DEVELOPMENTAL EFFORTS TO ACHIEVE A SUSTAINABLE RURAL COMMUNITY.

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ABSTRACT
One of the greatest challenges of many developing countries of the world today is the uncontrolled rate of rural-urban drift which has overwhelmed the population in most cities making it very difficult to manage. The rural areas of Nigeria are generally characterized by very high levels of illiteracy, abject poverty, unemployment and lack of basic infrastructural facilities, such as good housing, access roads, electricity, health-care facilities, schools and transportation facilities. In view of this, the study will carefully conduct a critical analysis of major rural and urban centers through a review of related literature in descriptive data analysis. Although the current housing problems are undoubtedly more acute in the urban centers, government has come to realize that since the majority of the population are rural dwellers, there is housing needs as well if its goal of sustainable rural development is to be achieved.

Keywords: Community, Development, Housing, Rural, Sustainable, Urban

INTRODUCTION
The Government as an icon of any territorial entity has the sole prerogative to provide the needed social and basic amenities for the survival for its people and economy. In pursuance of the objective of sustainable rural development, successive governments in Nigeria have commissioned various agencies and research organizations to conduct comprehensive and detailed researches into rural housing problems in the country (Johnary, 1987). Housing without doubt, is an essential element of every human settlement and it is of utmost importance in the general strategy of socio-economic and national development (Osuide, 2004). Housing and the housing environment have been defined in different ways by different scholars. That notwithstanding, however, these definitions revolve around
describing housing and the housing environment as being made up of the entire residential environment including the structural characteristics of the house occupied as well as the internal and external facilities contributing towards a conducive condition of living (Sada, 1984, Omuta, 1988, Akinbode, 2000). Housing has always been a strategic asset to man, irrespective of his socio-economic status, colour or creed (Chukwujeku, 2005). This is so because housing is among the three basic necessities of life, the others being food and clothing. A house provides the base from where family life is organized and structured.

For any developing country such as Nigeria the provision of adequate and affordable housing or shelter is of prime importance to all, more so, as shelter is one of the basic needs for human survival. Addressing the current shortage of adequate and affordable housing, even in the rural areas of Nigeria, requires urgent attention. A large percentage of the population in the rural areas lack adequate shelter and many families are living in unacceptable conditions of poverty. The issue of the challenges and prospects of housing in sustainable rural development efforts cannot, therefore be overemphasized. This study, therefore assesses the role that housing may play in sustainable rural development efforts using Esan-West Local Government Area as a case study.

**Literature Review**

There have been attempts by Government and other agencies to provide affordable housing for the people. Public sector intervention in housing began in pre-independence era in Nigeria. It was largely limited to the provision of staff housing units in the Government Residential Areas (GRAs) in the regional capitals, and the African Quarters (Olotuah, 2000; Orange & Udegbue, 2000, Olotuah & Bobadoye, 2009). After gaining independence in 1960 the policy on Government Residential Areas was retained and promoted with greater zeal. The reservation scheme had little or no impact neither on the housing stock nor on the housing problem. The African Staff Housing Scheme and Nigerian Building Society (NBS, established in 1956) were continually fortified to provide mortgage loans and to encourage savings. Little was achieved because of limited financial resources coupled with the poor response of the public to the savings scheme (FGN, 2004). A decree promulgated in 1972 set a target of constructing 59,000 dwelling units with 15,000 units in Lagos while 4,000 units were
 earmarked for each of the eleven states of the federation (Jiboye, 1997, FGN, 2004).

In the 1962-1968 Development Plan, the government’s effort at housing provision was focused, principally, on Lagos. However, out of the 61,000 units that were to be built during the period, only 500 units (less than 1%) were actually built by the federal government. Moreover, the bulk of the housing units were meant for Senior Civil Servants while the housing situation of the poor majority was left unattended to (Olotuah & Bobadoye, 2009). In 1972 the government established the Federal Housing Authority (F.H.A.) to oversee its housing programmes. The government proposed the construction of 59,000 housing units in Lagos and 4,000 in each of the other state capitals. However, this effort was not specifically geared towards meeting the needs of the poor in the society. The second civilian government that came into power in 1979 had housing as one of its cardinal programmes. It embarked on the design and construction of low-cost houses for low-income earners. They consisted of 1-bedroom core houses, for low-income earners, which could be expanded by the owners if the need arose; and 3-bedroom apartments for other income groups. The housing programme was hardly successful. The target set was not met in any state of the federation. In fact, the percentage achieved was 20 for all states put together (FGN, 2004). This, in effect, means that 32,000 dwelling units were constructed which was a far cry from the number planned. The poor for whom they were built had an uphill task having access to the buildings. Olotuah, (2015).

Lewin (1981) argues that the rapid deterioration of urban housing is the visible and most obvious consequence of urbanization and urban poverty. In spite of being a fundamental need for dignified living, a sine qua non for man’s existence as affirmed by Yakubu (1980), housing is a major area of deprivation for the urban poor. Poor housing conditions manifest in the high proportions of people living in overcrowded accommodation devoid of the barest presence of public infrastructure and social amenities. This often is as a result of severe housing shortages in urban centres.

Housing shortages often lead to slum settlements which have been observed to pose problems of environmental health hazard (Abrams, 1966). This often generates deviant behaviours such as prostitution, criminality, and juvenile delinquency (Mangin, 1967; Huntington, 1968; Portes, 1971; Okoko 2001). Poor quality housing is thus not only hazardous to man’s health and welfare it places definite limitation on the output and productivity of its occupants.
The high unequal income distribution in the country is further aggravated in such circumstances, which perpetuates the vicious circle of poverty, within the general populace. In contradistinction, housing intervention, stimulates the economy of a nation, and is thus a catalyst for rapid socio-economic development. It is a basis for guided urban development since housing is a part of the total demand package of man (Chattergee, 1982; Salau, 1992). The provision of other essential socio-economic services and public infrastructure is intricately intertwined with housing provision, which enhances the user population’s general productivity and the acquisition of human capital, and thus their wellbeing and quality of life.

Housing, being a location specific activity, the Government especially local government is considered as the most important actor in the process of housing delivery or rather in facilitating the people to house themselves (Ebsen, C and Ramboll, B 2000). Rural development is a means of bringing about enduring changes in the structure of the rural sector in a manner that productivity and output are increased, the technology and techniques of production are radically revolutionized with enhanced standard of living (Izeogu, 1987; Nkorn, 2000). Thus rural development encompasses radical improvement in social relationship governing land tenure, access to land, technology, labour, physical infrastructures, access to services and political organization of society. The central objectives of rural development revolve around the productivity, welfare and quality of life of the rural dwellers (Todaro and Smith, 2009).

The urbanization process predated its colonial experience, which is a principal factor responsible for the contemporary urban system in the country. The high rate of urbanization is, however, not matched by a corresponding commensurate change in the rate of economic and technological development and social change (Mabogunje, 1980; Onibokun, 1985; Adedeji & Olotuah 2012; Olotuah 2015).

Rural and Community Development are generally concerned about improvements in the quality of life but community development may not be restricted to rural areas alone. Community development is about self-help development efforts from members of the community (Agioibenebo, 1987).

Research methodology
This study will study will carefully conduct a critical analysis of major rural and urban centers through a review of related literature in descriptive data analysis. Thereby, systematically investigating the challenges and prospects.
of housing in sustainable rural housing set up in Nigeria through an analytic method of data interpretation which will include an examination of data from both primary and secondary sources. Both qualitative and quantitative data collection methods will be used on the selected cases. Data will also be collected through interviews with relevant government authorities and residents in order to obtain comparative views on the subject matter. Secondary sources of data collection will include useful literature materials such as books, magazines, questionnaires, journals and the internet will be of great benefit in providing useful information.

Discussion
Sustainable development can be described as that which meets the needs of the present without compromising the ability of future generations to meet their own needs. In other words, it can be described as the ease of living with little or no cost. This definition is a pointer to the fact that concerted efforts must be made by the Nigerian government to find ways and means of using the available resources in more sustainable practices in the area of increasing housing stock and making rural environment more habitable. As noted earlier, the country is presently confronted with a relatively large deficit of housing requirements, a very high occupancy ratio in most cities, lack of basic infrastructural facilities such as pipe-borne water, water closet, electricity etc., a large volume of solid waste generated especially in cities, unsanitary conditions in which the solid wastes are collected, processed and disposed of and so many problems all of which contribute in no small measure to environmental degradation.

Towns were developed at transportation hubs—rail stations, river ports, major crossroads— providing the places where agricultural or natural resources could be traded or shipped. Many rural communities were built around main commercial streets and relatively compact, walkable neighborhoods, along with valuable infrastructure that served their civic, cultural, and social needs. The working lands surrounding the towns often provided the reason for their existence, and continue to do so in many places. In many parts of the world, most especially the developed countries, the sources of housing finance is from government, individual savings, life insurance reserves, commercial banks, savings and loans institutions (Primary Mortgage Institutions or Building Societies), However, in Nigeria the main sources of housing finance are Government- by way of loans staff
to build their houses, grants to the Federal Housing Authority by the Federal Government and various State Housing corporations by the State Governments as well as through individual savings. Private enterprise has played a major role in providing finance for housing in the country. The bulk of housing stock in the country are constructed through individual efforts. The commercial banks and insurance companies have not play significant role in housing provision efforts in the country. Commercial banking practices does not give room for long term lending which housing construction require. Whereas in United Kingdom and most countries in Europe, commercial banks and insurance companies very readily lend money for home ownership. In Nigeria, the lending policy of insurance companies are very conservative while commercial banks by nature of their operations find it difficult giving loans for projects with long gestation period which is the hallmark of housing construction. If more houses are to be built and less dependence placed on the resources of government only, then there is the necessity of finding new sources of money for housing construction.

In most rural areas, these are not new trends, but generations-old issues. Additionally, residents of remote communities have limited access to jobs, services, and transportation options. Long, expensive commutes to distant employment centers which can eat up a large percentage of the family budget, or families have to live sparsely on the small amount of local work available. People who don’t have access to personal vehicles or who do not drive, such as low-income residents and senior citizens, lack mobility and have even less access to jobs, healthcare, and other services, these are many more challenges impeding the growth and development of rural communities.

Coordinating Federal investments yields better results for communities and uses taxpayers money more efficiently by meeting multiple economic, environmental, and community objectives with each Naira spent. For example, investing in the revitalization of a town’s Main Street can spur business development, catalyze the renovation of historic structures, save taxpayer money by the fixing of dilapidated roads, facilities etc. immediately they show signs of break down. Also avoiding the need for the purchase of new equipment when existing ones are abandoned and lay to waste. Some small, rural jurisdictions have limited local government staff, experience, or funding, which can mean few resources dedicated to comprehensive
planning, regional collaboration, and other efforts to identify shared 
community goals and visions that can help shape growth and development. 
Rural communities may lack access to private and public capital, making it 
difficult for them to obtain funds for economic development and 
revitalization. For example, philanthropic organizations that exist in larger 
communities are less present in rural areas, reducing resources that might 
assist local governments and organizations. The result can be development 
that fails to take advantage of the communities’ assets, has limited long-term 
benefits, and creates long-term costs for the community.

The presence of basic social amenities, good infrastructure will spur any 
community to greater heights of growth and development. The provision of 
good road network and affordable houses will attract immigrants from other 
towns and cities to invest and foster a sustainable development. Some rural 
communities lack housing options. Much of their housing stock may be 
aging, resulting in low energy efficiency and high utility costs. Communities 
that offer a variety of housing types, such as single-family homes, 
townhouses, duplexes, and apartments in varying price ranges, are best 
positioned to attract and retain residents at all life phases—from single-
person households to young families to retirees. The location of new housing 
can also provide a competitive advantage, as homes that are near schools, 
jobs, shopping, and services reduce residents’ combined housing and 
transportation costs. Housing integrated into commercial areas, such as 
residences above first-floor stores and offices on main streets, may make it 
more convenient and affordable for residents to reach daily destinations 
while providing a local consumer base for businesses.

The significance of housing as a major determinant of man’s welfare, life 
sustenance and survival cannot be over emphasized. It has and will always 
be a prime concern to individual, the family, community and the nation at 
large. To the individuals, owning a home has always been a cherished dream 
and life ambition most especially in developing countries such as Nigeria. In 
most cases, it constitutes the first major capital investment of individuals.

Provision of housing as a requirement comes next after food. Indeed there is 
no doubt about the universal acceptability of housing as one of the 
fundamental needs of human beings which, in order of priority comes after 
food and before clothing. In developing countries (particularly Nigeria), the 
problem of housing is more pronounced than in the developed countries. 
Moreover, the shortage of housing in the urban areas is more pronounced
and critical than in the rural areas. A United Nations study revealed that an estimated normative housing requirements during the period 1970-1980 were: 323 million dwelling units for the whole world out of which the developed countries required 90 million units while 233 million units were required for developing countries (United Nations, 1974). The policy was expected to have a strong political and financial commitment by governments especially in helping the poorest citizens of the world. In Nigeria, like many other developing countries, this programme has not been effectively implemented since 1976 delegates’ conference. When it became obvious that the problem of housing majority the citizens in the country was getting out of hand, the slogan “Shelter for all by the year 2000” was adopted by the government in the 1980’s to signify the commitment of the government to housing provision for the citizens. This was in consonance with the United Nation’s resolution which called for shelter for by the year 2000. It provided a time-frame enabling adequate evaluation of performance of government housing programmes (FGN, 1990). It was, however, a mirage since the vast majority of Nigerians are yet to have access to decent and affordable housing years after 2000 targeted date set. The problem being lack of political will as well as inaccessibility to financial and other resources required for housing provision. The rate of population growth in the country is rather high and this is accompanied by rapid urbanization which stultify efforts made by the successive governments in housing provision.

The failure of public housing policies and programmes in the past in Nigeria has been traced to inadequate knowledge of the nature, scope and dimension of the country’s housing problems both in the urban and rural areas of the country as well as to the myopic and narrow concept of Nigeria’s housing needs (FGN, 1990). The country witness barrage of failed attempts at addressing the problem of housing in during the period of military rules which spanned late 1960s and late 1990s. Consequently, the civilian administration which came into being in the late 1990s inherited a serious problem of inadequate housing, resulting from many years of neglect, undeveloped housing finance system, limited supply of long term funds, high interest rate on mortgages, high cost of land and building materials, poor planning and implementation of housing policies and programmes, existence of administrative bottlenecks which make processing and securing of approval of building plans, Certificates of Occupancy and other necessary government permits very difficult and the unmitigated corruption in the
allocation of government lands within the framework of the Land Use Act, Cap.202 LFN 1990 (Ogwu, 2006, Akomolede, 2007, and Onyike, 2007). The problem is further compounded by the high incidence of corruption in all other relevant sectors of the Nigerian economy and the lack of adequate political will by the government to deal decisively with the housing problem. There is also the problem of conflict of objectives among actors and stakeholders in the housing industry namely: the funding institutions and the developers on one side and the consumers of housing on the other side. Moreover, the profit maximization objective of the developers and funding institutions tends to conflict with the affordability of housing to the housing consumers especially the low-income earners (Draft National Housing Policy, 2004) with the government which is supposed to play active role at solving the accentuated problem of housing provision in the country standing by as a disinterested umpire. There are schemes of building rural communities, Action Plan for Housing and Homelessness sets out a clear roadmap to address the homelessness challenge and unemployment which a major cause of rural-urban drift. Therefore, significantly increasing and expediting the delivery of social housing units will boost housing construction, improve the rental market, and deliver on the commitment to see housing supply, in overall terms which will invariably improve the unemployment situation. Sustainable rural communities need a supply of housing that is suited to the needs and means of younger people, and those on limited incomes to reduce rural-urban drift.

There is also a need to look at how the housing needs of older people who are likely to comprise a growing proportion of the rural population can best be met. High market prices and rents, and reduced provision of affordable housing limit choice. The result is an exodus of people who are needed to sustain local businesses, schools, shops and services. In certain areas, a predominance of second homes is reducing the vitality and sustainability of existing communities.

**Recommendations and conclusion.**

The following are basic recommendations to a sustainable rural development in Nigeria. Rural Development strategies should be adopted, strategies that are appropriate, relevant to the environment and needs of the people, properly directed and placed. This view is according to Abass, (1993) contested on the realization that the solutions to the problems of
unemployment, land pressures, equitable income distribution and the improvement of the living conditions of the poorest strata of the people have been deficiently met; leading to further and aggravated problem of poverty, pauperization, inequality as well as the creation of a new breed of home slavery. Efforts should be made by governments to pump money into agricultural development to yield the meaningful results. There should be a comprehensive template for rural development: It has been observed that over the years, there have been no National policies for Rural Development or where it exists; this should be holistically pursued.

Rural Industrialization:
Government should see rural communities as a base for industrialization, this will not only beef the commercial activities of the areas but also reduce rural-urban drift. The rural development programmes in Nigeria failed to record tremendous success due to deficiency in infrastructural development. Usually, rural areas are dotted with primary products, however, without industries to process them, most of these products cannot command high prices since they are not transformed into variety of uses. Hence, the need for grass root factories and processing facilities just to say the least.

Inadequate Community Participation:
The top-bottom approach to rural development employed by successive governments hindered longevity of the development, as there is absence of total community participation. People see most of the programmes as imported idea. There is little or no attempt to allow the rural communities to identify the problems and goals, analyze their own needs, and commit themselves to the achievement of targets. Local experts, Chiefs and community leaders should be taken along when deciding what projects to embark on, and where and how to execute them. The planners should consult the interest groups, the co-operatives, and professional organizations. Therefore, once the rural dwellers are given room to participate in planning, the chain of the planning process is continuous to success.
All the natural endowments in the rural areas of Nigeria should be put to effective utilization. The resources are potential means of sustainable “Economic Base” of each rural settlement. To appreciate the vital link between the rural and urban economies especially in the areas of urban industrial/manufacturing sector, a framework of integrated developments
that incorporates the growth poles model of city development and that of integrated-local-endogenous development is very imperative. The long term repercussion of urban industrial expansion would be accommodated by rural economy that exists to supply the urban needs.

Rural Development strategies in Nigeria should not be trivialized by the politicians, simply because there is no comprehensive rural development plan from where strategies can be originated. Hence, the country’s strategies to solve the rural poverty had been embedded in ad hoc, lopsided and cosmetic ideas as occurred to the government of the day and its agencies therefore paving way for integrated rural development programmes in Nigeria.

The government should see to the end of corruption, embezzlement and misappropriation of public fund: Large scale corruption and indiscipline have at various times hindered efforts directed at rural development in Nigeria. Public officials entrusted with public funds have been found wanting. Rather than use resources earmarked for rural development for the purpose, government officials and politicians connive to misappropriate such fund for personal use. Also, money meant for various developments have been found domiciled in foreign accounts where such can hardly be repatriated even if discovered. For rural development to indeed serve the purpose for which it is designed, it must be sustainable, efficient and affordable. In order to achieve all these, certain planning etiquettes must be observed.

Design of comprehensive template for rural development—Just as master plans serve as a guide for city’s overall development—be it physical, economic or social, a comprehensive template for Nigerian rural development is highly required.

To attain sustainable improvement in agricultural production and food security in Nigeria, it is glaringly becoming necessary to revisit and reintroduce the pattern of agricultural management style of the defunct Western Region. During those good agricultural days, administration of agricultural schemes, farm settlements and extension services were organized in extension divisions that covered the entire region: Okitipupa, Ife, Ilesa, Ondo, Ekiti, Owo, Ibadan West, Ibadan East, Osun, Oyo, Egba, Egbado, Colony, Ijebu, and Remo divisions.

Massive Industrialisation— Both rural and urban development requires a buoyant economy beyond agricultural investments. Experience from other
climes of the world indicates that while agricultural development could increase the economic prosperity of the rural people, the sustainability of the development goes beyond that. For any country to develop, it must scamper for industrial revolution. (Rostow, 1960). This is not to condemn investments in agriculture in its entirety; however, the economy of the developing country, Nigeria inclusive is likely to remain stagnant (at the base), if manufacturing is not given consideration. For instance, most of our agricultural products perish on the farm due to lack of industries to process them into finished products that can be exported to earn foreign exchange. E.g. mango, orange and pine apple among other farm produces. So, the dream of developing rural areas may remain elusive for years, and no amount of investment in agriculture can solve rural development if government fails to industrialise to actually jump start the economy of the rural people.

Appropriation of robust budgetary allocation to rural development projects- Heavy budget should not only be appropriated for rural development programmes, it should be efficiently managed and also thoroughly monitored to ensure success. Also, the business as usual attitude should be jettisoned. Resources meant for development should actually be for such purposes for which they are meant.

As the economic base of the rural economy improves and the market expands, small and medium scale enterprises (SMEs) would be required to consolidate the indigenous manpower needs of the sector. Institutional infrastructures would go along with the trend of development.

Adoption of citizen participation as a veritable instrument for sustainable rural development- As has been identified as a constraint to rural development in Nigeria and indeed other developing countries of the world, community participation in all strategies adopted to enhance rural development is very crucial. The model of bottom-up approach should be favoured as against its top-down counterpart if meaningful achievements must be recorded. Ideas for development should be spontaneous rather than imported. Governments and policy makers should allow the community people to decide on their priority while they (policy makers) only advise and guide.

Federal Government should provide enduring and sustainable environments for local and international markets for the discharge of both agricultural and mineral products as well as tourism services. Marketing Boards in the past
oversee the price control, represents and protects interests of farmers at international market, particularly in Cocoa, Cotton, Groundnut and Rubber.

**Projects should be decided with the people not for them.**

Political Empowerment and liberation of the Rural People it is becoming a tradition that the local government administration presumed to be the closest to the people of the grass root is no longer championing their causes. Rather than organise elections and allow the locals to control their affairs by themselves, majority of the managers of local administration are now managers who are appointed by the Governors without the consent of the people.

Land in the African culture is synonymous to life and the basis of all socio-economic benefits. Federal Government need to review the institutional framework on land and land resources to allow respective proprietary land owners reap the full economic returns on their lands. To this end the expertise of Real Estate Surveyors and Valuers is very necessary in all the Local Government Authorities in Nigeria for effective and efficient management and appraisal of land resources.

**CONCLUSION**

Attractiveness of rural areas and effectiveness of agricultural production cannot be increased with just a bigger amount of investments. Rural way of life is like a social paradigm, which is developed under an influence of a whole set of non-economic factors: social, cultural, historical, ethnic, etc.

Development of “agricultural cities”. Experience of Belgorod Oblast of Russia shows that rural settlements get bigger with natural movement of people from peripheral districts of the region, as well as from neighbour regions and even countries. From one point of view, such attraction of people into rural areas serves as a driver for economic development. However, conversely, bigger rural settlements mean urbanization, reduction of agricultural producers and rural households, development of non-agricultural activities, and finally decrease of traditional agricultural production, which is always a threat to sustainable rural development. According to Lavrukchina, such way causes further “demographic shrinkage” of depopulation of peripheral rural districts (Lavrukchina, 2013).

De-urbanization and attraction of urban people to rural areas. This way requires development of related infrastructure in rural districts, including
housing, social and medical facilities, employment opportunities, transport, etc. Rural districts may become attractive for resettlement only in case of insurance of living standards at least equal to urban ones. Such way has led many countries to development of “satellite rural settlements”.

As of today, rural people seek for alternative employment in the cities, while it should be available in the traditional places of their inhabitation. Development of decentralized sustainable settlement systems in the suburban rural areas may ensure strategic sustainable development of rural areas and secure their historical and cultural identities.

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FLOOD AND SOCIO-ECONOMIC DEVELOPMENT IN NIGERIA: A FOCUS ON 2012 FLOOD DISASTER

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Abstract

Flood is one of the most disastrous environmental problems that severely affect human beings and other sectors of development on the planet. Diseases and economic losses are a major developmental challenge for many least developed countries battling with flood. This study is an investigation of Flood and Socio-Economic Development in Nigeria. Functionalist theoretical perspectives was considered in analyzing the study. The study found that climate change, heavy rain fall, release of water from dams, poor planning, indiscriminate dumping of waste and lack of drainage system are factors that causes flooding in Nigeria. Flood is also found to affect other sectors of development in Nigeria and is associated with the loss of lives and properties as well as disastrous health implications. Flood affect agricultural supplies, exacerbating malnutrition problems leading to loss of production, food shortages and destruction of storage facilities. Flood causes damages to homes, schools, businesses, and transportation system and paralyzes socio-economic activities. It was recommended that drainage system should be constructed and regularly inspected and monitored to take note of any failure with a view of effecting repairs. Enlightenment campaigns should be step up by the government, National Orientation Agency and other related bodies with the view to put an end to the habit of dumping refuse in drainages. That government should dredge river channels to widen it up and give the channel the ability to contain excess water. The study concludes that all hands must be on deck, both the government, Non-Governmental Organization, Community Based Organizations, the Mass Media and the general public corroborate in order to control and prevent (averts) the catastrophic effects of flood on socio-economic development in Nigeria.
Keywords: Flood, Socio-economic Development.

