity using bootstrapping and the result of the analysis indicates that, there exist positive relationship between the two variables as these; B=0.606, SE=0.048, TV=12.692, P=0.000, therefore, the
hypothesis which says there is significant relationship between education and agricultural productivity was supported. The result of this analysis was indicated in table 5 and figure 2 respectively.

**Table 5:** Result of the Structural Model Assessment (Hypothesis Testing).

<table>
<thead>
<tr>
<th>Relationship</th>
<th>B</th>
<th>Std</th>
<th>T</th>
<th>P&lt;</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edu&gt;Agric</td>
<td>0.606</td>
<td>0.048</td>
<td>12.692</td>
<td>0.000</td>
<td>Significance</td>
</tr>
</tbody>
</table>

![Table 5: Result of the Structural Model Assessment (Hypothesis Testing).](image)

**Figure 2:** Structural Model Assessment (Direct Effect)

**Discussion, Implication, Limitation, and Future Research**

Using the PLS statistical tool, this study, has investigated the direct relationship between education and agricultural productivity. Firstly, the reliability and validity of the instruments were determined through measurement model analysis as indicated in figure 1, which indicated that, the instrument have met the criteria for further analysis. Secondly, the relationship between education and agricultural productivity was analyzed through bootstrapping, and the result indicated a significant relationship as shown in table 5 and figure 2 respectively.

This result has provided yet another evidence that, education is an enhancer of agricultural productivity and it’s also a leeway out of poverty as it enhances agricultural output. The findings from this study, have contributed to the advancement of knowledge for being conducted in African context, while the construct of this study, and their relationship were majorly investigated in Western and Asian context. Additionally, investigating the construct in a different context which is Katsina State Nigeria is another uniqueness of this study.

**Implication of the Result**

One of the major explicit implication for policy maker on agricultural productivity and rural development by extension, as drawn from this study was that, education has a significant
influence on agricultural productivity. This implies that, the more people are educated the higher the agricultural productivity, this also means that, education could serve as mechanism for rural development and poverty reduction as well.

Conclusion

Conclusively, this study examined the effect of education on agricultural productivity. The result from the analysis shows that, education has a significant influence on agricultural productivity which implies that, the more education is provided in the areas, the higher the agricultural productivity in Katsina State Nigeria. From the findings of this study, it has been proved that, to facilitate and realized rural development objective, government should provide more schools in the rural areas in order to boost agricultural productivity and by extension achieved rural development.

References


FAO (2018). The State of Food Security and Nutrition in the World 2018. Retrieved from https://www.google.com/search?ei=xX6sXJmlOvqZ1fAP2vyP0Ac&uq=fao+report+on+food+security+2018&oq=fao+report+&gs_l=psyab.1.0.0l10.11032.14195..20516...0.0..0.603.2474.0j3j2j1j0i7il10l11i167j0i67.CCRZ1I7H1o (accessed 20th May, 2019)