Introduction

It is a common knowledge that about 70% of the earth’s surface is covered with water and it is a known fact that all human beings, including animals and plants requires or need specific amount of water in order to survive. However, throughout human civilization (history), every society regards flood as the unusual presence of water on land to a depth which affects normal activities (Obebi, 2013). Flooding is one of the most disastrous environmental problems that affect and continue to affect human beings since the beginning of life on earth. Akpa (2017) explained that, “Flood is among the most diver stating natural disaster in the world, claiming more lives and causing more property damage than other natural phenomenon” (p34). The Biblical book of Genesis revealed how flood destroyed the whole world. The account relates that the earth was corrupt and filled with violence and after a series of warning, God caused rain to fall for forty days and forty nights until the highest mountains were submerged and all life perished except Noah and those with him in the ark. It was after 150 days that the water subsided that the ark rested on the mountain of Arafat (Genesis 6:9-9:17). The Quran added that Nuh (Noah) was inspired by Allah (God) and was commanded to build an ark. The people who mocked him and denied the message including one of his own sons drowned. The Quran referred to the final resting place of the ark as mountain Judi. The Yazidi called the landed place Ain Sifni in the region of Ninevah plains, about 40 kilometers Northeast of Mosul in the present Iraq. Though, this flood was as a result of disobedience, it was strictly human error or man induced. The great flood of Gun-yu in China, also known as the Gun-yu myth was a major flood in ancient China that takes place about 4,000 years ago during the reign of Emperor Yao which resulted in the great population displacement among other disasters, such as storms and famine when people left their homes to live on the high hills, mountains and trees and washed down the yellow river. This was regarded as one of the worst anywhere in the world (https://en.m.wikipeadia.org┐wiki/Genesis.flood.narrative). The most catastrophic flood in the world were the 1887 and 1931 China flood that claimed over 6 million lives in one fell swoop, the 1979 Morvi Dam burst incident that killed over 4, 500 people in India, the Huascaran
landslide in Puru in 1962 that claimed over 4,000 lives, the spring flooding in Haiti that occurred in 2004 which snatched over 3,000 lives, the 2010 Pakistani flood affecting more than 2,000 lives and the 2011 Rio de Janeiro flood that snuffed lives of over 800 people (Obebi, 2013).

Nigeria and other African countries are not left out, several Nigerian communities had experienced an upsurge of flooding with devastating effects. The Nigeria Post – Disaster Needs Assessment (2012) explains that: Severe flooding events have become a frequent phenomenon facing communities and authorities in Nigeria each year. Although the country is vulnerable to multiple hazards, such as draughts, floods, landslides, gully erosion, and wind storms, it is draught and floods by far that affects the greatest number of people in the country. In the last two years, Nigeria has been affected by several extreme flood events, which have resulted in devastation and economic damages worth millions of dollars in the affected urban cities (p.113).

Following the sudden bursts of water from the Ladja dam in Camaroon and the Guinean dam, coupled with the heavy rain experienced between July and September 2012, more than 20 states in Nigeria were seriously affected by water flood. Over 363 people died as a result of the flood with about 2 million displaced causing the destruction of household property, destruction of farm produce leading to food scarcity and hunger to victims, overcrowding of displace victims, spreading of communicable diseases and water borne diseases, attack by dangerous animals flooded into people’s homes, loss of houses, ponds, farmlands, etc. The states most affected were Adamawa, Benue, Taraba, Plateau, Bayelsa, Kogi, Niger, Lagos, and Rivers. The water level in these states rose several meters higher swallowing whole buildings and cutting off the entire communities. According to Erekpokeme (2015), the 2012 flood was one of the worst in Nigeria leading to loss of lives and property worth millions of naira. The flood were unprecedented and for the fact that floods are a yearly occurrence in Nigeria, the government lacked capacity to control disaster of such magnitude. Several agencies and volunteer persons joined hands with the government to assist flood victims by donating relief materials as well as providing temporary accommodations to alleviate the plight of the flood victims. The National Emergency Management Agency (NEMA, 2012) reported that the country experienced the worst incidence of flood in 40 years. The report added that in that year alone (2012), flood began in early July and killed 363 people and
displaced over 2.1 million as of November. 32 of Nigeria’s 36 states were affected by the floods and an estimated total of seven million people were affected. Odidi (2012) laments that:

The reoccurring flood disaster along the coastal communities in the country has left no fewer than 25 million people displaced and devastated. Those living along the coastal communities of Rivers, Niger, Benue, Sokoto, Katsina, Lagos, Ondo, Bayelsa, Delta, Akwa Ibom, Anambra, and Cross River State are gravely affected by the incessant flood menace which has made the governors to direct victims to leave their communities and providing makeshift relief for them. It is said that the federal government has abysmally failed to explore proactive measures in tackling perennial flood in some disaster prone northern states and blocked drains and water channels in the southeast and some states in the Niger Delta region which has equally rendered many Nigerians homeless and helpless. No matter how government will provide relief materials cannot salvage the suffering dwellers of these affected communities. The worst is that property worth billions of naira has been destroyed by the flood. Although the warnings of climate change on flood disaster were issued to Nigerians by experts, our government never provide the solutions. The continuous revenging flood has put many Nigerians into untold hardship in which those in the coastal communities are grossly affected while the relief materials provided by some of the affected states governors are not adequately enough to cater for the people (p.1).

The monetary value of the damages and losses caused by the floods were estimated to worth N2.6 trillion. Many factors are accounted as the main causes of flood in Nigeria. These include global warming and climate change, heavy rainfall, failure of dams to retain water, lack of drainage facilities, erection of building in flood plains, dumping of waste into the drainage and water bodies, overflow of rivers and ocean banks due to high tides, when lakes, ponds, river beds, soil and vegetation cannot absorbed all the water, it ran off the land in volumes. The United Nations (UN) report of 1995-2015, (as cited by Davies, 2016), reveals that in the last 20 years, 157,000 people have died as a result of flood affecting 2.3 billion people, which accounts for 56% of all those affected by weather-related disasters considerably more than any other type of weather-related disaster. The report further states that flood strikes in Asia and Africa more other than continents, but poses an increasing danger elsewhere. Flooding as an environmental
problem is not only caused by natural factors, but also by man’s interaction with his environment. The year 2012 witnessed wide spreading throughout the country both in North the Southern part of Nigeria. More than 27 states were affected by flood; as a result of this, both the state and federal government spent huge sums of money to help the communities affected. The effects of flooding are devastating. Sometimes it results in major disasters involving structural damage, erosion, disruption of socio-economic activities, transportation, and communication, loss of land and property, displacement of people, destruction of agricultural land and contamination of food, water and the environment in general (NEST, 1991). Solutions to flooding may reside in the construction of check dams, flood walls, adequate drainage system and legislation that will refrain man from activities that induce flooding. Another measure to combat the problem of flooding in to embark on channelization of the stream, these channels may ensure easy flow of water when there is heavy rain fall.

Conceptual and Theoretical Discourses

The Concept of Socio-Economic Development

For this study, socio-economic development can be defined as activities both involving both social and economic factors which result in the growth of the economy and societal progress. It implies the continuous improvement in the wellbeing and in the standard of living of the people. Socio-economic development is measured with indicators such as the growth of GDP, life expectancy, literacy and levels of employment.

The concept of Flood

Sada (1988) defines flood as unusually high rates of discharging; often leading to inundation of land adjacent to streams caused by intense or prolonged rainfall. The National Erosion and Flood Control Action Plan Committee (2005) defined flood as a condition which exists when discharge of a river or stream cannot be accommodated within the margin of its normal channels so that waters spread over adjoining land. Flood can be defined as an overflow of an expanse of water that submerges land. It is an overflowing or irruption of a great body of water over land. The European Union (EU) Floods Directive defines flood as a covering by water of land not normally covered by water. According to Wikipedia (2009), flood is an overflow of water that submerges or drowns land. It can also be defined as a large amount
of water covering an area that is usually dry (Udo et al, 2015) it is an overflowing of a great body of water over land not usually submerged. For this study, flood is defined as the flow of water above the carrying capacity of a channel.

**Forms of flooding in Nigeria**

Flooding occurs in Nigeria in the following forms:

1. **Coastal flooding:** This occurs in low-lying belt of mangrove and fresh water swamps along the coast.
2. **River flooding:** This type of flood occurs in the flood plains of the larger rivers.
3. **Flash flood:** This is associated with rivers in the in-land areas where sudden heavy rains can change them into destructive torrents within a short period.
4. **Urban flooding:** This occurs in towns located on flat or low lying terrain especially where little or no provision has been made for surface drainage, or where existing drainages have been blocked by waste or refuse or eroded soil sediments.
5. **Dam burst or/and levee failures:** Dam burst are common following intense rainfall. For instance, the Bagauda Dam near Kano.

*Source: Adapted from Nigeria Post – Disaster Needs Assessment (2013)*
Vulnerable areas in Nigeria
NEST (1991) listed the geographical areas in Nigeria that suffer from flood more others as follows:

1. Low-lying areas in the southern part of the country where annual rainfall is very heavy.
2. The Niger Delta zone
3. Flood plains of the larger rivers of the Niger, Benue, Taraba, Sokoto, Hadeja, Cross River, Imo, Anambra, Ogun, Kaduna, etc.
4. Flat low-lying areas around and to the south of Lake Chad which may be flooded during and for a few weeks after the rain.

Figure 3: Flood Risk Map of Nigeria, Depicting Mortality Risk Index
Source: Adapted from Nigeria Post – Disaster Needs Assessment (2013)
Theoretically, functionalist perspective will be considered in analyzing this study. Functionalism is a macro classical theory in sociology which assumes that society consist of different parts, each of which serves a particular purpose. In other words, functionalists sees each aspect or element of society as interdependent and contribute to society’s functioning as a whole. Proponents of functionalist sociological perspective includes: Emile Durkheim, Robert R.K. Merton, Talcott Persons, etc. Functionalist theorists, while agreeing that flood is dysfunctional to some extent in the sense that it is associated with socio-economic losses, health challenges and consequently death as well as defacing of environment, water pollution, outbreak of infections and diseases yet sees flood as serving a need within society. For example, Flood has positive effects in the sense that low lands near rivers depend upon river silt deposited by floods to improve the nutritional value of the local soil. During flood, many people are employed in the emergency services to assist flood victims. Many people are hired to cook for victims of flood disasters. Corrupt states government officials in the affected states also benefit because the relief materials and money donated by the federal government agencies and other concerned citizens to compensate victims of flood and put preventive measures are diverted to their personal use. Thus, from the functionalist perspective flood persist because it serves interest in the society. Hunters and fishermen make gains as fish and crabs are frequently caught in compounds inundated with floods without necessarily setting out fishing nets and boats. Hunters claim that traps caught more animals than it used to since animals chased by flood are easily available.

Causes of Flood in Nigeria
Nigeria post – disaster needs assessment (2013) hinted that:
The causes of flooding, erosion, and gully formation differ by location, but are largely human. These include: (a) Improper building and infrastructure design, location, and construction, as well as inadequate drainage: (b) Poor solid waste management in urban and peri-urban areas that chokes the already inadequate drainage meant to prevent flooding and erosion; and (c) Destructive and unsustainable land-use practices that remove protective vegetation cover, including protective biodiversity and carbon-rich areas, or disturb the fragile soil, such as over grazing, deforestation, cultivation of
marginal lands, and uncontrolled mining for building material, which are linked to poverty. (p.114).

Many factors can be identified as the major causes of flood in Nigeria. These include:

1. Global warming and climate change: The dangers posed by climate change are nearly as dire as those posed by nuclear weapons. Flood alone accounted for 47% of all weather related diseases affecting 2.3 billion people, the majority of who (95%) live in Asia (Davies, 2016). Studies have linked extreme weather caused by global warming and climate change as major causes flood. Climate change exacerbates the risk of disastrous flood in many part of the world. According to the United Nations report 1995-2015, (as cited in Davies, 2016), across the globe, over 600,000 lives have been lost-an average of 30,000 per year. Over 4 billion people have been injured, left homeless or in need of emergency assistance of weather related disasters in the last 20 years. While less frequent than floods, storms were found to be the deadliest type of weather related disaster, accounting for 242,000 deaths or 40% of the global weather related deaths, with 89% of these deaths occurring in low-income countries. Climate change is likely to result in higher winter rainfall, more intense storms and rising sea levels in the future (Giddens, 2010). WHO (2001) projected that climate change will continue to increase threat to human health. For example, Awake (2003) reported that an important factor in the resurgence of insect-bone diseases is change in the nature and society both insects and insect-bone diseases (including malaria) are today being reported at higher elevations in Africa, Asia and Latin America. Warmer weather in some areas transform rivers into puddles, while in others it triggers rains and floods that leave behind stagnant pools. In both cases the standing water serves as a perfect breeding ground for mosquitos.

2. Heavy rain fall: Flood can be caused by heavy or extensive rainfall exceeding the capacity of a river’s channel. Torrential rains made rivers to overflow their banks and caused houses to collapse and also washed away livestock.

3. Release of water from dams: NASA Earth observatory disaster plan (2012) reveals that in addition to the challenges posed by heavy rains, Nigerians had to cope with the release of water from the dams which further swelled the River Benue. Overflow of water from dams is another cause of flooding in Nigeria. This is a situation in which water from dam overflows to cover large areas of land. Examples of such dams include: the Ladgo dam in Cameroon, Kainji dam, Oyan dam, Bagauda dam etc.
4. **Poor planning:** Poor planning also causes flood. For example, in the case of (2012) Nigerian flood, the Nigerian Meteorological Agency (NIMET) and other experts issued a warning and alerted that there would be an above normal rain fall in strategic parts of the country which might lead to flooding incidence in 12 states of the federation. Yet, the government never reacted or provided proactive solutions (Odidi, 2012). This explain why the flood was rising on daily basis while the state governors in the affected states and the National Emergency Management Agency (NEMA) were overstretched. The quest to harness the available resources may lead to poor construction of dams and the failure of these structures may result to flood. For example, the collapse of Bagauda dam near Kano in 1988.

5. **Indiscriminate dumping of waste.** The dumping of waste may block the water channels causing flooding.

6. **Lack of drainage system.** The absence of surface drains and blockage of existing drains with municipal waste, refuse and eroded soil sediments are the major cause of dreaded flood (Odidi, 2015). Lack of drainage facilities that can control water may also cause flood. Excessive rainfall leads to flooding, especially in areas with poor drainage system, places where water inundates the capacity of the soil to contain water and where poor land use practices prevents drainages from channeling excess water away.

The NASA Earth Observatory Disaster Plan (2012), reveals that in addition to the challenges posed by heavy rains, Nigerians had to cope with the release of water from the Lagdo Dam in neighbouring Cameroon, which further swelled the river Benue River.

**Plate 1: Breakdown of 2012 Flooding Situation in Nigeria**

<table>
<thead>
<tr>
<th>S/No</th>
<th>Location of Flood</th>
<th>Causes in the Identified Location</th>
<th>Estimated Amount of Infrastructure/Properties lost</th>
<th>Estimated No. of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abia State</td>
<td>Rainfall, windstorm, and fire of June 26, 2012</td>
<td><em>2,643</em></td>
<td>L = 2</td>
</tr>
<tr>
<td></td>
<td>Umuanmman-theiy</td>
<td>Community in Uguwagba LGA, Nlagu in Obingwa LGA, and Ode-Ukwu in Osisioma LGA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Adamawa State</td>
<td></td>
<td></td>
<td>L = 2l</td>
</tr>
</tbody>
</table>
By LGAs: +Numan, Demsa, Jada, Yola North, Yola South, MayoBelwa, Goyuk, Lamurde (25 communities), Madagali, and Michika

<table>
<thead>
<tr>
<th>Location</th>
<th>Event Description</th>
<th>Number of People Affected</th>
<th>Location Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kofare, Damilu, Saminaka, Rugangr, Njiboliyo, Yeldifate, Jada, Shuwa, Lumadu, Jhau, Kwambula, Kirchinga, Beman, Dubangun, Ngodogurun, Tino Kogi, Nasarawa-Demsa, Nzugaleng, Zuran, Dwam 1, Belachi, Bare, Greenvillage, and Ngbalag communities</td>
<td>Persistent rainfall resulting in the release of water from the Lagdo Dam in the Republic of Cameroon on August 24, 2012</td>
<td><strong>46,030</strong> currently in IDP camps. The number is increasing by the day, as the release of the water has not abated and is expected to continue as long as rainfall swells the dam.</td>
<td>Destruction of houses and farmlands washed away, worth millions of Naira.</td>
</tr>
<tr>
<td>Akwa-Ibom State</td>
<td>Rainfall of August 2, 2012</td>
<td><strong>847</strong></td>
<td><strong>L = 15</strong></td>
</tr>
<tr>
<td>Uyo metropolis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anambra State</td>
<td>Heavy precipitation and release from Jebba and Kainji hydroelectric power Dams</td>
<td><strong>9,964</strong></td>
<td>Destruction of residential homes, places of worship, markets, schools, hospitals and farmlands; Orient Petroleum Resources Oil Well totally submerged.</td>
</tr>
<tr>
<td>Ogbaru, Ekwusigo, Anambra East and Anambra West Local Government Areas: Aguleri-Otu, Enugu-Ut, Otuocha, Miniata, Umuenwelum, Umualije, Umuez-Enam, Ihie-Anam, Umueba-Anam, Ossomala, Ogwulike, Atani, Ochuche, Ohite, Odekpe, Anyamelum communities</td>
<td></td>
<td></td>
<td><strong>L = 0</strong></td>
</tr>
<tr>
<td>Bauchi State</td>
<td></td>
<td><strong>370</strong></td>
<td><strong>L = 0</strong></td>
</tr>
<tr>
<td>S/ No</td>
<td>Location of Flood</td>
<td>Causes in the Identified Location</td>
<td>No. of Affected/ Displaced Persons (IDPs)</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------</td>
<td>-----------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>Benue State</td>
<td>Floods on September 11, 2012</td>
<td>Destruction of buildings, livestock, farmlands, properties worth millions of Naira</td>
</tr>
<tr>
<td></td>
<td>Makurdi metropolis</td>
<td>Release of water as of September 20, 2012</td>
<td>* 33,000 ; ** 3,189</td>
</tr>
<tr>
<td></td>
<td>Makurdi and 23 other communities in four LGAs</td>
<td>Rainstorm and release from the Dams on 14th September 2012</td>
<td>*25,000; ** 10,054</td>
</tr>
<tr>
<td></td>
<td>Otukpo district of Otukpo</td>
<td>Rainstorm of August 24, 2012</td>
<td>** 300</td>
</tr>
<tr>
<td>7</td>
<td>Borno State</td>
<td>Rainstorm of September 10, 2012</td>
<td>*405</td>
</tr>
<tr>
<td></td>
<td>3 LGAs (Gwoza, Askira/Uba and Hawul) of 12 communities: Tashan Alade, Ghung, Gwoza, Kwajaffa, Yelwa, Lokoja, Pelabirini, Lassa, Hambagda, Ngelleri, Bulla Waziri, and Gidan Balu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Cross River State</td>
<td>Flood on August 28, 2012</td>
<td>** 2,656</td>
</tr>
<tr>
<td></td>
<td>Agwagune community and other wards of Biase LGA, namely: Abanyong, Erel South, Erel North, Umon North, Ikun/Ituno and Agwagune/Okurike</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Delta State</td>
<td>Flood on July 20, 2012</td>
<td>** 5,000</td>
</tr>
<tr>
<td>10</td>
<td>Ebonyi State</td>
<td>Release of water from the Kiri in Adamawa State and from Lagdo Dams</td>
<td>Cultivated farmlands, houses, markets, schools, hospitals and worship places</td>
</tr>
<tr>
<td>11</td>
<td>Gombe State</td>
<td>Flood on September 11, 2012</td>
<td>Destruction of 250 households</td>
</tr>
<tr>
<td>12</td>
<td>Jigawa State</td>
<td>Heavy rainfall and windstorm of August 25, 2012</td>
<td>Destroyed houses and farmlands worth millions of Naira</td>
</tr>
<tr>
<td>13</td>
<td>Kaduna State</td>
<td>Rainstorm of September 14-15, 2012</td>
<td>517 Houses destroyed, 1 church, 1 primary school and 2 secondary schools, farm crops washed away, submerged 1 car. Destruction worth millions of Naira.</td>
</tr>
<tr>
<td>S/No</td>
<td>Location of Flood</td>
<td>Causes in the Identified Location</td>
<td>Estimated No. of Affected/Displaced Persons (IDPs)</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
<td>----------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>14</td>
<td>Kano State</td>
<td>Flood of September 12, 2012</td>
<td><strong>4,417</strong></td>
</tr>
<tr>
<td></td>
<td>Gabasawa, Sumaila, Bebeji, Nassarawa, Dala, Gwali, Bichi, Bagwai, and T/Wada LGAs</td>
<td>Rainstorm and Flood, July 20, 2012</td>
<td><strong>1,049</strong></td>
</tr>
<tr>
<td>15</td>
<td>Katsina State</td>
<td>Torrential rainfall of August 24, 2012</td>
<td><strong>2,730</strong></td>
</tr>
<tr>
<td></td>
<td>8 Local Government Areas affected: Maiadua, Bindawa, Kusada, Batsari, Kurhi, Safana, Kankia, and Jibio.</td>
<td>Rainstorm and Flood, July 20, 2012</td>
<td><strong>1,049</strong></td>
</tr>
<tr>
<td>16</td>
<td>Kogi State</td>
<td>Release of water from the dam as of September 22, 2012</td>
<td>*900,000; <strong>5,000</strong></td>
</tr>
<tr>
<td></td>
<td>9 LGAs of 332 communities affected</td>
<td>Rainfall and release of water from Kainji and Jebba Dams of September 13-15, 2012</td>
<td>*10,000; <strong>5,000</strong></td>
</tr>
<tr>
<td>17</td>
<td>Lagos State</td>
<td>*430</td>
<td>Destruction of houses</td>
</tr>
<tr>
<td>S/No</td>
<td>Location of Flood</td>
<td>Causes in the Identified Location</td>
<td>No. of Affected/Estimated Amount of Infrastructure/Properties lost</td>
</tr>
<tr>
<td>------</td>
<td>-------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>18</td>
<td>Lagos</td>
<td>Flood on July 16, 2012</td>
<td>Mda = 200</td>
</tr>
<tr>
<td></td>
<td>Nassarawa State</td>
<td>Rainstorm</td>
<td>*432; ** 57 Farmlands</td>
</tr>
<tr>
<td></td>
<td>54 communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Niger State</td>
<td>Prolonged torrential rainfall and the release of excess water from Kainji and Shiroro Dams</td>
<td>** 220 Mud houses and farmlands washed away. Losses to properties worth an estimated N250,000,000,000.00</td>
</tr>
<tr>
<td></td>
<td>Makwa, Lavan, Edati, Borgu, Bida, Chanchaga, Shiroro, Bosso, Munya and Wushishi LGAs in 157 communities: Zdegu, Ketso, Kpashafu, Ekegi, Fangantswaka, yinha, Lugure... Sugi, Dadi, Basagi, Shigaba... Wuya kanti, Tama... Fadukpe... Manta... Koro village... Koro village... Kyari... Pompon... Jigba... Lemu... full nos available.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Oyo State</td>
<td>Flood on August 2, 2012</td>
<td>Figures not available at the time of report Reconstruction of 7 bridges and buildings</td>
</tr>
<tr>
<td></td>
<td>Ibadan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Plateau State</td>
<td>Torrential rainfall of August 10, 2012 that lasted thirteen hours, August 12, 2012</td>
<td>** 10,000 Destroyed houses and washed away bridges and farmland.</td>
</tr>
<tr>
<td></td>
<td>6 LGAs affected: Wase, Lantang North, Lantang South, Kanam, Mikan, and Shadam (226 villages)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jos North: Rikkos, Gangare, Rukuba and Kwana Shagari Villages</td>
<td>Flash flood of July 22, 2012</td>
<td>*4,583; ** 3,000 Houses and farmlands washed away worth millions of Naira</td>
</tr>
<tr>
<td></td>
<td>Lantang North</td>
<td>Flood, Rainstorm, and Fire of July 17, 2012</td>
<td>Destruction of 500 houses and properties worth millions of Naira</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Table:**

<table>
<thead>
<tr>
<th>State</th>
<th>Event Description</th>
<th>Displaced Persons (IDPs)</th>
<th>Destruction</th>
<th>( I = )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>River State</strong></td>
<td>Flood and fire of September 10, 2012</td>
<td><strong>2,000</strong></td>
<td>800 houses</td>
<td>1 = 2</td>
</tr>
<tr>
<td>Rumuokwachi and Kaa</td>
<td>Rumuchinda community in Rumuene Obia/Akpor and Okposi and Zor and Lusua communities in Saga, Khana LGA</td>
<td><strong>471</strong></td>
<td>107 houses</td>
<td>1 = 3</td>
</tr>
<tr>
<td>Ikpokiri I and II communities of Ogubado LGA</td>
<td>Flood on June 1, 2012</td>
<td><strong>500</strong></td>
<td>100 houses</td>
<td>1 = 0</td>
</tr>
<tr>
<td><strong>Taraba State</strong></td>
<td>Release of water from the Lagdo Dam of September 11 and 21, 2012</td>
<td><strong>14,636</strong></td>
<td>107 houses</td>
<td>1 = 10</td>
</tr>
<tr>
<td>Ibbi - 30 communities and Warawa village, Wukari LGAs</td>
<td><strong>375</strong></td>
<td>Destruction of houses and properties worth millions of Naira</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sardauna LGA</td>
<td>Flood of August 27, 2012</td>
<td><strong>375</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yobe State</strong></td>
<td>Hours of torrential rainfall on August 28, 2012</td>
<td><strong>3,720:</strong> <strong>1,578</strong></td>
<td>Destruction of houses, roads and farmlands washed away worth millions of Naira</td>
<td>1 = 0</td>
</tr>
<tr>
<td>Gashua, Bade LG Areas in Garin Lamido, Kisawa, Saban Gari, Abuja Amare, Zango, Isari, Tundun Yan Rariya communities and Federal Low-cost housing</td>
<td><strong>955,783:</strong> <strong>157,744</strong></td>
<td>Total value in Naira not yet available</td>
<td></td>
<td>L = 207; ( I = 71; ) ( M_p = 40 ); ( M_d = 200 )</td>
</tr>
<tr>
<td>Total</td>
<td>June, July, August and September period</td>
<td><strong>955,783:</strong> <strong>157,744</strong></td>
<td>Total value in Naira not yet available</td>
<td>1 = 71; ( M_p = 40 ); ( M_d = 200 )</td>
</tr>
</tbody>
</table>

**Source:** Adapted from Nigeria Post – Disaster Needs Assessment (2013)

The table above indicates that there are different causes of floods disaster across states in Nigeria based on geographical locations and the number of people affected.
Flood and Socio-economic Development in Nigeria

Flood generally have negative socio-economic consequences on the society. These negative effects include among others: loss of lives and property, submerge of houses and roads, collapse of bridges, eroding of the soil surface causing soil infertility, pulling of electric poles and communication network masts. Other are loss of animals, defacing of the environment, water pollution, Outbreak of infections and diseases and certainly death (Akpa, 2017). Again, Odidi (2012), explained that:

Since the upsurge of the flood challenge, economic activities have been totally grounded without immediate solutions to it. Even some of the high land communities are gradually taken up by the flood while death casualties have increased to 95 percent. The crisis of goods and services and transportation are at geometrical progression (p.2).

The 2012 flood for instance, has brought the invasion of dangerous reptiles including crocodiles and snakes in many communities. The flood has created untold poverty for many communities sending a wrong signal of an impending hunger and strife in years to come as well as high profile criminal activities. Even wild animals were chasing away people from their homes. While the rescue centers provided by the government were not adequate enough to cater for the flood victims, Deaths were being recorded in the so called rescue centers while some flood victims who refuse to vacate their communities were being invaded by criminals. Flooding is an important factor responsible for spread of diseases such as diarrhea, typhoid, scabies, cholera and malaria. The devastating negative consequences of flood are enormous. Flood affects all sectors of development, it has led to the loss of lives and property and it holds disastrous health consequences. Death tolls from flooding have risen in many parts of the world. Farmers often suffer huge economic losses. Flooding has taken its toll on agriculture and food supplies, exacerbating malnutrition problems in poorer areas of the world. Losses of production, food shortages and rural under-nutrition as well as storage facilities are associated with flooding. Prizes of commodities increased and schools are shutdown. Nigeria post-disaster need assessment (2013) reported that:

The 2012 flood caused losses to food crops amounting to N305.070.1 million and affected livelihoods. Indeed, large areas of agricultural land were inundated just before harvest time. Food prices in many flooded areas have
risen by 30 to 70 percent, increasing food insecurity among the affected populations.

In Nigeria, floods damaged over 1.9 million hectares of land and reduced food production along flood plains. Rice production in the affected states were reduced by 22.4%, rice was reduced by 14.6%, and suya beans, cassava and cowpea were reduced by 11.2%, 9.3% and 6.3% respectively (Anugwara & Emakpe, 2013). A total of 12 million goats, 3 million poultry and 136 cattle were killed in the 2012 floods (Erekpokeme, 2015). Crops worst hit by the flood included cassava, plantain, yam, maize and pawpaw which are major staples in the region (International Institute for Tropical Agriculture, 2012). The UN report 1995-2015 found that children in households exposed to recurrent flooding have been found to be more stunted and underweight than those living in non-flooded villages. Children exposed to floods in their first year of life also suffered highest levels of chronic malnutrition due to loss of agricultural production and interrupted food supplies. The flood incidents markedly affected farming activities as arable land often submerges in water; fishing rivers are usually overflowed and contaminated preventing accessibility. Flood often causes damage to homes and businesses, especially if they are located in natural flood plains of rivers. Flood has been responsible for obstruction of school activities. During flooding, school activities are halted, school infrastructures are damaged and it prevented students from going to school. Flood affects transportation system and damages bridges. Flood is known to cause increase in food prices and many people are exposed to wild animals chased by flood. Flooding cut off communities from other neighboring towns and villages and has led to the decline in tourism, paralyzing economic activities in many towns and cities in the country. Flood degrade the environment, soil and water are polluted by chemicals. Flood causes impairment of communication, displacement of families, migration of people and led to poor health condition of victims.

### Plate 2: Summary of Damage and Losses Caused by the 2012 Floods in Nigeria’s Most Affected States

<table>
<thead>
<tr>
<th>Sector</th>
<th>Subsector</th>
<th>Disaster Effects, million Naira</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td></td>
<td><strong>Damage</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,256,299.3</td>
</tr>
<tr>
<td>Sector</td>
<td>Education</td>
<td>Health</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------</td>
<td>--------</td>
</tr>
<tr>
<td>Agriculture</td>
<td>82,134.6</td>
<td>18,204.8</td>
</tr>
<tr>
<td>Manufacture</td>
<td>18,204.8</td>
<td>9,476.8</td>
</tr>
<tr>
<td>Commerce</td>
<td>1,155,959.9</td>
<td>74,425.0</td>
</tr>
<tr>
<td>Oil industry</td>
<td>1,155,959.9</td>
<td>225,000.0</td>
</tr>
<tr>
<td>Water and Sanitation</td>
<td>12,902.2</td>
<td>--</td>
</tr>
<tr>
<td>Electricity</td>
<td>12,902.2</td>
<td>--</td>
</tr>
<tr>
<td>Transport</td>
<td>23,840.2</td>
<td>17,167.0</td>
</tr>
<tr>
<td>Environment</td>
<td>23,840.2</td>
<td>17,167.0</td>
</tr>
<tr>
<td>Total</td>
<td>1,482,155.6</td>
<td>1,135,808.5</td>
</tr>
</tbody>
</table>

**Source:** Adapted from Nigeria Post – Disaster Needs Assessment (2013)

Plate 2 indicates summary of damages caused in all development sectors across the most affected states in Nigeria.

### Plate 3: Impact of the Flood Disaster on Employment and Income in the Agricultural Sector

<table>
<thead>
<tr>
<th>State</th>
<th>Working days lost in crop production</th>
<th>Income loss by workers in crop production (million naira)</th>
<th>Working days lost in fisheries</th>
<th>Income loss of workers in fisheries (million naira)</th>
<th>Total working days lost in agriculture</th>
<th>Total income loss of workers in agriculture (million naira)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adamawa</td>
<td>1,070,935</td>
<td>107.3</td>
<td>244,416</td>
<td>61.1</td>
<td>1,315,351</td>
<td>168</td>
</tr>
<tr>
<td>Anambra</td>
<td>1,096,470</td>
<td>493.2</td>
<td>283,056</td>
<td>70.8</td>
<td>1,379,526</td>
<td>564</td>
</tr>
<tr>
<td>Bayelsa</td>
<td>2,820,685</td>
<td>1,268.7</td>
<td>2,444,112</td>
<td>61.0</td>
<td>5,264,797</td>
<td>1,880</td>
</tr>
<tr>
<td>Benue</td>
<td>1,512,610</td>
<td>680.6</td>
<td>294,816</td>
<td>73.7</td>
<td>1,807,426</td>
<td>754</td>
</tr>
<tr>
<td>Delta</td>
<td>1,387,390</td>
<td>615.3</td>
<td>2,898,720</td>
<td>724.7</td>
<td>4,266,110</td>
<td>1,340</td>
</tr>
<tr>
<td>Edo</td>
<td>218,950</td>
<td>98.4</td>
<td>1,005,312</td>
<td>251.3</td>
<td>1,224,262</td>
<td>350</td>
</tr>
<tr>
<td>Jigawa</td>
<td>285,560</td>
<td>128.4</td>
<td>1,629,408</td>
<td>407.3</td>
<td>1,914,968</td>
<td>536</td>
</tr>
</tbody>
</table>
Plate 4: Impact of the Flood Disaster on Government Revenues and Expenditures

<table>
<thead>
<tr>
<th>Item</th>
<th>Value (Billions Naira)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenue before disaster</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Total Revenue after disaster</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Revenue loss</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Total Expenditure before disaster</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Total Expenditure after disaster</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Expenditure increase</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Fiscal Balance before disaster</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Fiscal Balance after the disaster</td>
<td>In percent of GDP</td>
</tr>
<tr>
<td>Decline in Fiscal balance</td>
<td>In percent of GDP</td>
</tr>
</tbody>
</table>

Source: Adapted from Nigeria Post – Disaster Needs Assessment (2013)

Plate 5: Impact of the Flood Disaster on Employment and Income in the Commerce Sector

<table>
<thead>
<tr>
<th>State</th>
<th>Working days lost in trade SMEs</th>
<th>Income loss by affected trade workers</th>
<th>Working days lost in micro-trade</th>
<th>Income loss of micro-trade workers (million naira)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kebbi</td>
<td>2,996,520</td>
<td>1,348.3</td>
<td>617,760</td>
<td>154.4</td>
</tr>
<tr>
<td>Kogi</td>
<td>2,681,265</td>
<td>1,206.5</td>
<td>204,816</td>
<td>51.2</td>
</tr>
<tr>
<td>Nasarawa</td>
<td>2,101,355</td>
<td>1,310.2</td>
<td>1,018,368</td>
<td>254.6</td>
</tr>
<tr>
<td>Taraba</td>
<td>2,911,355</td>
<td>1,310.2</td>
<td>1,018,368</td>
<td>254.6</td>
</tr>
<tr>
<td>Total</td>
<td>16,961,740</td>
<td>7,257</td>
<td>10,640,784</td>
<td>2,660</td>
</tr>
</tbody>
</table>

Source: Adapted from Nigeria Post – Disaster Needs Assessment (2013)
Adamawa 33,000 49.5 3,236,400 2,155.4
Anambra 19,500 7.3 1,434,780 955.6
Bayelsa 10,500 16.3 12,819,840 8,538.0
Benue 0 0 836,400 557.0
Delta 16,500 6.2 7,529,820 5,014.9
Edo 6,000 2.2 391,980 261.0
Jigawa 9,000 3.4 6,653,700 4,431.4
Kebbi 7,500 2.8 5,744,160 3,825.6
Kogi 12,000 4.5 3,860,040 2,570.8
Nasarawa 45,000 16.9
Rivers 43,500 16.3
Taraba 9,000 3.4 2,016,240 1,342.8
Total 211,500 93.9 42,670,440 28,418.5

Source: Adapted from Nigeria Post – Disaster Needs Assessment (2013)

Plate 6: Communicable Diseases of Immediate and Long-term Concern

<table>
<thead>
<tr>
<th>Communicable disease</th>
<th>Immediate concern</th>
<th>Longer-term concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera/Typhoid/Shigellosis</td>
<td>+++</td>
<td></td>
</tr>
<tr>
<td>Acute lower respiratory tract infections</td>
<td>+++</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A &amp; E</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Dengue fever</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Meningitis</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Poliomyelitis</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

Source: Adapted from Nigeria Post – Disaster Needs Assessment (2013)

Conclusion and Recommendations

It is obvious that incessant cases of flood in Nigeria has not only stunted both the growth and socio-economic development in Nigeria but it has also...
caused serious health implications of the affected people generally. Flood has equally paralyze so many business activities, leading to loss of lives and property, damaging transportation and communication systems, residential houses, agricultural products, school infrastructure, contaminating the environment and causing (forcing) people to migrate to other places indiscriminate dumping of waste, lack of drainage system, poor planning, heavy rainfall, global warming among many other factors were exposed in this study as the factors that causes incessant cases of flood in Nigeria. There is therefore, an urgent need for both the government, Non-governmental Organizations, Community Based Organizations, the Mass Media and the general public to corroborate to avert the catastrophic effects of flood on socio-economic development in Nigeria. The following recommendations are suggested:

1. Improving drainage system: This can help to control floods by facilitating easy flow of excess water, especially in urban areas during flash floods.
2. Water from dams should be discharged periodically so as to avoid overflow.
3. Building canals. During flooding, excess water can be channeled through canals to non-risk areas, to other areas with high demand for water. Canal can be used to lock excess flood waters in its linear reservoirs to prevent flooding and store water for future use.
4. Harvesting rain water. This involves collecting and storing of rain water not only to prevent flood but also to curb the problem of water scarcity. This can be done by building ponds, storm drains, water retention basins and flood-control dams.
5. Effective information or warning system
6. Regular removal of constrictions along the river channels.
7. Dredging of river channels to widen it up and give the channel the ability to contain excess water.
8. Capacity building to integrate climate change and its impacts into urban development planning involving local communities, raising public awareness and education on climate change.
9. Government should ensure that structures are erected on water ways or areas that are prone to floods.
10. Enlightenment campaigns should be stepped up by the government, National Orientation Agency and other related bodies with the view to putting an end to the habit of dumping refuse in drainages.
11. Drainage system should be regularly inspected and monitored to take note of any failure with a view to effecting repairs.
12. Provision of standard infrastructural facilities such as good surface drainage, portable water supplies and other supporting facilities should be made a priority.
13. Environmental sanitation should be made compulsory in all communities.
14. The national inland waterways authority (NIWA) should take steps to clear water ways and tributaries which are sorted and taken over by shrubs to allow for channels and easy flow of water to contain the ravaging flood in coastal communities.
15. The federal government should collaborate with other relevant agencies and international communities to initiate proactive and preventing measures to fight against future reoccurrence of flood disaster in the country.
16. Education on flood management should be included in the nation’s educational curriculum

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IMPLICATION OF ROAD SIDE SOLID WASTE DISPOSAL IN NIGERIAN CITIES

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Abstract
The vigorous pursuits of economic development without due consideration to its negative effects has contributed to too many environmental problems. Virtually all aspects of man’s productive (economic) activity involves the generation of waste”. This paper is set out to determine the implication of indiscriminate roadside waste disposal in Nigerian cities. The research revealed that over 50% of the solid waste generated in Nigerian cities is left uncollected causing health hazard and environmental problems. In most of the major streets in Nigerian cities a substantial portion of the streets are taken over by heaps of solid waste. In Lagos, Bauchi, Delta, Ibadan and many other cities, the recent flood disasters are linked to indiscriminate dumping of solid waste blocking drainages and water ways. This study discovered that high urbanization rate, inadequate solid waste management facilities, weak enforcement of environmental sanitation laws and poor knowledge of the negative implication on the community health. The study recommends that solid waste segregation at source and formal scavenging should be encouraged, solid waste management agencies should be fully equipped with modern waste management equipment, Law enforcement and prosecution should be fundamental in stopping illegal dumping, finally. A high level of awareness and education on sanitation, environmental health matters and benefits of proper waste disposal should be created to the entire public so that they can appreciate the need for a clean living environment and actively participate in keeping the urban roads and drainages clean.

Keywords: solid waste, Nigerian cities, open disposal, flooding, environmental law.

Introduction
One of the major problems confronting Nigerian towns and cities today is poor solid waste management. A feature of the urban scenery of Nigeria today exhibits the gradual takeover of virtually every available open space by refuse dumps or heaps made up of solid wastes, making this solid waste
as part of the urban scenery. Apart from the physical obstruction of legitimate human activities, the solid waste dumps are fertile ground for the breeding of disease vectors and in effect, have made the dumps grave health hazards (Nwachukwu, 2010; Filani and Abumere, 1986; Omuta, 1988). These wastes to say the least disfigure the scenic beauty of the city environment. Nigeria’s major urban centres are today fighting to clear mounting heaps of solid waste from their environments. These strategic centres of beauty, peace and security are being overtaken by the messy nature of over flowing dumpsof unattended heaps of solid wastes emanating from household or domestic or kitchen sources, markets, shopping and business centres. (Timmi-Aku 2000). City officials appear unable to combat unlawful and haphazard dumping of hazardous commercial and industrial wastes which are a clear violation of the clean Air and Health Edicts in our environment sanitation laws, rules and regulation. Refuse generation and its likely effects on the health, quality of environment and the urban landscape have become burning national issues in Nigeria today. All stakeholders concern with the safety and the beautification of our environment have come to realise the negative consequences of uncleared solid human wastes found in residential neighbourhoods, markets, schools, and central business districts and other open spaces in our cities. These solid wastes have become recurring features in our urban environment. It is no longer in doubt that our cities are inundated with the challenges of uncleared solid wastes. As a result, urban residents are often confronted with the hazardous impact to their collective health and safety (Njoku, 2006). The hue and cry over the health consequences of exposed and fermenting rubbish have not been quantified, although their impact is noticeable, especially in times of epidemic in congested activity nucleic civic centres, CBDS, neighbourhoods, etc. In recent years, the problem of solid waste became so aggravating that lot of efforts were made through environmental sanitation exercise, creation of ministries and agencies at all levels of government with mandates to among others tackle waste management but alas, backlog of un-cleared waste still co-habit our urban centres. (Chiemelu, 2010). The rapid changes and growth in industrial technology, the rapid increase in the country’s population, the ever increasing rural-urban migration, the dramatic change in consumption patterns in favour of imported packaged can foods and other luxurious goods are substantially yielding high quantities of both degradable and non-degradable materials like metals, bottles, plastic materials, glasses, electrical
and electronic equipment and other solids which transverse Nigerian cities today; hence complicating the problem of maintaining urban environment at a healthy level for human beings. The poor state of solid waste management in Port-Harcourt city is caused by inadequate facilities, poor funding, and poor implementation of policies as well as wrong lifestyle (consumption pattern). According to Egunjobi (1986), the problem of effective solid waste management has to do with poor social services delivery efforts which cause unnecessary delays in solid waste clearance. It is either broken down machinery, non-maintenance of dumpsters, poorly maintained urban streets and roads and irregularities in the designation of sanitary landfill sites. Nigerians seem to be permanently accustomed to dirt. Evidence of this can be seen every day by way of indiscriminate discharge of garbage into drains and at times on the highways. Studies have revealed that household account for about half of the solid wastes generated, that is, by weight in the third world cities, which includes Port-Harcourt. It has also been noted that solid waste management has received considerable attention not only in Rivers State but Nigeria generally. The major effects of poor solid waste management in Port-Harcourt city include: blocked drains, flooding, erosion, traffic congestion, soil pollution, air pollution, health problems, unaesthetic dump sites and loss of community pride (Ademiluyi and Alulo 2009):

Furthermore, it has been established that the more developed a nation is, the more the waste generated per person per day hence the more advance the technology of waste management.

Figure 1: Solid Waste Generation and Collection by Regions of the world

[Graph showing solid waste generation and collection by regions]
The figure above shows that more solid waste is generated by developed countries of the world. While developed countries collect and dispose of over 80% of its solid waste but on average developing countries do not collect up to 40% of its total solid waste generated. African cities do not evacuate up to 40% of the waste generated in their urban areas as shown below. Since it is true now that solid waste problem has become a myth-defying solution in Nigerian cities, this paper will seek to unravel the generation and collection rates of solid waste in Nigerian cities, and identify the implications of open dumping and uncollected heaps of solid waste on the landscape of Nigerian cities as a basis for making appropriate recommendations to solve the problems.

MATERIALS AND METHODS
Geographically, Nigeria is a country located in West Africa along the Atlantic Ocean's Gulf of Guinea, it lies on Latitude: 9° 04' 39.90" N Longitude: 8° 40' 38.84" E and has a total area of 923,768 km² (356,669 sq mi), Figure 2 Map of Nigeria Showing Capital Cities.
As at 2017, Nigeria’s population stood at 186,053,386 people with a population density of 204.28/person/km², available data reveal that the population of Nigeria has been increasing at an alarming rate and our towns and cities are growing rapidly. In 1921, the population of Nigeria was only 18.72 million, in 1952; it rose to 30.4 million and in 1963 to 55.67 million. The preliminary census data for 1991 indicated a population of 80.5 million. In 1931, less than 7 per cent of Nigerians lived in urban centers that are settlements with populations of 20,000 and above. The proportion rose to 10 per cent in 1952 and to 19.2 per cent in 1963. In 1980, 2000, and 2017 it grew to 22%, 35% and 50% respectively. At present, there are fifteen cities with populations of over one million people; twenty-five cities with over 500,000 people and more than fifty cities with over 200,000 people as in table below

Table 1: Population Growth of Nigeria, 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Yearly % Change</th>
<th>Urban %</th>
<th>Urban Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>190,886,311</td>
<td>2.63%</td>
<td>50.2%</td>
<td>95,764,092</td>
</tr>
<tr>
<td>2016</td>
<td>185,989,640</td>
<td>2.65%</td>
<td>49.3%</td>
<td>91,668,667</td>
</tr>
<tr>
<td>2015</td>
<td>181,181,744</td>
<td>2.70%</td>
<td>48.4%</td>
<td>87,680,500</td>
</tr>
<tr>
<td>2010</td>
<td>158,578,261</td>
<td>2.68%</td>
<td>43.8%</td>
<td>69,440,943</td>
</tr>
<tr>
<td>2005</td>
<td>138,939,478</td>
<td>2.58%</td>
<td>39.3%</td>
<td>54,541,496</td>
</tr>
<tr>
<td>2000</td>
<td>122,352,009</td>
<td>2.52%</td>
<td>35.0%</td>
<td>42,810,252</td>
</tr>
<tr>
<td>1995</td>
<td>108,011,465</td>
<td>2.54%</td>
<td>32.3%</td>
<td>34,918,670</td>
</tr>
<tr>
<td>1990</td>
<td>95,269,988</td>
<td>2.64%</td>
<td>29.8%</td>
<td>28,379,229</td>
</tr>
<tr>
<td>1985</td>
<td>83,613,300</td>
<td>2.62%</td>
<td>25.7%</td>
<td>21,508,164</td>
</tr>
<tr>
<td>1980</td>
<td>73,460,724</td>
<td>3.00%</td>
<td>22.0%</td>
<td>16,191,472</td>
</tr>
<tr>
<td>1975</td>
<td>63,373,572</td>
<td>2.51%</td>
<td>19.8%</td>
<td>12,573,568</td>
</tr>
<tr>
<td>1970</td>
<td>55,981,400</td>
<td>2.23%</td>
<td>17.8%</td>
<td>9,969,016</td>
</tr>
<tr>
<td>1965</td>
<td>50,127,214</td>
<td>2.12%</td>
<td>16.6%</td>
<td>8,315,202</td>
</tr>
<tr>
<td>1960</td>
<td>45,137,812</td>
<td>1.90%</td>
<td>15.4%</td>
<td>6,967,110</td>
</tr>
<tr>
<td>1955</td>
<td>41,085,563</td>
<td>1.65%</td>
<td>11.1%</td>
<td>4,541,081</td>
</tr>
</tbody>
</table>

Many research findings show that while cities in Nigeria, as in other developing countries, have been growing at a very rapid rate, there has been no commensurable growth in the rate at which social services and sanitation infrastructural amenities are provided (Osibanjo 2008). The result has been a gradual decline in the quality of the urban environment and in the quality of life.

RESULTS AND DISCUSSION

Waste generation and collection rates in Nigerian cities

FMHE (1983) and Izeogu (1989) identify the major factors determining solid waste generation in Nigeria cities in the eighties as population growth, urbanization and social development, income class composition, diffusion of technical competence, commercial growth, and industrial development. These factors still serve as pointers to the quantity of solid waste generated in Nigerian cities today. Similarly, FMHE (1983) revealed in a study on solid waste management in Nigerian cities that residential and commercial land uses generate over 70% of the municipal solid waste in Nigeria (Bogoro, 2014). These heaps of solid wastes are generated and deposited mainly on streets; drainages open spaces, uncompleted buildings in the cities and other public places. It is generally believed that waste is a by-product of development and sophistication. However, the machineries to control and monitor the processes that led to the pilling up of solid waste on our streets have not been matched by the concentration of indicators and the proceeds of development in our urban centers.

In Nigeria, studies have shown that solid waste generation in cities is increasing and the more the amount of solid waste generation the more complex is the solid waste management. (Filani and Abumere 1986). The volume of solid waste is largest for metropolitan Lagos and smallest for Potiskum as shown in table 2. In 1982, 9 million tonnes of solid waste was generated, 13 million tonnes in 1990 and 19 million tonnes was estimated for the year 2000, Bogoro 2014).

| Table 2 Estimated Solid Waste Generated in Some Nigerian Cities |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Lagos          | 625  | 618  | 786 079 | 998 081 | 1 033 745 | 1 339 416 |
| Ibadan         | 350  | 382  | 440 956 | 559 882 | 660 118 | 802 499 |
|                | 399  | 394  | 745   | 416   |    |    |
Achi (1993) documented that between 25% - 40% of the solid waste generated in Nigerian urban centres is often not evacuated but dumped in drainage channels, open land, uncompleted buildings and even along urban streets. It is this deplorable condition that led Mabogunje (1996) to conclude that “Nigerian cities are reputed to be some of the dirtiest, the most insanitary, the least aesthetically pleasing, least safe and secure and the most poorly governed cities of the world”. This gloomy picture of our cities should concern environmentalists because it seems to be pointing at accusing fingers at urban manager’s failure to deliver functionally aesthetic and livable cities. Hammed et al (2012) reported that the residents of Ibadan generate 485 860 260kg of solid waste annually in the city with only 10% of this being evacuated (OYSWMA, 012). The rest find their way into streams and river channels, open spaces, road medians and side drains, and other unauthorized places (OYSG, 2011). In Owerri city, Nwachukwu 2010 reported that the volume of solid waste that was evacuated in Owerri is not related to the quantity that was generated during the study period. This

<table>
<thead>
<tr>
<th>City</th>
<th>Solid Waste Generated (kg/year)</th>
<th>Solid Waste Evacuated (kg/year)</th>
<th>Remaining Solid Waste (kg/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kano</td>
<td>319 935</td>
<td>348 580</td>
<td>402 133</td>
</tr>
<tr>
<td>Kaduna</td>
<td>257 837</td>
<td>280 925</td>
<td>324 084</td>
</tr>
<tr>
<td>Onitsha</td>
<td>242 240</td>
<td>263 929</td>
<td>304 477</td>
</tr>
<tr>
<td>Port Harcourt</td>
<td>210 934</td>
<td>229 821</td>
<td>265 129</td>
</tr>
<tr>
<td>Oshogbo</td>
<td>313 903</td>
<td>243 712</td>
<td>173 720</td>
</tr>
<tr>
<td>Aba</td>
<td>31 903</td>
<td>143 712</td>
<td>169 719</td>
</tr>
<tr>
<td>Jos</td>
<td>99 971</td>
<td>111 905</td>
<td>135 272</td>
</tr>
<tr>
<td>Bauchi</td>
<td>67 477</td>
<td>75 607</td>
<td>91 396</td>
</tr>
<tr>
<td>Gusau</td>
<td>44 478</td>
<td>48 471</td>
<td>57 243</td>
</tr>
<tr>
<td>Potiskum</td>
<td>15 434</td>
<td>16 816</td>
<td>19 399</td>
</tr>
<tr>
<td>Uyo</td>
<td>12 508</td>
<td>13 628</td>
<td>15 721</td>
</tr>
<tr>
<td>Suleija</td>
<td>7 380</td>
<td>9 383</td>
<td>13 311</td>
</tr>
</tbody>
</table>

Sources: Bogoro 2017
signifies that the rate of solid waste disposal in Owerri is less than the rate of waste generation. The implication is that the high volume of solid waste generated in Owerri is not regularly evacuated for disposal, thus resulting in the emergence of heaps of solid waste on the streets in Owerri metropolis. Moreover, the low level of solid waste disposal in Owerri may be attributed to ineffective solid waste management system being operated in the city. Butu (2014), NISP (2003) revealed that, today, the prominent visible features that welcome guests to Kano city along some major streets are the heaps of municipal solid waste. These heaps, in some areas have formed mountains which can be seen at places like Gyadi-gyadi Court road, Naibawa, Mosque Road, U nguwa Uku behind Police Station, Gandun Albas a by Zoo Road, Jayin Filling Jirgi, Kofar Ruwa Katsina Road, Gadon Kay a near Yayan Awaki, Sabowar Gandu. Other areas are Rijiyan Zaki near Azman Filling station, BUK Road old side, Kabuga opposite Taxi Motor Park, Tal’udu by Police Station, at the front of Federal College of Education, Kofar Fumfo, Dakata near Custom office, Sabon Gari along Benin and Enugu Roads as well as Ibadan, Onitsha and Port Harcourt Roads. Other notorious waste dominating areas are Hotoro Road by Mopol Barracks, Kauw opposite Total Filling Station. The one around Sabon Gari market, Kasuwan Kwari, Singer, Bata and Bompai are more pronounced. These municipal solid waste dump sites are sited on the major streets at various locations.

In Lagos metropolis, Ojolowo and Wahab (2017), discovered that the gap between the quantities of MSW generated and collected from 2007 to 2013 in the Lagos metropolis is very wide. In 2007, the MSW generated was 8,287,126.5 tons, but 2,222,745.50 tons was collected, leaving 6,064,381 tons. In 2008, 2,814,543.45 tons was collected and deposited at 6 landfill sites out of 8,552,304.5 tons; while 5,737,761.05 tons was not collected. However, 2009 recorded the highest volume of 3,831,708.00 tons collection and the least volume of 7,299,465.6 tons uncollected MSW. The story in 2010 was similar to 2007 and 2008, as only 25.8% of the municipal solid waste generated was deposited at landfill sites, leaving behind 74.2%. The situation of municipal solid waste collection in 2011 was the worst because only 17.6% (the least in seven years) of the municipal solid waste generated was collected; leaving 82.4% uncollected. However there was improvement in 2012, with a record of 32.6% collection out of 12,610,874.9 tons. The year 2013 witnessed another poor performance, as the percentage of the collected municipal solid waste declined to 25.6%, leaving 74.4% uncollected. In
2014, it was a worst and sorry year for solid waste collection. However, from 2015 to 2017, there has been significant improvement but not up to expectation, as in 2017 up to 50% of solid waste generated in Lagos metropolis still remained uncollected. In Onitsha, a city in southeast of the country, reverse was the case compared to the scenario in Lagos, while in Lagos the old heaps of uncollected solid waste were gradually disappearing, in Onitsha, on the contrary, new heaps of solid waste are emerging in the city. In 1997 less than 5% of the solid waste was uncollected. In years 2000 to 2005 the volume of the uncollected grew from 9% to 12% respectively, by 2015, the Anambra State Environmental Protection Agency reported that up to 23% of the solid waste generated in Onitsha remained uncollected. Bogoro, (2014) discovered that in Bauchi metropolis only Bauchi State Environmental Protection Agency (BASEPA) is responsible for evacuation of solid waste. In assessing the performance of the agency, it was found that Bauchi metropolis with a population of 318 038 households generate 286 234.34kg (286metric tonnes) daily. BASEPA on the average collects 35 trips of tipper trucks with capacity of 5 274.10kg (5 metric tonnes), totaling, 35 x 5 274.10 = 184 593.39kg (62.41%). On daily basis, the quantity of uncollected solid waste is 111 181.95kg (37.59%). Annually, about 405 81412.0kg (40 581 metric tonnes) of the total waste generated remained uncollected. Adegoke (1990), in analyzing municipal waste in Kano, revealed that more than two-third (66.25) of the residents in Kano metropolis do not use authorized dumpsite for their waste.

Table 3 Disposal methods by residents

<table>
<thead>
<tr>
<th>Place</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMASAB bin</td>
<td>3.75</td>
</tr>
<tr>
<td>Authorized dump site</td>
<td>16.25</td>
</tr>
<tr>
<td>Unauthorized empty plot</td>
<td>66.25</td>
</tr>
<tr>
<td>Burning</td>
<td>3.75</td>
</tr>
<tr>
<td>Personal bin</td>
<td>13.25</td>
</tr>
</tbody>
</table>

Source: Fieldwork 2007

Even where these are available REMESAB bins, the waste are thrown in a more or less uncontrolled manner and the file of waste does not allow free access to waste points and often produce unpleasant and hazardous smoke from slow burning fires. The present disposal situation is expected to
deteriorate even more with rapid urbanization, as settlements and housing continue to encircle the existing dump and the environmental degradation associated with these dumps directly affect the population.

The implications of roadside s and open dumping are varied and are being creating serious problems. In the case of solid waste evacuation of solid waste dumped on roadside, heavy solid waste collection vehicles in Bauchi regularly create serious traffic congestion and hold-up along many busy streets in the city like Nasarawa street, wunti street and ran road between the hours of 08:00 to 10:00. Onyelowe, (2017) observed that in Umahia city, solid waste dump on the roadside tend to reduce the road capacity as shown below thereby causing traffic congestion and accident.

Plate 1 on the Street Waste Disposal in Port Harcourt

It is ironical, that Port Harcourt, which used to be known as the ‘Garden City of Nigeria’ because of her neatness is now overwhelmed by the presence of MSW, which is disposed indiscriminately in the streets and disused, borrow pits, which are now referred to as waste dumps. According to Uwaegbulam 2004, the presence of piles of refuse dotting the entire city may have now turned Port Harcourt rather a “garbage city”. Wastes have been indiscriminately dumped in the city especially at street corners and gutters, which have resulted in the blockage of gutters and also obstructing traffic. In port harcourt, ------- had reported that the major effects of poor solid waste management in Port-Harcourt especially roadside dumping of solid waste include traffic congestion, soil pollution, air pollution, health problems,
unaesthetic dump sites and loss of community pride. In the study of solid waste management in Sango Ota urban area, Ogun State, Ojo et al (2017) concluded that open burning of solid waste by the roadside especially along leeward side of the wind has serious negative effect on traffic. It lead to poor visibility on the highway and eventual accident due to frequent smoke emanating from the burning site because it is close to the main road.

Secondly, Blockages in drainages and flooding: Achalu and Achalu (2004) discovered that indiscriminate dumping of refuse hinders free flow of erosion and floods when it rains causing blockage of drainages, diversion of flood to various places like living houses, farm lands leading to overflooding, which results in destruction of lives and properties. Refuse dump along streams and river courses cause flooding which can result in natural disasters. It can also result in outbreak of diseases and plagues. Many people were killed due to flood in the Northern and Easter parts of Nigeria in 2012 and many properties were lost to flood including farm lands, schools and industries, leading to famine and draught.

The blockage of the drainages by solid waste especially non-biodegradable materials such as plastics and polythene materials lead to a situation where stagnant water bodies and un-cleared drainage/gutters overflow right in front of living quarters and major highways. The blockage of drainages by debris moved from refuse dumps by runoff during storm is the major cause of flood in most cities. Toyobo et al (2013) observed that empty sachet water disposed in gutters caused blockage of drainages which constitute to the level of flood during heavy downpour, and this is the characteristics feature of Abuja-Keffi Expressway especially around the Mararaba area and before the Bridge at One-man village in Bauchi. Bogoro (2014) reported that during rainy seasons year after year, there have been constant reported cases of road flooding along Kobi street, Wunti market roundabout, Dass road, etc, due to the blockage of the drainage channels owing to indiscriminate dumping of solid waste in to the drainage channels.
Excessive rainfall and blockage of drainage channels by municipal solid waste caused flooding in 126 (60%) streets. The points where MSW blocked drainage channels were either where two or more drainages crossed or at points of discharge into canals/lagoons. A total of 222 points were recorded. The LGAs with the highest concentration of blockage points were Shomolu (36), followed by Lagos Island (20). Apapa, Lagos Mainland and Surulere had 19 points each; while Kosofe had 18 points. Ajeromi-Ifelodun had 17. Alimosho and Mushin had 13 points each; Agege 12; Ojo had 9, Eti-Osa had 8; Oshodi-Isolo had 7; Ifako-Ijaiye had 6; while Amuwo-Odofin and Ikeja had the least points of 3. Ajeromi-Ifelodun LGA, which was flooded owing to blockage by solid waste. The names of the 126 streets along which municipal solid waste blocked drainage channels in metropolitan Lagos

Thirdly, illegally burned items such as garbage, plastic, shingles, tires, or construction/demolition waste release a myriad of pollutants into the air which not only look and smell bad, but also irritate the respiratory system, cause difficulty breathing, and can trigger asthma attacks. Air pollution is a major threat to human health and environment, especially pollution from unscientific disposal sites creates acute health problems to the surroundings habitants. The continuous inhalation of particulate matters consists of dust, fumes, mist and smoke cause lung damage and respiratory problems. In this
study, the concentration of pollutants like SPM, RSPM, SO2, NOx and CO was carried out in four selected sites around in some cities. At elevated levels, all the air pollutants will have adverse effects on human and environment. The accumulation of pollutants in the human body through inhalation of air is an important route [9]. The results of the present study revealed higher levels of SPM and RSPM. The dust released from various sources can produce a spectrum of diseases ranging from a simple cold to deadly diseases like cancer as reported by Bency et al 2003. The higher concentration of particulate matter causes acute and chronic respiratory disorders and lung damage in humans (Nwankwo, 1989). Population residing in the vicinity of polluted region by high suspended particulate matter was reported to have a higher risk of cardiovascular diseases.(Longe and. Balogun 2010, Myer and Davidson 2000). The high amount of RSPM are either in polluted or moderately polluted category and might be due to the harmful effect of the RSPM dwelling in the area.( Akintola, 2011,Asomani.et al 2007).

Environmental hazards/degradation: Moronkola (2003) claimed that indiscriminate dumping of refuse will give rise to offensive odour which is a source of nuisance to human existence as excessive intake of this polluted air can lead to choking of the lungs and breathing difficulty. People who are asthmatic patients can also react to the offensive odour by suffering from asthmatic attacks; death can also result if any of the breathing problems is not promptly managed. Accumulated refuse gives rise to noxious and offensive odour as a result of Ammonia (NH3), Hydrogen Sulphide (H2S), and amines that are produced when organic wastes are decompose Subramani2017,as a highly contaminated solution, open dump leachate comprises both organic and inorganic components that originate directly from deposited solid waste materials. It is known generally to contain significantly more contaminant loads than raw sewage or many industrial wastes. The relative quality of leachate varies widely depending on a series of complex but interrelated factors.It is a cause for concern that, despite the advances in waste management technology in terms of managing leachate generation and migration [that exist mostly in the more Nigerian cities, leachate often moves out of roadside open dumps areas and percolates to the groundwater aquifer or overflows to the vicinity of the disposal sites in many parts of the world.Many studies have confirmed that the concentrations of heavy metals in leachates are usually very low. However, they may
constitute a significant environmental threat, even when very low concentrations (μg/l) are leached into surface water or groundwater resources. Although their relative abundance in leachate also differs between different open dump sites, the typically reported heavy metals in leachates include: Cd, Pb, Zn, Ni, Cr, and Cu.

Breeding of arthropod borne diseases: Indiscriminate dumping of refuse promote the prolific breeding of arthropod -borne diseases like mosquitoes, houseflies, lice, tsetse flies, cockroaches which transmit diseases like malaria, viral encephalitis, typhoid, paratyphoid fever, diarrhea, dysentery, cholera, gastro-enteritis, amoebiasis, conjunctivitis, sleeping sickness, relapsing fever, scabies, filariasis, enteric pathogens etc. (Park 2007)

Many cities face serious health risk due to uncollected municipal refuse on street. Beside, open incineration of refuse is the most common method of refuse disposal with an unwelcome effect of air pollutions which causes and aggraves acute respiratory diseases. In addition, waste dumps are easily swept into streams and rivers by surface run-off which may contaminate drinking water to people downstream, or when they are blown by wind on open food sold on our streets and market can pose health hazard. Mshelia, (2016). In Kano metropolis, like most cities in the Nigeria, several tones of municipal solid waste is left uncollected on the streets each day, clogging drains, creating breeding ground for vectors and spreading diseases and creating a myriad of related health and infrastructural problems. A substantial part of the urban residents in the old Kano city and suburban informal settlements of Kano metropolis have little or no access to solid waste collection services butu, (2014)In Bauchi, in 2007 an outbreak of cholera was reported in Mallam Goje (Dawaki ward). Investigation revealed that it was as a result drinking well water that was polluted by the heap of refuse close to the well  Bogoro (2014)Farouk (1987) and Olofin (1991) traced the pollution of ground and stream water in Kano and Owerri to refuse dumpsites.

Discourages Tourism and other Business. The unpleasant odor and unattractive appearance of piles of uncollected solid waste along streets and in fields, forests and other natural areas can discourage tourism and the establishment and/or maintenance of businesses. On the southern end of Wunti market in Bauchi metropolis, there stands a mountain of solid waste that always shortly re-appear after it has being cleared. Traders deserted shops near the refuse dump because of poor patronage by customers who
repelled by the bad odor emanating from the dump and the dump when fully grown always block the road in southern part of the market. The value of property obviously diminishes if it is littered by roadside dumping. Besides, lands or places that have been turned into illegal dumpsites can serve as magnets for other criminal activities. The dirt and smell can also makes such areas unsightly which impacts on tourism, especially if the dumping is done in beside the road. The materials contain toxic substances, sharp objects, white goods, nappies, contaminated medical waste, asbestos and tyres just to mention a few. These materials pose serious health and safety risks to children who may pick, eat or play with them. Children may also suffocate in refrigerators that still have doors. The tyres can offer breeding ground for mosquitoes, contaminated medical waste can spread disease, and the sharp objects can physically harm people.

So many factors have been responsible for the indiscriminate open disposal. It has earlier been observed that many cities in Nigeria, as in other developing countries, have being growing at a very rapid rate, Nigeria’s urbanization rate is as high as 5%, without commensurable growth in the rate at which social services and sanitation infrastructural amenities are provided. The result has been a gradual decline in the quality of the urban environment and in the quality of life. The observation of these proponents of environmental sanitation leads to only one conclusion – that rapid urbanization has resulted in inadequate responses to the dumping of refuse along city streets, in burrows or erosion impacted terrains, and river beds or flood basins. These features of indiscriminate waste dumping reduce invariably the capacity of the rivers and rivulets to dispose storm runoffs along their drainage channels. A confirmed study done by Abumere et al.(1983) looked at the magnitude of solid waste generated annually in Nigeria and blamed the net effect on the oil boom recorded since 1970. He averred that there has to be a link between solid wastes generation and the rapid rise or rate of population growth in our cities. In the study, the fear of a lack of strategic measures for solid waste management would ensure that the level of wastes generation could use up to 50 million tons by year 2010. The United Nations study (1991) raised an alarm over the susceptibility of urban social services delivery, particularly access to water, to the domestic and industrial pollutants. Similar concerns over water pollution

Every household is supposed to have a container for temporary storage of the solid waste generated in the house, but about 10% do not have containers...
for temporary storage of waste generated in their households. Distance has a major factor causing roadside dumping. A resident, Mrs Joyce Ugwu, told The Guardian that some of the dumpsites are very far from the residents, stressing that the development has given rise to people dumping refuse indiscriminately on the roads and in some open spaces. Bogoro (2014), also revealed that in Bauchi distances to collection centres can cause indiscriminate waste disposal. Community collection centre system is the method of collection system used in Bauchi metropolis. Distance of collection centres to the households is vital in encouraging the effective usage of the collection centres. 38.70% traveled with their refuse between 100 to 500 meters to the nearest collection centre and 31.9% had to go as far as over 0.5km to dump their refuse.

Table 4 Distance to collection centres.

<table>
<thead>
<tr>
<th>Distance (metres)</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 100</td>
<td>467</td>
<td>29.40</td>
</tr>
<tr>
<td>101-500</td>
<td>614</td>
<td>38.70</td>
</tr>
<tr>
<td>501 and above</td>
<td>506</td>
<td>31.90</td>
</tr>
<tr>
<td>Total</td>
<td>1587</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Collection centres are found to be inadequate and therefore far away. In addition to long distance, the collection centres are not fairly distributed. Collection centres as community facilities, they should be in close and accessible locations. Long distance and inaccessibility may lead to emergence of illegal dump site or conversion of drainage channels, road sides and uncompleted buildings to dump site.

One of the major factors responsible for the illegal roadside disposal of solid waste is the weak enforcement of environmental sanitation law that forbids indiscriminate disposal of solid ware on the roadside. The relevant regulating bodies against illegal roadside dumping has failed to enforce penalties and fines to discourage the habit as well as licensing and charge rates acts for dumping services.

**Conclusion and Recommendation**

Since it has been observed by many research findings that while cities in Nigeria have been growing at a very rapid rate, there has been no commensurable growth in the rate at which social services and
infrastructural amenities are provided. The result has been a gradual decline in the quality of the environment and in the quality of life, it is therefore recommended that the pattern, trend and characteristics of urbanization in Nigeria should formulate and adopt strong policy measures aimed at stemming the growth of the cities; controlling the rate of rural-urban migration and improving the quality of life in both urban and rural areas. A high level of awareness and education on sanitation, environmental health matters and benefits of proper waste disposal should be created to the entire public so that they can appreciate the need for a clean living environment and actively participate in keeping the urban roads and drainages clean. Urban radio houses, Television stations and the FM Station should transmit programmes organised by the agency on environmental health, highlighting on the roles of individual and at community level in locallanguages of the community with emphasis on the importance of clean environment. Posters and handbills should also be printed to create more awareness.

It is therefore recommended that segregation at source should be practiced. The exercise should be carried out in three stages as follows: The first stage should be the separation of toxic waste from non-toxic waste. The toxic waste like batteries, chemicals, paints and others should be carefully be separated from other wastes and stored in a covered storage facility and kept out of reach of children. At the second stage, the non-toxic waste which contain recyclable and non-recyclable materials should also be sorted into two groups. The non-recyclable materials which comprises of ash, garbage, food scrubs and other biodegradable materials should be taken to communal collection centers for onward evacuation to disposal site. The final stage should be the separation of the recyclable materials into metallic and aluminiums materials in one container and polythene and plastics on the other container. Three temporary storage containers of different sizes and colours that can contain all the solid waste that can be generated in a week, at household level; one with cover for toxic waste, one for metals and aluminiums and the other for plastics and polythene should be kept at the household level. This will reduce the quantity of solid waste dumped on the urban roads by 50%

The urban management authorities may mobilize NGO’s or co-operatives to take up the work of organizing street scavengers and convert them to door-step “waste collectors” by motivating them to stop picking up soiled and contaminated solid waste from the streets, bins or disposal sites and instead...
improve their lot by collecting recyclable clean material from the doorstep on daily basis. The urban management authorities may, considering the important role of scavengers in reducing the waste and the cost to the local body in transportation of such waste, even consider extending financial help to NGO’s and co-operatives in providing some tools and equipment to the rag pickers for efficient performance of their work in the informal sector. They may actively associate resident associations, trade & industry associations, CBO’s and NGO’s in creating awareness among the people to segregate recyclable material at source and hand it over to a designated identified waste collector. The urban management authorities may give priority to the source segregation of recyclable waste by shops and establishments and later concentrate on segregation at the household level. The upgraded scavengers on becoming door-step waste-collectors may be given an identity card by the NGO’s organizing them so that they may have acceptability in society. They may notify such an arrangement made by the NGO’s and advise the people to cooperate. This arrangement could be made on “no payment on either side basis” or people may negotiate payment to such waste collectors for the doorstep service provided to sustain their efforts.

There should be an ecological legislation on Solid Waste Management to be enacted largely in response to the growing and emerging heaps of solid waste on the urban land and scarcity of disposal sites, particularly in in the high density areas. The law should emphasize on solid waste avoidance and volume reduction through source reduction and waste minimization measures, with the protection of public health and the environment as the primary goal. The already existing law on monthly sanitation, which is observed on every last Saturday of the month, should be maintained right at the household level to the entire metropolitan area. Law enforcement and prosecution is fundamental in stopping illegal dumping. Instead of spending millions of cash cleaning up roadside dumped materials, a special taskforce of police can be employed to watch over sites where illegal dumping frequently occurs. Witness reports from volunteers or people on illegal dumping must equally be taken seriously and the reported persons subjected to prosecution. It is a preventive effort that can work over the long-term to thwart the activity. Cities and administrative districts must therefore enforce stricter illegal dumping laws by clearly outlining the penalties and consequences if caught to stress the gravity of the activity.
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ADEQUACY OF BUILDING FACILITIES AND LOCATIONAL ATTRIBUTES AS DETERMINANT FACTORS FOR RESIDENTIAL HOUSE RENTAL VALUES IN MINNA METROPOLIS, NIGERIA

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Abstract:
Determination of residential house rental values in recent times has become a global phenomenon. This trend continues to put a challenge to Real Estate practitioners. This study aims at examining the impact of adequacy of building facilities and locational attributes as it affect residential house rental values in Minna metropolis, Nigeria. Standard multiple regression technique was employed in estimating the degree of the impact of the adequacy of building facilities and locational attributes on house rental value in both the high density, medium density and low density residential neighborhoods of Minna metropolis. Data on building facilities and locational attributes as well as data on rental values of residential houses in the category of 1-bedroom, 2-bedroom and 3-bedroom apartments were obtained from the field survey conducted in Kpakungu, Tudun Fulani and London Street representing high density, medium density and low density residential neighborhoods of the metropolis respectively. The results from the analysis revealed that the adequacy of building facilities and locational attributes are strong determinants of residential house rental value in the metropolis. The study’s findings will be useful to real estate practitioners and all relevant stakeholders in real estate investment and marketing.

Keywords: Building facilities, locational attributes, house, multiple regression, rental values.

Introduction
Housing is an essential ingredient that stimulates national development as well as socio-cultural and economic growth of human society. Housing is globally accepted as second most important human need after food and is considered as one of the most valuable economic asset of every nation (jioboye, 2013). According to Shinnic (1997), housing is a complex goods
which comprises of many attributes including the structure which also comprises all the physical characteristics of the dwelling, accessibility and facilities that constitute a bundle of services related to housing.

Although the study of structural and locational attributes as it affects residential house prices have gained increasing attention globally in recent times, it is however noted that only very few studies were conducted in the area of adequacy of building facilities and the influence of locational attributes in Nigeria and particularly in Minna the current area under study. Many of the foreign studies though examined the impact of locational and dwelling attributes however, gave less priority to measuring the impact of adequacy of the building facilities on rental values (Semaro & Fregonara, 2013; Barghava, 2013; Keskin, 2008; Fernandez et al., 2011; Ivy & Ernest, 2013). Few studies conducted in Nigeria dwelled more on the general structural characteristics without directly measuring the impact of adequacy of building facilities and also with less regard to the impact of residential location (Babawale et al., 2010; Oluseyi, 2014). Unfortunately, no such related study was found in the current area under study, as all the related studies found in Nigeria were carried out in a different geographical regions of the country other than in the area currently being examined. Thus, the impact of adequacy of building facilities and locational attributes on rental values of residential properties remains unexplained.

Lack of research on the impact of adequacy of building facilities and locational attributes on rental values of residential properties in Minna metropolis is unfortunate and regrettable because the research on the issues is very important as it will guide the estate surveyors and valuers in determining appropriate rental prices for all categories of residential accommodations across the various residential location in the metropolis. This study attempted to contribute to the knowledge base by exploring the impact of adequacy of building facilities and locational attributes on rental values of residential properties. The study measures the direct impact of the above attributes on the determination of rental values of residential properties in Minna, Nigeria.

The rest part of this study is structured as follows. Section 2 review of previous literature on the impact of structural and locational attributes on housing price. The study methodology was discussed in Section 3. The analysis of data was highlighted in Section 4 while presentation and
discussion of results was covered in Section 5. The last section of the study concludes the paper.

Related Studies on Structural Attributes

Semararo & Fregonara (2013) examined the impact of house characteristics on the bargaining outcome in Italy. The purpose of the study was to investigate the influence of each house characteristics on selling prices of a house in Italian real estate market. The econometric model which includes the hedonic regression technique and a measure of association known as proportional reduction in variance (PRV) measure was employed as a statistical tool for analysis of the data. The result revealed that structural characteristics such as number of rooms and bathrooms show negligible contributions not only to the bargaining outcome but also to the unit rental and sale prices.

Bhargava (2013) conducted a study on the determinant of property value in Jaipur city, India. The purpose of the study was to identify the various factors that influence property values in a city with a view of understanding the mutual relationship between the factors. Hedonic pricing model using correlations and Stepwise regression analysis was used as analytical tools. Findings from the study indicated that factors such as plot size; size of the house and built up area influences housing prices the most. Number of living room, bedroom, bathroom, garage and availability of other facilities like garden and pools follow the former.

The study of Babawale, Koeosho & Otegbulu (2010) employed the hedonic housing prices technique to determine rental prices of residential properties in Ikeja area of Lagos state, Nigeria. The result from the study indicated that number of bedrooms, condition of house, and availability of pipe borne water, number of toilets and bathrooms, and the average size of bedrooms as major determinants of rental values of residential properties in the area.

The study of Oluseyi (2014) also examined the critical factors that influence rental values of residential properties in Ibadan Metropolis, Nigeria. The results from the findings indicated that various factors have an influence on rental prices of residential properties at various density areas of the metropolis. However, dwelling attributes such as number of bathrooms and living rooms were found to be major determinants of house rental values for tenement buildings in Ibadan metropolis.
The study of Hurtubia et al. (2010) showed that in western countries the numbers of bedrooms, living rooms and bathrooms in a house are very important structural characteristics that are majorly considered by households in making home-ownership decisions. Keskin (2008) investigated the factors that affect housing prices in Istanbul, Turkey. The study adopted the log functional form of the hedonic housing prices technique in examining the determinants of housing prices on the basis of structural attributes, socio-economic characteristics, property location attributes and the neighborhood quality. Findings from the study indicated that factors such as the size of living rooms, inhabitant duration in the city, neighborhood satisfaction and time spent to place of employment and schools were found to have significant impact on house prices.

**Related Studies on Locational Attributes**

Many researchers on the study of housing attributes and housing prices examined and analyzed the impact of the locational attributes on house prices. Aluko (2011) for instance, investigated the influence of location and neighborhood attributes on housing prices in Lagos Metropolis, Nigeria. The focus of the study was the analysis and determination of the relative role of house location and neighborhood attributes on residential property prices. The results of the findings revealed that location and neighborhood attributes are major factors that influence house prices more especially when small geographical housing units are examined. Fernandez et al. (2011) also conducted a study on the effect of locational factors on house prices by employing Artificial Neural Network model (ANN) as technique for data analysis. The aim of the study was to investigate the extent to which attributes of house location and environmental factors influences house prices. The result suggested that house location has a significant influence on house choice and as such significantly affect house prices. Ivy & Ernest (2013) also study the impact of location and structural attributes of residential properties on house rental values in Accra Metropolitan area of Ghana. The results from the findings of the study revealed that the impact of house location on rental values is statistically significant.

**Methodology**

Quantitative research approach with post positivism philosophical worldview was adopted. Post positivist worldview according to Creswell
(2014) holds a deterministic belief in which causes determine the outcome or effects. This implies that post positivist study problems that reflect the need to examine and evaluate the causes that influence outcomes. A survey research which according to Fowler (2009) provides a quantitative or numeric description of trends, attitude or opinion of population by studying a sample of that population was also employed in obtaining the study data. Three hundred and eighty five (385) structured questionnaires with closed ended questions were administered to the sampled population out of which 337 were returned with 312 considered valid for analysis. The sample size that was adopted for this study was determined based on a set of criteria’s for appropriate sample size adoption highlighted by Glenn (2013). The criteria’s aside from purpose of the study and size of population include:

i. The level of precision  
ii. The level of confidence or risk and  
iii. Degree of variability in the attributes being measured.

The simplified formula for proportions developed by Yamane (1967 in Glenn, 2013) based on the above set of criteria’s provides a guide for arriving at a minimum sample size of 296 households from the total population of 1142 households across three residential location was adopted. Additional 89 households representing 30% of the determined sample size was added to the minimum sample size of 296 thereby making a total number of 385 sample questionnaires distributed for the study. The rationale for the additional number was to take care of the possibility of questionnaires that may not be returned (Glenn, 2013).

Direct observation was also made in order to get a good picture of the structural and locational characteristics of the study area. In line with the research objectives, research questions and the research hypothesis, data on annual rental values of houses in the category of 1, 2 and 3 bedroom apartment, adequacy of building facilities and the attributes of the residential location were obtained from the field survey and observation. The target population for the study was sampled using appropriate sampling techniques and, generalization of the entire population was done in the sampled population. The questionnaire survey was a cross – sectional type with data collected only once throughout the period of the study. Finally the data obtained for the study were however analyzed using Standard multiple regression technique through the help of Statistical Package for Social
Sciences (SPSS) software. The SPSS helped in facilitating data clearing and checking of logical inconsistencies.

**Data Analysis**

**Data Normality Test**

Pallant (2011) recommended that the normality of the data should be examined after the cleaning and screening process of the data is done. This process is normally done before further analysis of the data using descriptive statistics of Skewness and Kurtosis. A careful examination of the study data from the descriptive statistics tables revealed that the data were normally distributed. The values of Skewness and Kurtosis for the entire items are within the range of -1.0 and +1.0. Although very few cases were observed to be slightly above the values of -1.0 and +1.0, the cases were however less than the recommended threshold values of -2.0 and +2.0, thus indicating that they are within range. The general statistical measures for Skewness and Kurtosis, ranges from -3.0 and +3.0 (Tabachnick & Fidell, 2007; Pallant, 2011 and Zainudin, 2012). Pallant (2011) however, recommended the values of -2.0 and 2.0 for measures of Skewness and Kurtosis.

Table 1 below present the descriptive statistics for items on adequacy of building facilities construct.

**Table 1: Descriptive statistics for adequacy of building facilities**

<table>
<thead>
<tr>
<th>Items</th>
<th>No. of sample</th>
<th>Min. score</th>
<th>Max. score</th>
<th>Sum</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABF1</td>
<td>312</td>
<td>2</td>
<td>5</td>
<td>1125</td>
<td>3.61</td>
<td>.912</td>
<td>.068</td>
<td>-.869</td>
</tr>
<tr>
<td>ABF2</td>
<td>312</td>
<td>2</td>
<td>5</td>
<td>1102</td>
<td>3.53</td>
<td>.952</td>
<td>.065</td>
<td>-.929</td>
</tr>
<tr>
<td>ABF3</td>
<td>312</td>
<td>1</td>
<td>5</td>
<td>1119</td>
<td>3.59</td>
<td>.896</td>
<td>-.114</td>
<td>-.486</td>
</tr>
<tr>
<td>ABF4</td>
<td>312</td>
<td>2</td>
<td>5</td>
<td>1173</td>
<td>3.76</td>
<td>.920</td>
<td>-.129</td>
<td>-.925</td>
</tr>
<tr>
<td>ABF5</td>
<td>312</td>
<td>2</td>
<td>5</td>
<td>1172</td>
<td>3.76</td>
<td>.821</td>
<td>-.119</td>
<td>-.598</td>
</tr>
</tbody>
</table>

Source: SPSS Version 22 (2018)

Table 1 above presents the descriptive scores for each of the items based on the responses from 312 respondents. Similarly, the table presented the standard error, standard deviation and the statistical measures of Skewness and Kurtosis for each item in the construct. From the above table, the
measure of Skewness and Kurtosis ranges between -0.114 and 0.068 and the measure of Kurtosis ranges between -0.486 and -0.929. Thus, with the Skewness and Kurtosis statistics in the above table showing values less than -1.0 and 1.0, it is therefore concluded that the distribution of the data does not depart from normality.

Table 2 below shows the descriptive statistics for items on locational attributes construct.

<table>
<thead>
<tr>
<th>Items</th>
<th>No. of sample</th>
<th>Min. score</th>
<th>Max. score</th>
<th>Sum</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA1</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>713</td>
<td>2.29</td>
<td>.387</td>
<td>-1.075</td>
<td></td>
</tr>
<tr>
<td>LA2</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>665</td>
<td>2.13</td>
<td>.537</td>
<td>-.913</td>
<td></td>
</tr>
<tr>
<td>LA3</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>681</td>
<td>2.18</td>
<td>.505</td>
<td>-.961</td>
<td></td>
</tr>
<tr>
<td>LA4</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>646</td>
<td>2.07</td>
<td>.567</td>
<td>-.680</td>
<td></td>
</tr>
<tr>
<td>LA5</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>739</td>
<td>2.37</td>
<td>.311</td>
<td>-.883</td>
<td></td>
</tr>
<tr>
<td>LA6</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>736</td>
<td>2.36</td>
<td>.318</td>
<td>-.851</td>
<td></td>
</tr>
<tr>
<td>LA7</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>748</td>
<td>2.40</td>
<td>.303</td>
<td>-.879</td>
<td></td>
</tr>
<tr>
<td>LA8</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>627</td>
<td>2.01</td>
<td>.766</td>
<td>-.600</td>
<td></td>
</tr>
<tr>
<td>LA9</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>701</td>
<td>2.25</td>
<td>.435</td>
<td>-.986</td>
<td></td>
</tr>
<tr>
<td>LA10</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>738</td>
<td>2.37</td>
<td>.314</td>
<td>-1.011</td>
<td></td>
</tr>
<tr>
<td>LA11</td>
<td>312</td>
<td>1</td>
<td>4</td>
<td>732</td>
<td>2.35</td>
<td>.312</td>
<td>-1.035</td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS Version 22 (2018)

Table 4.2 above shows the descriptive scores for each of the items based on the responses from 312 respondents. Similarly, the table presented the standard error, standard deviation and the statistical measures of Skewness and Kurtosis for each item in the construct. From the above table, the measure of Skewness and Kurtosis ranges between 0.303 and 0.766 while the measure of Kurtosis ranges between -0.600 and -0.986. However, three items from the table 4.16 above, have recorded Kurtosis value of -1.011, -1.035 and -1.075. These items are LA10, LA11 and LA1 respectively. Pallant (2011) however, recommended the values of -2.0 and 2.0 for measures of Skewness and Kurtosis. Thus the cases with Kurtosis values above 1.0 as shown in the above table, falls within the recommended values.
of -2.0 and 2.0 respectively. It is therefore concluded that the distribution of the data does not depart from normality.

**Exploratory Factor Analysis**
Exploratory factor analysis for the study construct was undertaken. Both the 5 items of the adequacy of building facilities attributes and the 11 attributes of location were subjected to principal components analysis (PCA) using SPSS version 21. Inspection of the correlation matrix has shown that none of the coefficients in the matrix for both the two constructs was below 0.3, by implication the entire data set for the two constructs have met the required criterion for factor analysis. The Kaiser-Meyer-Olkin (KMO) value for each of the constructs exceeded the recommended value of 0.6 (Kaiser, 1974 in Pallant, 2011) and Bartlett’s test of Sphericity for each of the constructs reached statistical significance (p = 0.000) thus, supporting the factorability of the correlation matrix.

The principal components analysis for each of the construct extracted only one component with Eigen value of 3.792 and 7.619, explaining 75.846% and 69.266% of the variance respectively. An inspection of the scree plots of the two constructs revealed a break after the first component, thus indicating that only one component for each of the constructs was to be retained for further analysis. The results of this analysis support the use of the two scales respectively.

**Reliability Statistics**
To ensure very good internal consistency reliability for the study scales, reliability statistics for the entire study scales was carried out. Cronbach’s alpha coefficient for the adequacy of building facilities construct is 0.920 while for the locational construct is 0.955, thus indicating a strong internal consistency reliability of the measurement items for each of the constructs. According to De Vellis (2012), an ideal Cronbach’s alpha for ascertaining scale reliability of a construct should be above 0.7. The Inter-Item correlation matrixes for each of the constructs are positive and the values of Item-Total Statistics are all above 0.3, indicating that all the items are measuring the same underline characteristics.

**Empirical Results and DISCUSSION**
A Standard Multiple Regression was performed between the annual rental value as the dependent variable and the adequacy of building facilities and attributes of location as the independent variables. The analysis was
performed using SPSS REGRESSION and SPSS EXPLORE for evaluation of assumptions.

Result of the evaluation of assumptions indicated that the data is not skewed. The evaluation result also showed that the data to a large extent are normally distributed, linear and the variance of the residuals about predicted Dependent scores are the same for all the predicted scores except for one case (case number 273 with annual rental score of 5 and residual value of 2.417 with a model predicted value of 2.58). This case was however checked to determine its likely effect on the results for the model as a whole. The value obtained from the Cook’s Distance of the Residual Statistics is 0.032 which is lower than the threshold value of 1.0 as potential problems (Tabachnick & Fidell, 2007). Using p-value less than 0.001 criterions for mahalanobis distance, possible threat of Outliers was checked. The Critical Chi-square value using the number of independent variables as the degree of freedom from the Biometrical table for statisticians extracted and adopted by Pallant (2011) from a table in Tabachnick and Fidell (2007). The Critical value derived from the table for the two numbers of the independent variables for this study was 13.82, and the maximum Mahal Distance in the data file was 6.999, hence suggesting no case of Outliers found. No case of missing data, and no case of Multicollinearity and Singularity was found, N = 312.

The correlations table showed the correlations between the variables; Coefficients table displayed the Unstandardized regression coefficients (B), the Standardized regression coefficients (B), the semipartial (Part) correlations (Sr2), t value, significance value, 95% of confidence limit and Collinearity statistics (Tolerance and VIF). R for regression was significantly different from Zero, F (2, 309) = 153.119, P < 0.001 shown in ANOVA table. From the Model Summary the R square value is at 0.498 and 49.8 percent confidence limits. The adjusted R square value is 0.495 indicating that 49.8% of the variations in annual house rents are attributed to the combined impact of the predictor variables (adequacy of building facilities and locational attributes) adopted for the study. The size and direction of the relationship revealed that annual rental values of residential properties in Minna metropolis are 49.8% influenced by adequacy of building facilities and attributes of property location.

CONCLUSION

From the above study, it is worthy to conclude that the impact of adequacy of building facilities and locational attributes on rental values of residential
properties in the study area cannot be over emphasized. The adequacy of building facilities was measured in relation to the number of toilet, number of bathroom, size of kitchen, living room and bedroom respectively and has contributed very significantly to the prediction of house rental value in the study area. Location of residential property in relation to accessibility to work place, public transportation, proximity to high quality schools, CBD, sporting facilities among others has equally made strong and unique contribution to the prediction of residential property rental values in Minna metropolis.

The findings of the study aside from being a good reference materials to academia’s in the field of real estate management, it will also serves as useful guide to the practicing estate surveyors and valuers, town planners and the government agencies responsible for property rating assessment as well as property owners and users; and other related stakeholders in housing investments and management. Conclusively, the study has contributed significantly to knowledge base as it was able to expose the relationship between adequacy of building facilities and housing price on one hand and attributes of location and house prices on the other hand of residential properties in Minna metropolis.

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THE IMPACT OF TUTOR-STUDENT RELATIONSHIPS ON STUDENT CREATIVE PERFORMANCES IN ARCHITECTURAL DESIGN STUDIO

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ABSTRACT
Interactions between teachers and students are very important at all levels of learning because of the effect these interactions have on the students’ performances. Within the architectural set-up, the design studio is the platform where students spend the highest percentage of their time and it is here that they also engage in intensive one-on-one sessions with their tutors. This paper considers types of tutor profiles most common in architectural studios and how these profiles impact on the tutors relationships with their students as well as on their students’ creativity in the design studio. At the end it has been found that tutors’ profiles and manner of interactions with their students affect their students’ creative performances in both positive and negative ways. For instance, tutors who are assertive and forceful often make their students feel repressed and unable to express themselves freely relate which in turn suppresses the creative abilities of the students. The paper recommends that there be a well-structured educational system set in place so that architectural educators know what is required of them and how to go about fulfilling those requirements.

Keywords: Tutor Profiles, Tutor-student Interactions, Student Creative Performances, Design Studio,

INTRODUCTION
Teachers have always had an influential role to play in the lives of their students. Students spend a considerable amount of their life years within a classroom setting under various forms of teaching and different sets of tutors. It has been estimated that children spend approximately 5-7 hours a day with a teacher for almost 10 months (csun.edu). The same is true for the architecture student. A large percentage of his/her time is spent in the design
studio either working on assigned projects or receiving crits from tutors. Considering the amount of time spent between teacher and students, it is important that there be good interactions between them so that both groups can enjoy the time spent together within the learning environments. Learning environments bring together both students and teachers with various characteristics and temperaments. The temperament of a tutor might directly affect his/her teaching methods and also the way he/she relates with the students. The level and manner of the interactions might also influence the students’ level of performance within the classroom. Hamre & Pianta (2001) assert that students who relate well with their teachers have more confidence in exploring the classroom and school setting both academically and socially, and are better able to tackle academic challenges and work on social-emotional development.

One of the challenges of tutoring within the architectural education framework is that architecture teachers do not receive any formal educational training. A good number are practicing architects who come into the classroom armed only with knowledge gained from practical experiences and with memories of their experiences as students, or with the experiences they accumulate over the years in their teaching profession (Ashkan, 2016). They more or less learn on the job and the quality of their teaching is contingent on their experience, awareness, and talent (Goldschmidt, 2010). For many of them, also, no avenue exists to ascertain whether their teaching methods are actually producing the desired results in their students. This point was emphasized by Anthony (1991) who noted that because faculties do not receive or engage in any formal training in how to practice teaching, they remain unaware of their teaching style, teaching method, and the impact of their educational role on students’ development. The result is that architectural educators go about it in ways which are most convenient and appropriate for them,

STATEMENT OF PROBLEM
Within the design studio, students spend more one-on-one time with their tutors than in any other course. However, instances have shown that relationships are not always positive between students and their tutors. This makes the study of teacher/student relationship in design studio very important seeing that this could have an impact on how students perform ultimately. By understanding different tutor profiles, one will be enabled to
have a better understanding of how and why tutors behave and teach the way they do. It will also hopefully help tutors to make improved efforts at better interactions with their students since the goal of every tutor should be to contribute positively to the academic achievement of their students.

AIM OF THE PAPER
The aim of this review is to examine the relationships between design tutors and students in the studio and the possible effects these relationships have on students ‘creativity. This will be achieved by answering the following questions:
1. What kinds of profiles or teaching styles are most common among tutors of architectural education?
2. Is there any relationship between tutor profiles and mode of interaction with students?
3. Is there any association between student-tutor relationships and students’ creative performances in the design studios?

METHODOLOGY
The methodology used for writing this paper is purely qualitative and is based on literature survey. This involves reviewing related literature from journals, articles, past research works and online sources in order to obtain relevant information about the topic.

LITERATURE REVIEW
A. Architectural Design Studio
The design studio plays a central role in the architectural educational process. Cuff (1991) describes the studio as the most important of the architectural student’s academic educational experience. Within the design studio, students’ creative abilities are explored and developed and it is here that students learn how to cultivate and transform their creative thinking abilities into practical designs. The studio is a good example of situated learning, in which students learn from the situation as well as from working on more specifically content-related activities (Nicol & Pilling, 2000). Due to its importance as the core course in architectural education, design studio naturally takes up a considerable amount of the architecture students’ time. Boyer & Mitgang, (1996) estimate that
architectural students can potentially devote nine-tenths of their time to studio work.

B. Tutoring and the Crit Teaching Method
In architectural education, tutoring can take many different formats. These different formats can be in form of group tutorials, individual tutorials, seminars, work-shops, visits to buildings, and ‘crits’ with invited external practitioners and academics (Webster, 2004).

The crit teaching format can be approached in two ways. The first involves a one on one interactive session between the student and the design tutor during which time the students’ design work is presented to the tutor for his/her assessment, comments and criticisms. This session might occur several times a week for the duration of the study program. Goldschmidt et al (2010), estimate that diligent students who do not miss classes may likely participate in some 250-350 one on one crits within a 5 year degree program. The second approach involves sessions with external jurors who are usually practicing architects or academicians from within or without the institution. Such sessions may take place once or twice within a semester. At these sessions, assessments are made of students’ projects and scores are given by the assessors which usually constitute part of the students’ final grades.

The crit teaching method is such an important and central part of the architectural educational system that it has become the predominant teaching method used in schools of design all over the world. The common assumption is that since it has survived for so long and has produced innumerable architects over the years, it must be the best method for teaching architectural students.

C. Historical Background of the One-on-One Crit Framework
The history of architectural education was one of an apprenticeship system wherein young people interested in becoming designers worked under a master tutor for several years in order to acquire relevant knowledge and skills. Having gained sufficient knowledge and being judged able to stand on their own, they left to begin their own practice. This system formed the basis for the first recognized architectural educational system which was launched in the Ecole des Beaux Arts in France in 1819 and later spread to other European countries and to North America as well. The design studio tradition evolved from this formal educational system and can be dated back to the period 1900-1914. Within the new framework, the master-apprentice system was replaced with the tutor-student system within a university
setting. (Goldschmidt et al 2010; Ashkan, 2016; Eigbeonan, 2013; Ockman, 2012)

TUTORS AND THE DESIGN STUDIO
A. THE ROLE OF TEACHERS IN DESIGN STUDIO
Teaching is a process of transferring knowledge and professional skills from one person to another, in this instance, from teacher to student. The roles played by architectural design teachers cannot be overemphasized. They help students to develop their potentials as well as the imaginative, conceptual and practical skills necessary to identify human needs and to express these in space and form. This is done by offering constructive criticism on the quality of a student’s design ideas and resultant design proposals. The design tutor is also responsible for the assessment and grading of students’ work (Brown & Yates, 2002; Hassanpour et al, 2013; Webster, 2004).

B. DESIGN TUTOR PROFILES/TEACHING STYLES
The teacher, however, is more than just a carrier and imparter of knowledge. He/she is also an individual with a set of characteristics and personality traits which may influence his/her level of interaction with his students and also his/her ability to impart knowledge to the students. This explains why while some tutors have an open door policy with their students, others tend to discourage excessive interactions. Several researchers such as Goldschmidt (2002), Webster (2004) and Ashkan (2016) have revealed several classifications of architectural design tutors based on their temperament profiles and on their manner of interactions with their students. Their findings have been summarized into three tutor profiles. They are:

1.) Instructor as Expert/Master. The tutor is portrayed as an expert or master who possesses knowledge, proficiency and some degree of power. He has a dominant, assertive personality displaying a forceful influence on his students’ and often exerting his influence over their projects. He is the least likely to ‘feel’ the student and may even go to the extent of drawing for the student.

2.) Instructor as Facilitator/Coach. This tutor does not force his opinions, methods or principles on students but rather allows them to set the pace for their own learning process. In this teaching style, students discuss issues and solve problems together in the studio while their instructor acts as an
encourager and guide. With the facilitator style, the needs and goals of the students are the main priority and there is a readiness on the part of the facilitator to search for different ways of helping the student which must not necessarily be through taking instructions from the studio teacher.

3.) Instructor as Entertainer. He is seen by his students as ‘an architectural studio propagandist’ or ‘entertainer’. He promotes design education by relating his own life experiences and making historical references. He does not do much to encourage interaction, understand or connect with his students design ideas. Interaction between the students and their designer in such situations becomes that of ‘keeping the tutor happy so as to get good grades.

STUDENT – TUTOR INTERACTIONS: EFFECT ON STUDENTS’ CREATIVE PERFORMANCES IN THE DESIGN STUDIO
Tutors who view their students as empty containers devoid of their own ideas and who are solely dependent on them for knowledge, may tend to be autocratic and repressive, doing little to encourage individuality or creativity (Sidawi, 2012). The implication of such tutor behavior, however, is that the student may feel repressed and unable to express himself freely. Thus the creative ability of the student might likely be suppressed. Many classrooms lack democracy and students fear their teachers (Sidawi, 2012). Obviously, creativity cannot thrive in an atmosphere of fear and timidity. In an atmosphere of positive interactions between student and tutor however, a student can freely and confidently consult his tutor on any matter relating to his design without fear of being humiliated or of his ideas being dismissed. This is essential for initiating and sustaining creativity. (Johannessen & Olsen (2011); Casakin, 2007).
A study carried out by Lueth (2008) reveals that students desired their tutors to push them and make them feel excited rather than engaging in too much of teaching. The students felt that that would ginger them to respond by producing great works that the tutors could be proud of. The students also indicated some level of frustration with tutors who were not clear in what they wanted thereby making it hard for the students to know whether they were doing the right thing or not.
The process of communication in the design studio however comes with its own unique challenges. Tutors attitudes, behaviors, and ways of instruction have the potential to either hinder or initiate creativity in students. Some of
the behaviors and attitudes of tutors which have the potential to hinder creativity in students include: (1.) lack of clarity and consistency on the part of tutors about their goals or objectives for the studio, (2.) the tendency for tutors to assert their viewpoints and personal feelings into the teaching practice, (3.) tutors having a subjective understanding of creativity (4.) power wielding of the tutor over the student because of his elevated position as ‘master’ (5.) the practice of rewarding students with the best looking projects (Sidawi, 2012).

Table 2: Summary of Tutor – Student Interactions and the Resultant Effect on Students Creativity

<table>
<thead>
<tr>
<th>Tutor Behavior</th>
<th>Student’s Reaction</th>
<th>Effect on Students’ Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Negative Interactions</strong></td>
<td>-Feels repressed and unable to express himself freely</td>
<td>-Leads to suppression of creative ability of students</td>
</tr>
<tr>
<td>-Autocratic and repressive, doing little to encourage individuality or creativity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Power wielding, asserting their viewpoints and personal feelings into the teaching practice.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Lack of democracy/fairness</td>
<td>-Feels repressed and unable to express himself freely</td>
<td>-Leads to suppression of creative ability of students</td>
</tr>
<tr>
<td>-Lack of clarity and consistency about what they want and about their goals or objectives for the studio</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Positive Interactions</strong></td>
<td>-Feels free and confident to consult tutor without feeling humiliated or dismissed</td>
<td>-Creativity is initiated and sustained</td>
</tr>
<tr>
<td>-Positively interacts with students, encourages students to develop their creativity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Pushes student and makes them feel excited</td>
<td>-Gingers positive response in students</td>
<td>-Students respond by trying to produce great works</td>
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</table>

CONCLUSION AND RECOMMENDATIONS

The role of teachers in the life of students is of paramount importance. This study considered the relationship of tutors and students in the design studio
and to ascertain whether this has any effect on students’ creative performances.

The study has been able to identify three basic categories of tutor profiles and to also verify that tutors profiles affect the way tutors relate with their students which ultimately affects students’ creative abilities. For instance, it has been found that the forceful, assertive tutors tend to create fear in their students making it difficult for the students to express themselves freely thereby limiting their creative performances. On the other hand, the ‘entertainer’ tutor does not make any effort to connect with his students or their creative ideas, thus the students often go along with his/her ideas just so they can obtain good grades.

This paper recommends that more attention be given to the teaching of architectural education by having the tutors undergo some form of educational training. This will help them not only to deliver better knowledge to their students but will also help them work towards better interpersonal relationships with their students for improved student creativity. Moyer & Mitgang (1996) have supported this view by stating that improving the quality of professional teaching practice in design studios could help architecture undergraduate students to gain lifelong learning skills to become independent and competent citizens as well as productive architects, and to promote social efficiency.

There is also a need for a well-structured educational system to be set in place so that architectural educators know what is required of them and how to go about fulfilling those requirements. As Goldschmidt et al (2010) have stated ‘feedback to teachers is necessary as part of developing a design teaching pedagogy.’

REFERENCES


GEOIDAL MAPPING AND THREE DIMENSION SURFACE MODELLING USING DUAL FREQUENCY GPS AND PRECISE LEVEL

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ABSTRACT

Dual Frequency Global Positioning System (DGPS) has emerged as a successful technology in providing precise positions of points on the surface of the earth over the reference ellipsoid with sub-metre level of accuracy. DGPS is one of the most frequently used positioning methods in geodesy. The end products of surveying with this receiver gives geodetic latitude (ϕ), geodetic longitude (λ) and ellipsoidal height (h) which are obtained with reference to the ellipsoid. This research involved the determination of Geoidal undulation for the production of Geoidal map of Bauchi metropolis, Bauchi state. DGPS receiver and precise Level instruments were used to obtain ellipsoidal and orthometric heights of the study area. Geoidal heights were derived from the differences between ellipsoidal heights and orthometric heights. The adjusted orthometric heights obtained using precise Level and the ellipsoidal heights which are part of the geodetic/Universal Transverse Mercator (UTM) coordinates obtained using DGPS were post processed using spectrum survey office Software (SSO). The Geoidal map, contour map and three dimensional surface Model (3D) were created using ArcGIS 10.2.1 Software version. The Microsoft Office Excel was used to deduce the ellipsoidal heights and orthometric heights in order to obtain geoidal heights for the production of Geoidal Map of the study Area. The statistical analysis of the result met the precision of second order geodetic control network and levelling specifications. The result of the spearman correlation coefficient computed using geodetic coordinates is 0.054 and the coefficient of determination 0.0029%. The result of the Z test computed (0.125) indicated that the measurements are precise at 95% confidence level. The reliability of the measurements of X and Y second order geodetic coordinates were computed at the scale of 1:5000 and found
reliable at 95% confidence level. The mean value of the geoidal heights determined is 22.680 metre which can be used as the geoid of Bauchi State. The contour map, geoidal and 3D model were produced at the scale of 1:60,000 and the contour lines were interpolated at 0.2 meter contour interval which represented the terrain configuration. Therefore, the results obtained can be used for any work requiring the use of geoidal heights in Nigeria and any part of the world.

**Keywords:** Mapping, Dimension, Surface, Modelling, Frequency, Precise.

**Introduction**

One of the basic goals of geodesy is the determination of the geoid which is the equipotential surface of the earth gravity field that coincides on the average with the mean sea level. The geoid is the surface which coincides with that surface to which the oceans would conform over the entire earth, if free to adjust to the combined effects of the earth's mass attraction (gravitation) and the centrifugal force of the Earth's rotation. Specifically, it is an equipotential surface, meaning that it is a surface on which the gravitational potential energy has the same value everywhere with respect to gravity (Aleem et al., 2013). The geoid surface is irregular, but considerably smoother than earth's physical surface. Sea level, if undisturbed by tides, currents and weather, would assume a surface equal to the geoid (Featherstone 2000). In geodesy, the different reference surfaces for heights determination are the earth surface, the telluroid, the geoid, the quasi-geoid and the ellipsoid. The heights determined with reference to the geoid is regarded as the orthometric height and the heights determined with reference to the ellipsoid is known as the ellipsoidal height. The ellipsoidal heights are geometric values while orthometric heights are physical values reflecting local variations in gravity as well as changes in topography, the conversion from ellipsoidal to orthometric height requires a geoid height model. Geoid comes from the word “geo” which literally means earth-shaped. Geoid is an empirical approximation of the figure of the earth (minus topographic relief). It is defined as the equipotential surface of the earth’s gravity field which best fits, in the least square sense; the mean sea level. On the ocean, the geoid is on average at the same level as mean sea level, the surface obtained by removing from the instantaneous sea surface all periodic and quasi-periodic
variations (tidal phenomena, air pressure, littoral seas, eddies and continual shifting of ocean currents).

Geodesy is concerned with the relative positioning of points and the gravity field of the earth. For geoidal mapping and three dimension (3D) surface modelling, a well defined coordinate system is needed on which measurements are tied to a set of reference points called a geodetic datum (geoid or ellipsoid). A control survey is a means of establishing precise positions of geodetic monuments. There are two types of survey controls. These include horizontal and vertical controls. Horizontal controls are defined with respect to an ellipsoid of revolution whilst vertical controls are defined with reference to a local geoid. Horizontal and vertical terrestrial geodetic control networks are important and valuable for the accurate positioning of construction and engineering projects, they serve as points of reference for correct positioning. Controls are established by classical and modern methods. The classical methods are traversing, triangulation and trilateration while the modern methods include the use of satellite techniques such as the Global Positioning System (GPS), and satellite altimeters. Satellite techniques could be used to establish and densify 3D networks more rapidly, with greater accuracy and less difficulty than terrestrial techniques (Poku and Gunter, 2006). Moreover, the use of classical methods is limited by such requirements as intervisibility between the instrument stations and target stations, favourable weather, atmospheric conditions and accessibility of stations. In addition, the accuracy levels are low. Hence classical geodetic networks established by terrestrial methods are insufficient to contemporary requirements (Heiskanen and Moritz, 1967).

Ellipsoids are reference surfaces usually determined on the physical surface of the earth. The difference in height between the physical surface and the ellipsoid is regarded as the ellipsoidal height while the difference in height between the physical surface and the geoid is called the orthometric height. The difference in height between the geoid and the ellipsoid is regarded as the geoidal height or geoidal undulation. The height anomaly is derived from the difference between the quasi-geoid and the ellipsoid or the physical surface of the earth and the telluroid. The height anomaly is a quantity similar to the geoid height, however is located on the level of the topography not sea level. The surface formed by points which are above the reference ellipsoid (and thus a distance below the topography), is called the telluroid. The surface formed by points which are above the reference ellipsoid which
coincide with the geoid at sea level, if free to adjust to the combined effects of the earth's mass attraction and the centrifugal force of the Earth's rotation is called the quasi-geoid. It lacks any physical meaning; it is not an equipotential surface, although out at sea it coincides with the geoid. Normal heights are very operational. They are always used together with so-called “quasi-geoid” heights (more correctly: height anomalies). Orthometric heights (more precisely: Helmert heights) on the other hand are always used together with geoid heights.

Presently, the most accurate positioning technology is the Global Positioning System (GPS). GPS gives accurately the 3D position of points (ellipsoidal latitudes, longitudes, and heights) and can measure under favourable weather conditions. In addition, it can measure when placed on any platform (static or dynamic). One major advantage of GPS technology over the traditional methods is that inter-visibility is not a requirement. In addition to providing highly accurate data, it is easy to use, portable, less labour intensive, and its surveys are relatively less costly. The coordinates of the GPS are referenced to the World Geodetic System 1984 (WGS 84), a global ellipsoid having its origin closed to the earth centre of the mass, which forms the origin of its coordinate system.

The mapping systems of various countries are based on their local coordinate systems. In the local coordinate systems, horizontal positions are referenced to the local ellipsoids that are defined differently by various countries to fit their topography, and heights are referenced to the local geoid (orthometric height, H). For accurate location and mapping of the natural resources which are sometimes transboundary, there is a need to integrate data obtained in one system into another. A modern height system in a modern survey and mapping communities requires the ability to measure elevations relative to mean sea level easily, accurately, and at the lowest possible cost.

GPS applications range from cadastral surveys to monitoring sea level rise; from navigation and mapping to the use of remote sensing for resource management; from mineral exploration to assessment of potential flooding areas; from the construction and precise positioning of dams and pipelines to the interpretation of seismic disturbances. The height reference system is also implicated in many legal documents related to land management and safety such as easement, flood control, and boundary demarcation (Ayhan et al, 2009). Therefore, based on these information and the needs to support
modern height system, the implementation of Accurate Height System (AMS) in Nigeria particularly in Bauchi metropolis has to be realized. There are a lot of geodetic methods for determining of height or heights differences. These methods are classified as geometric levelling, trigonometric levelling, and GPS/Levelling. Generally, geoid undulation is required for many geodetic and surveying applications. The most notable application is for converting GPS-derived ellipsoidal height to orthometric height for engineering purpose. Classical methods of heights determination is the techniques usually adopted in the study area; hence there is high demand for digital dataset for the production of geoidal map and 3D surface model of the study area. There is a growing use of GPS surveys in Nigeria due to its numerous advantages over classical methods. It applications include land and engineering surveying, GIS and navigation. If GPS data is properly processed and used, GPS can be an effective tool to promote national development as the data can be used for planning of communities, exploration and exploitation of natural resources, correct positioning of engineering and construction works, scientific investigation, enhancement of agricultural productivity and provision of services among other applications of which the study area is not an exception.

A digital terrain model (DTM) is a digital representation of ground surface topography. It represents a very important geospatial data type in the analysis and modelling of different hydrological and ecological phenomenon which are required in preserving our immediate environment. DTMs are used in geographic information systems (GIS) and are the most common basis for digitally produced topographic maps and orthogonal projections of the earth (also called orthophotos). DTMs are particularly relevant for many applications such as lake and water volumes estimation, soil erosion volumes calculations, flood estimate, quantification of earth materials to be moved for channels, roads, dams, embankment etc. They are essential data for planning, decision making, and information gathering and measuring including volume changes. High accuracy DTMs are typical for industries involved in mining, land reclamation or construction activities or government agencies involved in urban and infrastructure planning. The geoidal undulation varies globally between ±110 m, when referred to the GRS 80 ellipsoid. The geoid model will give geoidal undulation at every point of observation and the fundamental relationship, to first approximation, that binds the ellipsoidal heights obtained from GPS
measurements and heights with respect to a vertical (local) datum established from conventional spirit levelling (Heiskanen and Moritz, 1967; Featherstone et al., 1998; Olaleye et al., 2013). Ellipsoidal heights can’t satisfy the aim in practical surveying, engineering or geophysical applications as they have no physical meaning and must be transformed to orthometric heights (H), which are referred to geoid, to serve the geodetic and surveying applications.

According to Raaed (2014), in this study, a proposed computational scheme is applied for the assessment of the orthometric correction for long line trigonometrically levelled height differences. This algorithm is based on the spherical harmonic coefficients of geopotential models and trigonometric elevation data. The applied algorithm does not demand any terrestrial gravity data and is route independent. In particular, two geopotential models with different resolutions were utilized. The results showed a reasonable applicability of the investigated algorithm to compute the orthometric correction for trigonometric levelling. Thus it is recommended to use this approach for computing the orthometric corrections in similar modern heighting applications, such as precise EDM trigonometric height traverses.

Amal (2016) in his work, a large part of Baghdad University campus has been selected. The determination of Geoidal height for the local area requires Ground Control Points which both Ellipsoidal and Orthometric heights are known to compute the difference between them.

This work investigates the use of ellipsoidal heights in place of orthometric heights for engineering surveys. DGPS observations were carried out to obtain the ellipsoidal heights for a number of points in the study area in Port Harcourt, Nigeria. Orthometric heights for the same set of points were determined using geodetic levelling. The results satisfied third order levelling which is good enough for engineering surveys (Badejo, 2016). Heister et al (2012); A multidisciplinary research project to examine hydrology, sedimentology and plant ecology of the wetlands of the Okavango Delta was initiated in 1993. One key research area is the determination of precise orthometric height differences along the Okavango/Jao/Boro river system. Traditional methods (geodetic and trigonometric levelling) to determine orthometric heights within the delta are prevented due to the wide swampy areas. Local geoid models do not have the required accuracy to transfer ellipsoidal heights derived by GPS to orthometric heights. Premission analysis revealed that the determination of a local geoid, derived
by a combination of GPS and levelling determined height differences, is the most suitable approach.

One of the major tasks of geodesy is the determination of geoid. This task is getting more crucial due to the development of global positioning systems (GPS). This is due to the fact that GPS provide ellipsoidal heights instead of orthometric heights. To convert ellipsoidal heights into orthometric heights, precise geoid heights are required. Nowadays, the most effective universal technique used for the determination of orthometric heights is the GPS and Levelling technique. This paper focuses on this technique and multiple regression analysis method was used to further determine the geoid undulations. ArcGIS 9.2 software version was used for generating the grid map of the area using the corrected orthometric heights obtained by the regression method (Edan et al., 2014).

Orthometric is the height preferred by users because of its relationship with Mean Sea Level which approximate the geoid. If the geoid is known, it can be used to produce the geoidal map. Geoidal Maps are essential tool in all spheres of our day-to-day activities most especially in geophysical studies, because they portrayed the geopotential configurations of any given place. However, as important as such maps have the same instrument for geospatial exploration purposes are lacking for many places including part of Mubi north. The aim of the research was to determine the Geoidal Undulation and produce the Geoidal Map of part of Mubi North Local Government Area of Adamawa State, Nigeria. Single Frequency Global Positioning System and Geodetic Level (Wild N3) instruments were used to obtain ellipsoidal and Orthometric heights of the areas. The adjusted Orthometric heights obtained from Geodetic Levelling and the Ellipsoidal heights which are part of the geodetic coordinates obtained from GNSS were post processed using Leica Geo-Office Software. The Geoidal lines and Digital Geoidal Model (DGM) were created using Surfer 7 Software. The Microsoft Office Excel was used to deduce the Ellipsoidal height, Orthometric height and Geoidal Undulations, for production of Geoidal Map of the study Area. The statistical analysis of the result met the Geodetic specifications and therefore can be used for any work required the use of geoidal undulation in the study area (Aleem et al., 2016).

Digital Elevation Model (DEM) represents a very important geospatial data type in the analysis and modelling of different hydrological and ecological phenomenon which are required in preserving our immediate environment.
DEM are typically used to represent terrain relief. DEMs are particularly relevant for many applications such as lake and water volumes estimation, soil erosion volumes calculations, flood estimate, quantification of earth materials to be moved for channels, roads, dams, embankment etc. In this study, three different sources of spatial data in the generation of DEMs (Shuttle Radar Topography Mission SRTM 30, Digitized Topographical map and Google Earth Pro.) were compared with field measured data from Total Station Instrument, the field data were used to generate a Digital Elevation Models DEMs from 495 radial points over the test site. The accuracy of generated DEMs were assessed statistically by comparing (1) estimates of some topographic attributes (slope and aspect), (2) overall spot height estimation performance and, (3) independence of spot estimation errors and the magnitude of field measured height. From the results obtained it was concluded that the DEMs from the satellite imagery (SRTM 30) does not perform well in collecting data for topographic works. The digitized topographic map gives a good result but the variation from the reference in this study may be as a result of human activities and erosion that has occurred from when the topographic map was produced and also the quality of the topographic map. The Google Earth pro was also concluded to perform far better than the SRTM 30 data. Finally, it was recommended that Real Time Kinematic GPS combine with total station can be tested for speed and accuracy and also SRTM data and other global terrain data sources i.e., GTOPO, Microsoft Visual Earth and NASA World Wind can also be examined for suitability of their application over larger assessment area (Olalekan et al., 2011).

In order to obtain geoid heights of unknown points, geoid models are performed by using several techniques such as (Soycan and Soycan, 2003); Inverse Distance Weighting, Nearest Neighbor, Triangulation with Linear Interpolation, Natural Neighbor, Polynomial Regression, Local Polynomial, Radial Basis Function, Modified Shepard’s Method, Minimum Curvature, Moving Average, Biharmonic Spline Interpolation, Kriging.

Spatial interpolation has been applied in many disciplines such as, geodesy, geophysics, civil engineering, water resources, meteorology, mathematics, marine science and agriculture etc. Specific applications under those disciplines are many such as mine exploration, climate change investigation, crustal deformation monitoring, classification of soil properties, population density modelling, digital terrain model (DTM) generation and use,
chemical concentration modelling, soil Ph or moisture estimation and so on (Li and Heap, 2008).

**Statement of Problem**
In engineering works, engineers and surveyors are usually faced with the problem of determination of height differences between points. Some of the challenges are surveying of levelling networks, vertical applications, maintenance and control measurements of big structures like bridges, dams, very tall buildings and towers, determination of crustal movements of the earth and motorways, railways, sewers and pipelines measurement. Instruments used in surveying and measurement methods are determined in relation to topography of land, target precision, and the aim. In this study, accuracies of heights determination techniques were based on the instrument and the measurement methods. Digital technology for the production of geoidal map and three dimensional surface modelling is lacking in the study area. The major concerned is lack of an existing geoidal map and digital 3D surfaces model for geodetic, surveying applications, exploration and exploitation. It is in light of the above that this research was carried out to produce a geoidal and three dimension surface modelling of the study area.

**Aim and Objectives of the Study**
The aim of this thesis is to produce geoidal map and three dimension surfaces modelling using dual frequency GPS and precise level. In order to achieve this aim, the following objectives were followed:

i. Production of three dimensional Surface model of the study area
ii. Production of contour map of the study area
iii. Production of geoidal map of the study area

**Justification of the Study**
Considering the numerous problems of flooding and the need of contour map, geoidal map and 3D surface model use for civil engineering work, environmental monitoring and control, with a comprehensive contour map, geoidal map and 3D surface model of the study area, the environmental monitory agency can easily identify the problematic areas most especially in the raining season in order to provide preventive measures for such occurrences. The products of this research will further be use as tools for
developing the area and assist in controlling future developmental plans in the state and the nation in general.

The roots of underdevelopment of third world countries, such as Nigeria emanated from a number of factors which include poor quality of data collection, organization and management practices; and, lack of adequate knowledge to develop the area and manage the environment in a sustainable manner. The consequences of all these are obvious from air and water pollution, environmental degradation, diseases and death, etc. These are the challenges of surveyors, environmental managers and any other specializations that deal with the management of environment in Bauchi metropolis and Nigeria as a whole. The geoid that was determined will be useful in geophysical exploration and for geodetic application. In general, the information provided will be used in all aspects of physical developments that concern land in the study area. For instance, for planning purposes, construction of civil engineering work, building engineering, design and construction of works, both on the surface and underground. The research can be apply in water/flood volumes estimation, soil erosion volumes estimation, for geophysical exploration of natural resources, geodetic application and scientific investigations.

Scope of the Study
The study area for the geoidal mapping and 3D surface modelling is restricted to Bauchi metropolis in the north east part of Nigeria. The research work involved data acquisition, field observations and reductions of measurement, data downloading, post processing, geo-processing, and compilation of contour map, geoidal map and 3D surface modelling of the study area.

Study Area
Bauchi state was founded by one Yakubu and it later became a state capital in the year 1976. Bauchi state is located between latitudes 09° 30’ and 09° 50’ north of the equator and longitudes 09° 50’ and 10° 20’ east of the Greenwich meridian. The total area of Bauchi state is 49,119 km² (18,965sq mi) with the population density 95/km² (250/sq mi) (National Population Commission of Nigeria, 2006). Bauchi state is bordered by seven states; Kano and Jigawa to the north, Plateau and Taraba to the south, Gombe and Yobe to the east and Kaduna to the west. The map of Nigeria is showed in...
Figure 1.2. Mean daily maximum temperatures range from 29.2°C in July and August to 37.6°C in March and April. The mean daily minimum ranges from about 11.7°C in December and January to about 24.7°C in April and May. The state is drained by several river systems. The dominant one is River Gongola which originates in the Jos Plateau area, southwest of Bauchi State. It traverses, in a southwest-northeast direction through the southern LGAs of the state including Dass, T/Balewa, Bogoro, Bauchi and Kirfi and, thence, to Gombe State. It has numerous headwaters and tributaries within the state. The state comprises several previously independent powerful Emirates, including, for instance, Bauchi, Ningi, Katagum, Dass, and Duguri. The map of Bauchi state is showed in Figure 1.2. The study area is Bauchi metropolis the capital city of Bauchi state of Nigeria. It lies approximately between 09° 40′ E to 09° 45′ E and 09° 55′ N to 10° 15′ N covering an area of 180km² with the population of 493,810 as at 2006 census and still growing, (National Population Commission of Nigeria, 2006).

Methodology
The methodology adopted for acquiring complete datasets for precise representation of complex surfaces is divided into two stages namely: field work and data processing. The former deals with the equipment setup and data collection, while the latter focused on data manipulation and processing. The basic data include Ellipsoidal heights and orthometric heights which were acquired using Dual Frequency Global Positioning System (DGPS) and precise level respectively. Geoidal heights were derived from the observed ellipsoidal heights and orthometric heights. Geoidal heights (Geoid undulation) were computed from the separation of the reference ellipsoid with the geoid surface measured along the ellipsoidal normal. The Geoidal heights were interpolated by gridding using spline method of interpolation in ArcGIS 10.2.1 to produce the three dimensional surface model, Geoidal map and contour map of the study area. Geoidal and contour maps were therefore produced and the results were finally presented and analyzed for further discussion and conclusion.

Equipment Used
The equipments needed for the research work are as follows:
Hardware Used

i. DGPS receiver and its accessories to acquired data for ellipsoidal height

ii. Precise level and its accessories to acquired data for orthometric height

iii. Computer and its accessories for computation, processing and analysis

Software Used

i. ArcGIS 10.2.1 software for interpolation

ii. Microsoft Office excel 2007

iii. Microsoft Office word 2007

iv. Spectrum survey offices (SVO)

Flowchart of Methodology

The flowchart used for data acquisition, field observation, data downloading, post processing, geo-processing, and compilation of contour map, geoidal map and 3D surface model of the study area is presented in Figure 1.0.

![Flowchart of the Thesis Methodology](image-url)

Figure 1.0: Flowchart of the Thesis Methodology (Zakari, 2018)
Reconnaissance
The factors considered in the reconnaissance include the design of the network and techniques adopted for effective execution of the work. In this research study, office and field reconnaissance were carried out. These are explained as follows;

Field Reconnaissance
Field reconnaissance was carried out to locate suitable positions for control establishment. In preliminary survey the existing control points adopted for connection were determined and in-situ was ascertained. The control points/benchmarks observed were established in the study area (good choice of stations marks). Site inspection played a vital role in facilitating the work and ascertaining the methods applied. The problems of intervisibility between the stations were completely avoided in case of precise levelling. The recce diagram of the study area was produced and control in-situ check was adopted on the existing control points used for connection of the DGPS observation to ascertain the quality of the original control used.

Office Reconnaissance
The equipments and the methods adopted were chosen at this stage. Both the DGPS receiver and the precise level were tested on a control points and reference datum respectively, in order to ascertain their accuracy. The coordinates of the control points used for connection, the orthometric heights of the benchmarks and Bauchi State street guide map was collected from Bauchi State Ministry of lands and Housing. Booking sheet was designed and adopted for all field observations and measurements.

Data Acquisition
The field operations were carried out for the purposes of acquiring the ellipsoidal heights and orthometric heights for a number of well distributed points in the research area. Precise levelling and DGPS field exercises were conducted in this work. The data captured includes latitude (ϕ), longitude (λ) and ellipsoidal heights (h) of all points of interest, using DGPS Receivers and Precise level for orthometric heights (H). These sets of data were obtained from the site by means of direct field observation. A total number of five hundred (500) points monumented by the Bauchi State Ministry of lands and Housing and the Department of Surveying and Geo-informatics,
Federal Polytechnic Bauchi were observed and recorded. Additional two hundred (200) points was also monumented and observed. Apart from the pre-cast points, other two hundred and eighty four (284) points were selected at random and their coordinates were determined and recorded. This becomes necessary due to the topographical nature of the study area.

DGPS Survey Observation
Planning was the first important step for DGPS surveys, so that almanac data can be analyzed to obtain optimal time sets when a geometrically strong array of operating satellites is available above 15° of elevation (above the horizon) and to identify topographic obstructions that may hinder signal reception. Planning software graphically display GDOP (geometric dilution of precision) at each time of the day (GDOP of 7 or below is usually considered suitable for positioning a value of 5 or lower is ideal).

Differential GPS observations were made at the most suitable locations along the levelling routes. The derived coordinates were comparable to GPS standard accuracy. The WGS-84 ellipsoid was adopted as the reference surface for the determination of ellipsoidal heights (h). In analogy the height of a point is defined as the distance from the ellipsoid measured along a normal to the reference ellipsoid. Ellipsoidal heights can be derived from geocentric Cartesian coordinates provided by GPS observations. DGPS receiver was used to determine both the Universal Traverse Mercator (UTM) coordinates and the geographical coordinates of all the required stations. The GPS Fast-static mode of observation was adopted throughout the measurement. The data obtained was recorded into the memory card for post processing. The GPS receiver and spectrum survey office were used, which are suitable for the survey operations.

Precise Levelling Observation
The observations of the precise levelling operation carried out were reduced and processed to obtain the orthometric heights. Orthometric heights (H) refer to an equipotential reference surface, the geoid. The orthometric height of a distinct point on the surface of the earth is the distance from that point to the geoid, measured along the plumb line normal to the geoid. The orthometric heights of points were determined with precise level through levelling.
Determination of Orthometric and Ellipsoidal heights

The reference surface used for the determination of orthometric heights is the geoid while the reference surface used for the determination of ellipsoidal heights regarded as the ellipsoid. Precise levelling operations were carried out on the control points in order to determine the geoid while ellipsoid heights were determined by DGPS observation. The vertical separation between the geoid and the ellipsoid were determined and it known as the geoidal heights. Geoidal heights were used in the production of geoidal map. The orthometric heights and the ellipsoidal were used in the compilation of contour map of the study. The three dimensional surface modelling were produced from derived orthometric and ellipsoidal heights observed with precise level and DGPS respectively.

Data Quality

The quality of data used in this thesis was determined by the validity and reliability of the data. Validity is measured by the precision while the reliability is determined by the accuracy of the data. The quality control test for the data used in this study was carried out by the researcher and the result indicated validity. Before performing a minimally constrained and fully constrained adjustment, the network was analyzed for possible outliers using loop closures analysis of repeated baselines and comparison of known and observed baselines. Detection of blunders was facilitated through the source of blunder (height of instrument, centering errors, etc.), display vectors in northing, easting, ellipsoidal height, and distance (geodetic latitude, longitude, and height). Baselines were processed on daily basis to allowing the user to identify problems that might exist. A list of the triple difference, float double difference, and fixed double difference vectors (dx-dy-dz) were normally listed.

GPS system validation was performed to verify that the complete system achieved accuracy fitting for the types of GPS control surveys used. The validation survey is similar to a production of GPS survey; except that it was carried out on permanent pillars with high accuracy of 3D coordinates. GPS receivers, GPS antennas, field support equipment, baseline processing software, network adjustment software, office staff (for planning, supervision, processing, adjustments, reporting) and field staff (for system set-up and data collection): All of the above was verified during a GPS
validation survey. The results indicated that the validity, reliability and hence quality of the data were satisfactory.

**Data Processing**

Two sets of data were involved in this research work: the first set of data was obtained using dual Frequency GPS receivers and the second set of the data was obtained using precise level. The GPS observations were post processed using spectrum survey offices software and the final coordinates and the heights of the points within the study area were determined and obtained the three dimensional coordinates (geodetic latitude (ϕ), geodetic longitude (λ) and ellipsoidal height (h)).

The precise levelling data was also processed and reduced to obtain the orthometric height (H) of all the required points. The difference between the ellipsoidal and orthometric heights determined with DGPS and precise level yields geoidal undulations.

**Map compilation**

The processed data (geoidal undulations) was used for the production of digital contour map, geoidal map and 3D surface model of the study area. There are different types of software in the market for production of contour, digital terrain and three dimensional surface models. In this research work ArcGIS 10.2.1 was used for generating contour, geoidal map and 3D surface model. ArcGIS 10.2.1 is a Contouring and 3D surface mapping software package. It transforms random surveying data, using interpolation, into continuous curved surface contour. ArcGIS 10.2.1’s sophisticated interpolation engine will transform all XYZ data into publication quality maps. The methods were grouped into smoothing and exact interpolators. Smoothing interpolators are: Inverse Distance to a Power, Kriging, Polynomial Regression, Radial Basis Function, Spline, Modified Shepard's Method, Local Polynomial, Moving Average; while the exact interpolators are: Inverse Distance to a Power, Kriging, Nearest Neighbor, Radial Basis Function, Modified Sheppard’s Method, Triangulation with Linear Interpolation, and Natural Neighbor. But Spline methods of interpolation were used to approximate the geoid in the study area.

**RESULTS AND DISCUSSION**

**Validity and Reliability Test**

DGPS and precise levelling were carried out in line with, specifications for second order accuracy. The data were checked and the mean of the height
differences were taken as the most probable value of the measurements. The statistical analysis of the result met the precise of second order geodetic control network and levelling specifications. The result of the pearman correlation coefficient computed using northing and easting coordinates is 0.054 and the coefficient of determination is 0.0029% which indicated that the control points were normally distributed. The result of the Z test computed (0.125) indicated that the measurements are precise at 95% confidence level. The reliability of the measurement of X and Y second order geodetic coordinates were computed at the scale of 1:5000 and found reliable at 95% confidence level. Therefore, the quality of the data was guaranteed as showed in Table 1.1.

Table 1.1: Validity and Reliability Test

<table>
<thead>
<tr>
<th>Method</th>
<th>Software Used</th>
<th>Variables</th>
<th>Result</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation Pearson (Sig. 2-tailed), N=916</td>
<td>Microsoft excel, 2010</td>
<td>Var00001</td>
<td>0.054</td>
<td>Weak correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Var00002</td>
<td>0.103</td>
<td></td>
</tr>
<tr>
<td>Reliability test</td>
<td>SPSS</td>
<td>Var00001</td>
<td>Case: Scale: 1:5000 Valid:916 (100%) Excluded*: 0 Total:(916) 100%</td>
<td>The reliability of the coordinates were computed at the scale of 1:5000 and found reliable at 95% confidence level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Var00002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z-test (Sig. 2-talled), N=916</td>
<td>SPSS</td>
<td>Var00001</td>
<td>Case: (\alpha : 0.05) (Z: 0.125)</td>
<td>The result of the Z-test computed (0.125) indicated that the measurements are</td>
</tr>
</tbody>
</table>
Orthometric and Ellipsoidal Heights Determined and Compared

The transformation between the ellipsoidal heights and the orthometric heights was successfully done and geoidal undulation (N) were determined. The ellipsoidal height (h) and the orthometric height (H) were transformed by subtracting the geoid-ellipsoid separation, which is called geoid heights. Table 1.2 showed the sample of the results of the ellipsoidal and orthometric heights determined from the field. The ellipsoidal heights, orthometric heights and geoidal heights derived were used in the compilation of contour map, 3D surface model and geoidal map of the study area respectively. The geoidal undulation determined proved the theory that the vertical separation between geoid and reference ellipsoid is ± 100 m.

Table 1.2: Sample of Coordinates in UTM and Geoidal Heights from the Field

<table>
<thead>
<tr>
<th>PILLER ID</th>
<th>EASTING (M)</th>
<th>NORTHING (M)</th>
<th>ELLIPSOIDAL HEIGHT (M)</th>
<th>ORTHOMETRIC HEIGHT (M)</th>
<th>GEIODAL HEIGHT (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA/SC A001</td>
<td>590272.076</td>
<td>1149941.615</td>
<td>631.2754</td>
<td>608.4822</td>
<td>22.7934</td>
</tr>
<tr>
<td>BA/SC A002</td>
<td>590347.560</td>
<td>1149587.566</td>
<td>627.4385</td>
<td>604.6680</td>
<td>22.7705</td>
</tr>
<tr>
<td>BA/SC A003</td>
<td>590630.023</td>
<td>1147949.555</td>
<td>617.9043</td>
<td>595.1340</td>
<td>22.7703</td>
</tr>
<tr>
<td>BA/SC A004</td>
<td>590823.989</td>
<td>1147613.867</td>
<td>623.7726</td>
<td>600.9910</td>
<td>22.7716</td>
</tr>
<tr>
<td>BA/SC A005</td>
<td>591265.472</td>
<td>1147062.609</td>
<td>619.3624</td>
<td>594.6100</td>
<td>22.7584</td>
</tr>
<tr>
<td>BA/SC A006</td>
<td>591395.051</td>
<td>1146527.667</td>
<td>619.1873</td>
<td>596.4290</td>
<td>22.7583</td>
</tr>
<tr>
<td>BA/SC A007</td>
<td>591555.206</td>
<td>1146140.217</td>
<td>632.0442</td>
<td>609.2860</td>
<td>22.7582</td>
</tr>
</tbody>
</table>
Sample Profile of the Orthometric and Ellipsoidal Heights
The vertical and horizontal axes represent the heights and the position of the beacons respectively. The vertical axis (heights) was plotted against horizontal axis (beacons ID) as indicated in Figure 1.1. The profile showed that both ellipsoidal and orthometric heights portrayed same terrain. The Pearson correlation computed is 0.993 and the coefficient of determination is 99% which indicated that the ellipsoidal and the orthometric heights are positively highly correlated. The profiles of both the orthometric and ellipsoidal heights are represented by dark green and blue colour respectively as showed below. It was observed that due to non-parallelism of equipotential surfaces, points with same Orthometric heights or same ellipsoidal heights are not on the same equipotential surface. That is the gravitation potential at those points is not the same even if the points has same Orthometric heights or same ellipsoidal heights.
Sample Profile of the Geoidal Heights
The sample of the X, Y coordinates determined and the three heights system tabulated on Table 1.2. The vertical axis (geoidal heights) was plotted against horizontal axis (beacons position) as indicated on Figure 1.2. The blue line represents geoidal undulation and the mean of the geoidal heights was 22.277m which could be used as a constant to model the entire geoid of the study area and Bauchi State in general. This research proved the theory that the geoid as an equipotential surface of the Earth’s gravity field which best fits the mean sea level is irregular due to the uneven distribution of the Earth’s masses (C.F. Gauss in 1828).

Compilation of Three Dimensional Surface Models
The ellipsoidal and orthometric heights were used in the production of three dimensional surface models as shown in Figure 1.3 and Figure 1.4 respectively. The three dimensional surface models were produced at the scale of 1:60,000 and they represent the terrain configuration. The 3D
surface models produced from ellipsoidal and orthometric heights showed that they follow the same pattern, which is an indication that the two surfaces are true representation of the same terrain. The legend showed heights range on each of the 3D surface model which are represented by different colour ramp.

Figure 1.3: Three Dimensional Surface Model Generated from Geoidal Heights (Author’s Lab.)

Compilation of Contour Map
The spot heights were randomly observed in the study area and used for the determination of the geoidal heights. The geoidal heights were used in the production of contour map as showed in Figure 1.4. The contour map was produced at a scale of 1:60,000 and the contour lines were interpolated at 0.2 meter contour interval which represented the terrain configuration. The contour map produced from geoidal heights portrayed the geoid-ellipsoid separation.
Fig. 1.4 Contour map Generated from Geoidal Heights (Author’s Lab.)

**Production of Geoidal Map**

The Geoidal heights were used in the production of Geoidal Map as indicated in Figure 1.5. The Geoidal Map was produced at the scale of 1:60,000 and it represents the geoidal configuration. The legend showed heights range on the geoidal map which are represented by different colour ramp.

Figure 1.5: Geoidal Map Generated from Geoidal Heights (Author’s Lab.)
Summary
In the determination of Geoidal undulation for production of geoidal map of Bauchi metropolis, the coordinates, ellipsoidal and orthometric heights were determined with the aid of Dual Frequency GPS receiver (DGPS) and precise Level Wild N3 instruments respectively. The heights determined with precise Levelling were reduced and earth surface-geoid separation were determined (orthometric heights). The ellipsoidal heights were determined with DGPS. The DGPS coordinates obtained and heights determined were post processed using the Spectrum survey offices software and the final adjusted coordinates and heights were determined. Geoidal Heights of the study area were obtained from the differences between the orthometric and the ellipsoidal heights. The heights determined were exported from Microsoft office excel 2007 to ArcGIS 10.2.1 version. Shape files were created for each layer and were used in the production of the maps. The ellipsoidal and orthometric heights were also used for the production of contour map and digital geoidal model was created using ArcGIS 10.2.1 version. The geoidal undulations determined were used in the compilation of the Geoidal map of the study area.

Conclusion
In conclusion, levelled heights were established along with DGPS observations in Bauchi metropolis to unify the height system. The orthometric and ellipsoidal heights were determined using DGPS receiver and precise Level. The differences between orthometric and ellipsoidal heights were determined (Geoidal Undulation). The orthometric and ellipsoidal heights were used for the compilation of the contour map. Geoidal Undulations were used for the production of Geoidal map of the study area. The Geoidal Model and the 3D surface geoidal model were produced using ArcGIS 10.2.1 version.

Recommendations
In view of the foregoing results, it is therefore recommended that:

i. This research should be repeated using observations with Differential Global Positioning System in full static mode with more time spent on each station and geodetic level equipment to see if the accuracy of the result could be improved.
ii. Other researchers should use the geoidal heights determined to produce a mathematical model of the study area and the Nigeria as a whole

iii. Further research work should be under taking to simulate 3D model of the entire Bauchi State which could be utilize for densifying levelling networks of lower order for appropriate future planning.

iv. The Nigeria government should make efforts towards the production of a National Geoid Model through the office of the Surveyor General of the Federation in order to keep in pace with other developing countries.

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ISSUES ON WARM SPRING TOWARDS HEALTH TOURISM DEVELOPMENT: A GLOBAL PERSPECTIVE

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Abstract
The health importance of warm springs cannot be over emphasized. As might be expected, the composition of spring water varies from place to place according to the rock formation in which it occurs. Warm spring is the result of hot and cold spring mixing together but may also occur outside of geothermal areas. Health tourism is a term describing the rapidly growing practice of traveling across international borders to obtain health care. China is fast emerging as a desirable destination for individuals seeking medical care in a wide range of medical specialty including cardiology, neurology, orthopedics and others. In Nigeria, these destinations can be harnessed to cater the health needs of patients. They include ikogosi warm spring Ekiti, whispering palm iworo badagry, osun osogbo mangrove etc. Warm spring play important role as sites for therapeutics uses. Health tourism providers make information available about the hospitals and doctors that they are partnered with but the nature, extent and quality of information provided by different organizations vary. The provider usually require the patients to provide a medical report including nature of ailments, local doctors etc. Warm Spring sites are a potential health tourist haven for revitalization, rejuvenation and recuperation.

Keywords: therapeutic uses, health tourism provider, hydrotherapy and warm spring

Introduction
Tourism is a composite phenomenon. The inventory of its composite factors must go hand in hand with knowledge of general development objectives and characteristics of the area or region under consideration. No place is too
remote to be visited, if the attraction are properly packaged and presented. This attractions have been highlighted to enable participant appreciate tourism potentials. These include health tourism, ecotourism, beach tourism, cultural tourism (festivals, museums and monument, palaces, arts and crafts), man-made attractions (theme amusement parks, zoological/botanical gardens and resort/health farms) and natural/physical attractions. The natural/physical attractions include spectacular physical, geographical features such as: falls, rock formations, hills/highlands, caves/tunnels, and springs.

According to Geology Dictionary, springs may be defined as any hydro structural opening through which deep seated and concentrated discharge of ground water reaches the ground surface. Springs are commonly found at the part where water table in an area intersects the land surface. Springs including some less concentrated discharge flow known as seeps are known to be the chief source of the dry weather flow of most streams and also passage for hydrothermal fluid (containing dissolved minerals) to reach ground surface as warm or hot springs. As a result, the spring environment has been studied by researchers and its therapeutic uses have been harnessed for ayuverdic treatment. For example, warm spring in Georgia has been frequented by paraplegics US president Franklin D. Roosevelt who built the little White House there.

The economic potentials of warm spring cannot be over emphasized, since spring environment have been studied and are noted for their purity as source of water supply, tourist sites for recreational activities and therapeutic use. As a result, warm spring have been exploited for therapeutic uses because of their dissolved mineral content containing everything from simple calcium, lithium, radium and sulfur (use in treatment of eczema). Spring environments have become tourist destinations and locations for rehabilitation clinics because of the folklores and proven medical benefits for patients needing treatments for their ailments.

**Chemical Composition and Origin of Warm/Hot springs**

Analysis of many springs show that the solute in ground water consist mainly of chlorides, sulfates and bicarbonates of calcium, magnesium, sodium, potassium and iron, these substances cans be traced back to the common minerals in the rock from which they were divided by weathering. As might be expected, the composition of spring water varies from place
according to the kind of rock in which it occurs. In many car venous springs, the water is hard (i.e. rich in calcium and magnesium bicarbonates) because the bedrock includes abundant limestone and dolomite that consist of these carbonates. In some places within arid regions, the concentration of dissolved substances notably sulfate and chloride is so great that spring water is unfit for human consumption. The origin of spring are base on the different types of environment they were formed. As a result, spring water can be from magmatic, sedimentary or metamorphic origin. Regardless of their origin, warm springs such as Ikogosi in Ekiti, Yankari Wikki warm spring Bauchi etc offer health benefits to tourism destinations for a large number of nationals throughout the year. This is because warm springs are noted for their dissolved mineral contents as such have been exploited for their very high mineral contents (from calcium, lithium and radium etc). These have been supported by both folklores and proven researches.

**Concept of Health Tourism**

Historically, the first recorded instance of medical tourism dates back thousands of years to when Greek pilgrims traveled from all over the Mediterranean to small territory in the Saronic Gulf called Epiduaria. The territory was the sanctuary of the healing god Asklepios. Epiduaria became the original travel destination for medical tourism.

Spa towns and sanitariums may be considered an early form of medical tourism. In eighteen century England, for example, patients visited springs and spas because they were places with purported health-giving minerals waters, treating diseases from gout to liver disorders and bronchitis.

Medical tourism (also called medical travel or health tourism) is a term initially coined by travel agencies and the mass media to describe the rapidly-growing practice of travelling across international borders to obtain health care. It also refers pejoratively to the practice of healthcare providers travelling internationally to deliver healthcare.

Services typically sought by travelers include elective procedures as well as complex specialized surgeries such as joint replacement (knee/hip), cardiac surgery, dental surgery, and cosmetic surgeries. However, initially every type of healthcare, including psychiatry, alternative treatments, convalescent care and even burial services are available.

**Some International Health Travel Destination**

Over 50 countries have identified medical tourism as a national industry. However, accreditation and other measures of quality vary widely across the
globe, and some destinations may become hazardous or even dangerous for medical tourist. In the context of global health, the term “medical tourism” is pejorative because during such trips health care providers often practice outside of their areas of expertise or hold different (i.e. lower) standards of care. Greater numbers than ever before of student volunteers, health professions trainees, and researchers from resource-rich countries are working temporarily and anticipating future work in resource-starved areas. This emphasizes the importance of understanding health travel destination. For example; China is fast emerging as a desirable destination for individuals seeking medical care in a wide range of medical specialty including cardiology, neurology, orthopedics, and others. A number of private and government hospitals in major cities have established international department. Many leading hospitals provide treatment integrating Chinese medicine which is now home to leading stem cell research and treatment. They offer patients who want to take advantage of stem cell treatments that are still considered experimental or have yet to be approved in their home country. The goal of such association is often to raise awareness of health tourism in the hope of expanding the industry.

Israel is emerging as popular destination for medical tourist. In 2006, 15,000 foreigners travelled to the country for medical procedures, bringing in $40 million of revenue. Medical tourists choose Israel for several reasons. Some come from European nations such as Romania where certain procedures are not available. Other medical tourists come to Israel to visit the Dead Sea, a world-famous therapeutic resort. The Israel Ministry of Tourism and several professional medical services providers have set out to generate awareness of Israel’s medical capabilities.

In Jordan, medical tourism is an emerging travel destination, with related revenues exceeding one billion dollars in 2007. More than 250,000 patients from other countries sought treatment in Jordan that year. This included an estimated 45,000 Iraqis and approximately 25,000 patients each from Palestine and Sudan. An estimated 1,800 US citizens, and 400 Canadians also sought treatment in Jordan that year. The Kingdom was rated as number one in the region and fifth in the worlds as a medical tourism hub in a study by the World Bank.

Hospitals in Dubai and other emirates have expressed intent to develop in medical tourism. Some have American-sourced international healthcare accreditation, while others are looking towards the UK, Australia and
Canada for accreditation services. South Africa is the first country in Africa to emerge as a medical tourism destination. It offers world-class medical facilities and affordable medical and dental care by the health tourism providers.

A health tourism provider or medical tourism provider is an organization or a company which seeks to bring together a prospective patient with a service provider, usually a hospital or a clinic. If the patient is crossing international borders to obtain medical care, then that individual would usually be known as medical tourist. These groups are generally facilitators and developers of medical tourism, which brings into play a number of issues that do not apply when a patient stays within their own country of origin.

Some such organizations and companies specialize in certain areas of healthcare, such as cosmetic surgery, dentistry or transplant surgery, while others are more generalized in their approach, providing multiple services over a wide range of medical specialties.

In order to create room for Nigerians to receive medical treatment and at the same time carry out tourism adventures, mixed with an opportunity to expand business and build cordial tie within countries, Serokolo, a South African Health Tourism Company has formerly launched a Nigerian branch of the company in lagos. Serekolo, with headquarters in Sandston, South Africa came into Nigerian market “with a key focus on health and medical tourism (medical health and travels) through which Nigerians and citizens of other neighboring African nations are afforded “access to medical facilities and medical/surgical specialist” as international patients. (Oluwatimilehin, 2007)

From the foregoing, it is apparent that the Company has continuum and a common goal of promoting the highest level of quality of healthcare to patients in a global environment. In line with the Medical Tourism Association three tenets: Transparency in Quality and Pricing, Communications and Education. Hence, other health care providers like Serekolo can join the Healthcare Tourism International (HTI) which is a 501(c) non-profit tax-exempt organization that is complementary to the Joint Commission International accreditation group. Health care organizations can apply for self-certification or accreditation on the HTI website.

**Some Health Travel Destinations in Nigeria**

There are medical travel destinations in Nigeria that offer medical tourist an opportunity to explore its beaches, cultural heritage treatments and enjoy watching the freely roaming wild life in sanctuaries (Oluwatimilehin, 2007). These travel destinations can be harnessed to carter for the health
needs of patient’s nationwide. They include; whispering palms Iworo-Badagry, Enenabia warm spring, Okpoya Benue, Ikogosi warm spring, Ekiti, Akiri warm spring Awe, Osun Osogbo Mangroove, Lamurde hot spring Adamawa and Yankari and Wikki warm spring, Bauchi. Thus, informing the need for workshops, seminars and papers to be presented to enlighten people on the role of therapeutic spring water for effective development of health tourism in Nigeria.

Nigeria is exploring the possibility of opening other vistas of opportunity in its efforts to develop its tourism industry. The country is looking at the opportunity of partnering India to boost its effort in the area of health tourism. The partnership was sealed with the medical consortium from India at the ongoing Arabian Travel Market (ATM) in Dubai, United Arab Emirates. It will among other tourism initiatives put Nigeria at the forefront of health tourism in West Africa. India ranks among the well-known health tourism destinations, with patronage from the world over. The country will form a strategic tie with Nigeria. Key in the agreement is that selected Nigerian doctors and operators will be trained in the basic evaluation of prospective patients before they are taken for proper health treatment abroad. Also, officials of the medical India believed that most of the patients sent to India were usually and wrongly diagnosed with some of them not needing to undergo any medical treatment in India, thereby wasting money in travelling abroad.

For instance, there are four springs in Yankari and Wikki in Bauchi State, among them are three warm springs and one cold spring. The warm springs are Wikki, Mawulgo and Gwana while Dimil is the only cold spring in the reserve. But the most famous of them is the Wikki warm spring. The Wikki water gushes out from underneath a limestone escarpment surrounded by vegetation that boosts the ecosystem. The spring offers an excellent bathing facility which is situated in a gorge immediately below the camp. The water is pure, crystal clear and free from all reptiles and fishes and rich in mineral contents. The spring is 1.9m deep and 13m wide and flows at the rate of 100m/liters daily. This was established by researchers. The first estimated 100m/liters while the second estimated 101m liters. Studies have also shown that the water has a soothing constant temperature of 31.1°C and gushes out from a string of chambers under the sandstone cliff. Divers from various scuba clubs have tried to determine the source but they could only go as far as 9 meters.
The Economic Potentials of Spas/ Warm Springs

A spa town (also called a bathing-place or simply a spa) is a town situated around a mineral spa (a developed mineral spring). Patrons have resorted to spas to “take the waters” for their purported benefits. The word comes from the Belgian town Spa. In continental Europe a spa was known as a ville d’eau (town of water). The term spa is used for towns or resorts offering hydrotherapy which can include cold water or mineral water treatments and hot thermal baths.

Mineral water is water from a mineral spring containing various minerals such as salt and sulfur compounds. Mineral water can be sparkling (with effervescence), or still (without effervescence).

Traditionally, mineral waters were used or consumed at their spring sources, often referred to as “taking the waters” or “taking the cure,” at developed sites such as spa, baths or wells. The term spa was used for a place where the water was consumed and bathed in; bath where the water used primarily for bathing, therapeutics, or recreation and well where the water was to be consumed. Active tourist centers have grown up around many mineral water sites since ancient times, such as Hungary, Hisarya (Bulgaria), Vichy (France), Jermuk (Armenia), Yessentuki (Russia), Spa (Belgium), Krynica-Zdroj (Poland), Sulphur Baths (Tbilisi, Republic of Georgia), Bath (England), or Karlovy Vary (Czech Republic). In Romania a country enjoying a privileged position as home to over one-third of the European mineral and thermal springs, resorts developed since antiquity in places such as Baile Herculane, Geoagin or Slanic. Tourist development resulted in spa towns and hydropathic hotels (often shortened to “hydros”).

In modern times, it is far more common for mineral waters to be bottled at the source for distributed consumption. Travelling to the mineral water site for direct access to the water is now uncommon, and in many cases not possible (because of exclusive commercial ownership rights). There are more than 3,000 brands of mineral water commercially available worldwide. The more calcium plus magnesium ions are dissolved in water, the harder it is said to be; water with few dissolved calcium plus magnesium ions is described as being soft. The U. S. Food and Drug Administration classifies mineral water as water containing at least 250 parts per million total dissolved solids (TDS), originating from a geologically and physically
protected underground water source. No minerals may be added to this water.

However, in many places, the term “mineral water” is colloquially used to mean any bottled carbonated water or soda water, as opposed to tap water.

Warm Springs in Health Travel Destinations

Health tourism has witnessed a tremendous growth in the past ten years. People have seen the need to keep themselves fit and maintain light weights. The impact of being overweight was not all that known before. Hundreds of health resorts, spas and springs around the world, offering specialize beauty and fitness services and extended programs to improve people’s health. Springs play a major role in health tourism, since it extends into areas of ayurvedic. Over the years, warm springs have been exploited for their therapeutic uses. For example, warm spring Georgia has been frequented by paraplegic US president Franklin D. Roosevelt, who built the white house there to enjoy regular therapy from the best natural spring water in the world. Warm springs play an important role as sites for therapeutic uses because heated water can hold more dissolved salts. Warm and especially hot springs also often have a very high mineral content. They may contain everything from simple calcium, lithium, radium, opaline, silica (Siliceous sinter) and sulfur (antifungi). Thus, the spring environment surely has varied deposition and collection of mineral for ayurvedic treatment. Hence, due to folklore and proven medical value some of these springs have become popular tourist destination and location for rehabilitation clinics for those with ailments.

In Nigeria, resorts offering hydrotherapy which can include cold water or mineral water treatments and hot thermal baths can be harnessed. Many mineral spring containing various such as salts and sulfur compounds are used primarily for bathing, therapeutics, or recreation; Active tourist centers have grown up around many mineral water sites since mineral water are abundant from Yankari Wikki spring, Kerang spring water, Plateau State, Ikogosi warm spring, Lamurde hot spring and a host of others for hydrotherapy and hydropathical use.

Challenges to Health Tourism

Medical quality standards vary around the world, and international accreditation is relatively new. For these reasons, potential clients may face unknown and risks related to quality, safety and ethics. Medical tourists look
to health tourism providers to provide information about quality, safety and legal issues, but the quality of such information and services varies.

Medical tourism or health tourism providers assist you in planning your medical travel. They offer complete information on medical facilities, service providers, medical professionals, travel agencies, resorts, medical/travel insurance overseas as well as of local areas. This is pertinent for millions of medical travelers overseas who seek for their medical, dental and cosmetic procedures.

Health tourism providers’ make information available about the hospitals, clinic and the doctors that they are partnered with, but the nature, extent and quality of the information provided by different organizations and companies working in this field varies enormously. Hospital quality indicators can include whether they have been subjected to independent international health care accreditation, practice evidence-based medicine, and good governance, and whether independent health care staff, particularly the doctors providing the services have been subjected to independent credentialing, as well as evidence that the doctors maintain and improve their personal professional standards. In addition, there are a number of non-medical angles which receive varying degrees of attention by providers. These include:

- Prices and payment mode
- Hotels
- Non-medical risks involved
- Language issues
- Availability of techniques (e.g. new operations, new approaches to infertility, new imaging techniques)
- Pre-travel issues such as anti malarial therapy (e.g. Thailand and relevant immunizations are recommended (in Turkey and Philippines typhoid and hepatitis A).
- Ethic issues on organ harvesting in China
- Medico-legal issues such as are doctors, and or hospitals indemnified or insured, if patient sue and will corpse of such cases be responsibility of doctors to repatriate.

In view of the above, the Medical Protection Society, a British group is responsible for indemnifying doctors in many countries which increases the level of protection enjoyed both by patients locally as well as those coming
in as medical tourists. Currently, while hospitals providing medical tourism services may be subject to international accreditation by a reputable independent international group, there is no organization responsible for accrediting the health providers themselves and ensuring that their operating standards are safe and ethical.

**Travel for Health Tourism**

The factors that have skyrocketed the travel for health or popularity of medical travel include; cost of health care, long wait for certain procedures, ease and affordability of international travel, and improvements in both technology and standards of care in many countries. The avoidance of waiting times is the leading factor for health tourism in UK, whereas in the US, the main reason is cheaper prices abroad. Many surgery performed in medical travel destinations cost a fraction of the price done in the First world. For example, liver transplant that cost $300,000 USD in America cost about $91,000 USD in Taiwan. A large draw to medical travel is convenience and speed. Countries that operate public health care systems are often so taxed that it can take considerable time to get non-urgent medical care. Medical tourists come from a variety of locations including Europe, Middle East, Japan, United States, and Canada. Factors that drive demand for medical services abroad in First World countries include; large populations, comparatively high wealth, the expense of health care or lack of health care options locally, and increasing high expectations of their populations with respect to health care.

In first world countries like United States medical tourism has large growth prospects and potentially destabilizing implications. A forecast by Deloitte Consulting published in August 2008 projected that medical tourism originating in the US could jump by a factor of ten over the next decade. An estimated 750,000 Americans went abroad for health care in 2007, and the report estimated that a million and half would seek health care outside the US in 2008. The typical process is as follows; the person seeking medical treatment abroad contacts a medical provider, the provider usually requires the patient to provide a medical report, including the nature of ailment, local doctors’ opinion, medical history, and diagnosis and may request additional information. Certified medical or consultants then advise on the medical treatment. The approximate expenditure, choice of hospitals and tourist destinations, and duration of stay is discussed. After signing consent bonds
and agreements, the patient is given recommendation letters for a medical visa, to be procured from the concerned embassy. The patient travels to the destination country where the medical provider assigns a case executive, who takes care of the patient’s accommodation, treatment and any form of care. Once the treatment is done, the patient can remain in the tourist destination or return home. The goal of such associations is often to raise awareness of medical tourism in the hopes of expanding and standardizing the industry.

**Conclusion and Recommendation**

Spring constitute part of the natural attractions in tourism that has the capability of attracting domestic and international tourist. Hence, the hot or cold spring environment has been harnessed to care for health tourist. Springs have played important roles as a stimulator in developing health travel destinations because the mineral water can treat diseases from gout to liver disorders and bronchitis. It is pertinent to state that many places emerging as popular destination for medical tourist combine visitation to natural attraction such as Dead Sea, Sand dunes, safari, spring and resort with traditional/professional medical services for ayurveda treatments.

The role of warm spring in developing health travel destinations cannot be over emphasized because mineral spring site is a potential health tourist haven for revitalization, rejuvenation and recuperation. As such, spring as a natural attraction could be used as a catalyst to develop leisure and health tourism. Tourist will be attracted from within the nation but later, international tourism will develop. For this to happen, health tourism services should be encouraged at regular intervals. Also improved environment for health services can be attained through health tourism. Commercial activities will increase significantly and the nation will experience a boom through the value of foreign exchange earnings and a number of rentable properties.

The most apparent value of health tourism is that it makes the people to be aware of the health care providers and the value of services the render in relaxation and that this could still be attained in spite of current economic crises. It calls the attention of entrepreneurs to establish health tourism related industries and activities. Both the private and public sectors benefit from the services rendered. Government can also generate revenue through
taxes on business in the area and as revenue increases Value Added Tax (VAT) will increase.

The establishment of the new health tourist centers in travel destinations has a number of advantages for health tourist providers like healthcare transmission, and revival, especially in this age of marked alienation. Also such destinations could enhance local traditional medicines and creative orthodox technology. They are also expected to serve as avenues of interest (research) to students, professionals and stakeholders in the tourism industry.

The health tourism sub-industry therefore should be properly and well positioned as a veritable source of revenue, employment generation and a stimulant for rural transformation and engineering. Nigeria should without delay, reposition the health tourism sub-industry in the next millennium and beyond especially in the areas of warm spring and health clinics. The rural areas where sites are located should be aggressively opened to accommodate both the local and international health tourist.

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EFFECTS OF PROCUREMENT GOVERNANCE, TRANSACTION COSTS TO CONTRACTING BUSINESS AND TENDERING PROCESS IN NIGERIA

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Abstract
Public sector organizations undergo a procurement process to select a competent consultant and contractor to carry out the construction work using pre-determined selection criteria or guidelines as stated by the public procurement Act 2007. The Act objectives are to provide the best value for money, economy, transparency, accountability and competition among bidders (PPA 2007). However, it must be noted that the Act has not taken into account the transaction costs incurred with participation in the tender processes due to the varied activities undertaken by clients, consultants and contractors. The aim of the study is to assess the effects of procurement governance transaction costs with respect to contracting business and tendering process. A multi-stage stratified random sampling procedure was used in selecting the respondents from construction firms within some selected states of the North-West zone of Nigeria (Sokoto, Kaduna and Kebbi) that are registered in the Bureau of Public Procurement database of contractors that have participated in any federal government tendering process as respondents of the study. One hundred and thirty five (135) responses were retrieved from various respondents. Using Structural Equation Model (SEM), an analytical tool, using procurement governance and transaction cost as independent variable, with tendering process as intervening variable and contracting business as dependent variable, the result of this research shows that transaction cost variable and procurement governance variable has significant influence toward contracting business, procurement governance variable has indirect influence toward contracting business through tendering process with insignificance influence. The
research recommends that both client and contractors can reduce procurement governance effects by promoting: fairness in the award of contract to the lowest bidder; harmonious relationships between project client and contractor; sound knowledge on construction project procurement by both parties and more attention on how they can improve their bidding strategies based on the procurement governance guidelines.

**Keywords:** Contracting Business, Construction projects, Procurement Act 2007, Transaction costs, Tendering and Transaction costs theory.

**Introduction**

In construction projects in Nigeria, clients undergo a procurement process to select a competent consultant and contractor to carry out the construction work using pre-determined selection criteria (Ogunsanmi, 2013; Peter, Love, Davis & Edwards, 2008; McWhirt, Ahn, Jenniffer & Kelly, 2011) or guidelines as stated by the public procurement Act 2007. The Act objectives are to provide the best value for money, economy, transparency, accountability and competition among bidders (PPA 2007). To ensure aggregate procurement, there is need to obtain economies of scale and reduce procurement costs (PPA 2007). However, it must be noted that the Act has not taken into account the transaction costs incurred with participation in the tender processes due to the varied activities undertaken by clients, consultants and contractors. It is a common fact that contractors devote considerable time and resources in determining the cost of construction and then assessing the price they will quote to the owner (Li, Arditi & Wang 2013). The Client is interested mostly in the price quoted by contractors. This price is the rate at which exchange will take place. Price to the contractor becomes a cost to the owner (Hillebrandt & Hughes, 2000). However, the actual cost of a construction project is not the only production cost. The cost of preparing a bidding document, estimating, drawing up a contract condition, advertisements, administrative aspects and dealing with any deviations from construction (Arbitration or Dispute resolution) are also important. In construction these cost are incurred by clients, consultant or contractors as the case may be. The costs are known as transaction costs in the study of economic organizations (Coase, 1937). In transaction cost economics a transaction occurs when a goods, works or services is transferred across a technologically separable interface (Williamson, 1987). Similarly, in construction using the PPA (2007) a services or goods are supplied to the client in return to a stated amount agreed by client.
However, it is not clear whether transaction costs characteristics were reduced by the use of the PPA since they are not defined systematically (Li et al. 2013). Also, it is not clear or understood whether transaction cost have positive or negative impact on the tendering process phases of a construction project. Various researchers have proven the existence of such cost in the construction industry and other areas of studies. These to include construction-related topics, project organization and governance, (Pirotforte, 1997; Turner & Keegan, 2001; Winch, 2001; Muller & Turner, 2005; Jobin, 2008), Agriculture (Huo, 2015; Ferris 2005) and marketing and sub-contracting (Eccles, 1981; Gunarson & Levitt 1982; Reve & Levitt, 1984; Winch, 1989; Constantion, 2001).

Most of the aforementioned researchers on transaction costs indicated how stakeholders are face with challenges due to the costs incurred during transaction by both parties. These leads to higher cost of construction, less economic efficiency in the procurement chain system. For instance in the United Kingdom UK about 0.57% of the total project value was identified to be spending as the bid costs by the contractors whether they win or lose in a bidding processes (Hughes, 2016). This is against the fact that, such costs make a significant impact on the retained operating turnover for the construction firm or company.

Worthy of note in the construction transaction in Nigeria is that they offer various transaction costs characteristics (Lingard, Hughes & Chinyio, 1998; Costantino, Pellegrion & Pirotforte, 2011; Enshassi, Mohamed & El-Karriri, 2010; Thomassen, Vassbo, Solheim-Kile & Lohne, 2016; Li, Aridit, & Wang, 2012; Li et al., 2013) in respects of their Asset specificity, Transaction environment uncertainties, Contractors’ behavior, Owners’ behavior and Project management efficiency that can have positive or negative impact on tendering process in Nigeria. Objective of this study is to assess the effect of procurement governance (PPA), transaction costs to contracting business and tendering process in Nigeria. Tendering process considered in this study are preliminary bids examination (Technical bid phase i.e eligibility requirements), detailed evaluation (Financial bid phase), bids comparison, post-qualification verification and bids evaluation report phases.

Thus, the primary research hypotheses of this study are:
1. Procurement governance has a significant effect on transaction costs
2. Transaction costs has a significant effect on contracting business
3. Procurement governance has a significant effect on contracting business
4. Tendering Process mediates the effect of Procurement governance on contracting business.
5. Procurement governance has a significant effect on tendering process

Literature Review
Transaction Costs Theory (Theoretical Review)

Transaction cost economics theory has become a predominant theoretical framework (model) for explaining organizational boundary decision. Like most influential theories, transaction cost theory was not fully developed at the outset. It has been and continues to be retained and reformulated, corrected and expands in response to new theoretical and empirical development (Geyskens, Steenkamp & Kumar, 2006).

Transaction cost theory has its origin from Coase (1937), in his article “The nature of the firm” in which he explained market and hierarchies as alternative governance structures. The market is viewed as the dominant model of the logic of economic organization both in manufacturing, construction and overall (Hakansson, Ford, Gadde, Snehato & Waluszewski, 2009). Classic economic theory views the market as an economic system that “work itself” with supply adjusted to demand and production adjusted to consumption (Coase, 1937). According to Coase (1937), firms exist because the cost associated with organizing a transaction within the firm are lower than those associated with organizing it by exchange on the open market. In other word, there are certain costs associated with operating the market and it is necessary to form an organization to reduce these costs (Coase, 1937).

Pass et al (2000) explains that transaction cost is occurred due to input, goods, service or asset exchange between two individuals or more and even between companies. Transaction could happen through market involve purchasing and selling using price system. Transaction could be internalized through various department and frequently use transfer pricing which is categorized as internal. Coase (1998) states that the lower transactional cost the higher specialization, the bigger economic productivity, and the higher living standard of the people within that economy. The level of transaction cost depends on certain institution within a country, political and law system, culture, etc.

Zhang (2000) has identified factors influencing transaction cost, as follows:
- Goods characteristic and the rights to those goods (according to information about goods and personal status on those things).
- Actor’s identity is involved in transaction, related to bounded rationality of human’s nature, that is limitation of human to search, accept, store, process information; lack of available information.
- Technical situation and social regulation, trading and things related to the trading.

Based on explanation about definition and factors influencing the amount of transaction cost Li et al (2012 & 2013) formulated four determinant or transaction costs, which are:
1. Predictability of the owner’s behavior which is relationship with other parties, experiences in similar projects, payment on time, organizational efficiency and change orders.

2. Predictability of the Contractor’s behavior which are bidding attitude, qualification, relationship with other parties, experience, material substitution and frequency of claims.

3. Project management which includes leadership, quality of decision making, communication type, conflict management and technical competency.

4. Uncertainty in the transaction environment which are project complexity, project uncertainty, completeness of design, early contractor involvement, competition among bidders, design integration, bonding requirements, incentives and fair risk allocation.

Figure 1: Determinant of Transaction Costs

Sources: Li et.al 2013

Public Procurement Act 2007 (Procurement governance)
It is about decades (4th June, 2007) ago that Nigeria joined the League of Nations that enacted legislation on public procurement of goods, works and services. The Act contributed and as well improved the country’s standard
of living through public expenditure on capital goods and services. On the other hand, it is faced with many challenges and constraints during its implementation by the various organs of governments’ ministries, departments and agencies (MDAs). Many stakeholders have opined that having such an Act in place despite all challenges associated with it is better far than what the country was before the enactment (Onyema, 2011; EU, 2011).

This is because the reform has helped to confront the problems caused by corruption, fiscal irresponsibility, non-value for money, absence of public financial control, paucity, and non-use of certified procurement staff. This problem has resulted in time and cost overrun in much government expenditure (Ogbanna & Kalu, 2012). In addition, the huge cost incurred by the government in the procurement of goods and services could not be reasonably justified. The citizens were either disappointed or were doubtful of the sincerity of the government. Jacob (2010) stated some positive impacts of the Acts. This to include harmonizing the current policies and practices of government public procurement processes, accountability and transparency, establishing pricing standards and benchmarking in the procurement system. However, these impacts and others are the core objectives of the Act as stated in Part II section (4)(a)-(d).

Furthermore, the Act provides the use of open competitive bidding (NCB) for all procurement of goods, works and services by all procuring entities except where such approval for other method where given by the Bureau due to special condition as stated in the Act.

Contracting Business in Nigeria

In Nigeria, organized construction began in the early 1940’s with a few foreign companies. The ‘oil boom’ that followed about 10 years after Independence led to an upsurge in construction and demand for construction services, as the country at that period opened up to foreign and local investments and the obvious needs for infrastructure to drive economic growth. Foreign companies have dominated the industry since the 60’s and 70’s generating revenue for government and jobs for the citizenry (NBS 2015).

However, there have been down sides to this as these companies have been known to import resources and even skilled labour as opposed to using locally manufactured resources and promoting local content. The
construction sector has grown over the years, as a result of demands for real estate and housing and the provision of infrastructure to support an increasing population size, the need to open up communities to foster inter-state and inter-regional trade and movement. This loosened up the market for construction and services within the industry, to include even local companies, albeit a few, especially in the construction of commercial and non-commercial real estate. Also, investors within the sector have increased, the biggest being the Federal Government of Nigeria as a huge chunk of capital formation goes into investments in real estate and infrastructures development. The level of Government interaction within the industry is majorly as regulators, purchasers and financiers. Public private partnership in this area is robust and fuelled by the inability of government to provide the necessary expertise and skills to execute projects. As a consequence, the industry has recorded an average growth rate of 18.08% between 2010 and 2012. Also, because of the labour intensiveness of construction and construction services, jobs have been created and there is still potential to expand, in order to accommodate the rising need for services in that sector.

**Eligibility documents**

Zielczynski (2008) defined a requirement to be “a condition or capability to which a project, product, service or system most conform”. So, that cost, time and energy will be saving throughout the construction period. The issue of construction project requirements includes; lack of review and feedback to the client brief; client change requirements and design frequently; needs of end-users not clearly stated etc (Ann, Yu & Shen, 2013). Ann et.al (2013) recommends that in order to reduce or mitigate the problem of requirement in construction project, an experienced project participant as the client requirement manager should be appointed. In addition to this, a formal procedure to record, manage and track changes in client requirement must be maintained.

Mandatory requirements includes not only Tax, Pencom, ITF, NISTF and IRR, but also the additional evidence to proof to the clients’ the capability to carry out the construction project technically and financially (PPA, 2007) to build confidence both to the clients and other business. Zielczynski (2008); Li et.al (2012 and 2013) summarized many studies and research on bidding success, and identified some components including clients’ needs,
contractors’ behavior, transaction environment, information access, project management efficiency and magnitude of the transaction.

The public procurement Act 2007 identified about ten (10) key components in construction project bidding: tax clearance, pension certificate, industrial training certificate, national social insurance, financial capability, equipment ownership, court affidavit, bank guarantee performance bond, advance payment guarantee and interim registration report by BPP.

Bidding expenses
According to Brozowaki, (2001) major equipment manufacturers have calculated that it costs them up to Seventy Five Thousand United State Dollars (US$75,000) to bid on a complex tender. These costs are eventually passed on to the customer although be it indirectly. Project engineers and tender managers are generally highly paid, skilled people that end up spending much of their time doing secretarial and administrative work managing the tender process rather than adding value to it.

The activities involved in the course of tendering warrant expenditure. Each organization will spend to tender for a project. The client’s side too will spend to initiate and run a tendering process. Once competition is used, then the cost of abortive tendering becomes significant; for organizations that fail to win the project will either have to bear the cost of tendering or find a way of recouping. The more construction firms are involved in a bidding exercise the more this abortive cost gets higher. The cost of tendering will usually be subsumed in a firm’s overhead (Chinyio, 2011).

Bidding is a process that takes place to provide a transparent, fairness and value for money in the selection process that is based on laid down criteria. It is most important in organizations that are exposed to a degree of public scrutiny from stakeholders. These stakeholders could be the general public in the case of government departments, or shareholders in the case of businesses. Indeed, there are benefits to the tendering process, but there are also costs. More to the point, if these costs are not managed effectively then they can be quite significant and not provide proportionate returns (Dalrymple et al., 2006; Laryea, 2008).

Research Methodology
The research designs used for the study were survey and quasi-experimental research designs. The administered questionnaire is divided into four
sections in order to capture the specific objectives of the study. A multi-stage stratified random sampling procedure was used in selecting the respondents from construction firms in this study. Respondents’ construction firms were purposively selected on the basis of their registered with the Bureau of Public Procurement database of contractors under the civil or building categorization/classification indicating their IRR (Interim Registration Report) number or ID. The firms were also selected based on their frequency in bidding MDAs projects, turnover and minimum number of bids win in a year within the study area and the fact that majority of these areas have average numbers of federal government agencies that PPA 2007 rules applied to. In all a total of 230 questionnaires were distributed to respondents’ for the study. The survey was carried out between August and October 2018.

This research is classified as quantitative research by using Structural Equation Model (SEM) analysis unit. This research uses 3 kinds of variables; those are dependent variable, independent variable, and also intervening variable. The dependent variable in this research is Contracting business (CB) (Y2) and the intervening variable is tendering process (TP) (Y1). While the independent variable in this research consists of 2 variables, those are Procurement governance (PG) (X1) and transactional cost (TC) (X2). Thus, there are 4 variables in this research, which are 2 independent variables, 1 intervening variable and 1 dependent variable. Structural equation of this research is as follows:

$$\eta_{1KOP} (CB) = \gamma_1 \xi_1 (IA (PG)) + \gamma_2 \xi_2 (BT (TC)) + \gamma_3 \xi_3 (CG (TP))$$

Equation (1)

**Description**

PG = (Procurement Guidelines)

TCs = (Transaction Costs)

CB = (Contracting Business)

TP = (Tendering Process)

Variable Measurement Equation of Procurement Governance ($\xi_1$)

$\xi_1 = \lambda_1 X_1 + e_1$: PPA 2007 has significantly curbed bribery and corruption in construction projects of Public sector organization procurement

$\xi_1 = \lambda_2 X_2 + e_2$: PPA 2007 have guaranteed the achievement of timely completion of the projects my company has handled.

$\xi_1 = \lambda_3 X_3 + e_3$: Always planned for procurement activities whenever the financial year is approaching.
ξ1 = λ4 X4 + e 4: There is fairness in the award of contracts in public sector organizations due to non-interference of external bodies in the process
ξ1 = λ5 X5 + e 5: Communication channels in the Procurement process for companies that participated in bidding have been according to the procurement guidelines

Measurement equation of transactional cost (ξ2)
ξ2 = λ7 X6 + e 6: Owners Behavior
ξ2 = λ8 X7 + e 7: Contractors Behavior
ξ2 = λ9 X8 + e 8: Project Management Efficiency
ξ2 = λ10 X9 + e 9: Transaction Environment Uncertainties

Variable measurement equation of Contracting Business (η1)
ξ3 = λ19 X19 + e 10: Professional and Technical Staff
ξ3 = λ20 X20 + e 11: Retained Profit margin
ξ3 = λ21 X21 + e 12: Competition
ξ3 = λ22 X22 + e 13: Growth
ξ3 = λ23 X23 + e 14: Performance to other sector

Variable Measurement Equation of Tendering Process (η1)
η1 = λ24 X24 + d 15: Bid Examination
η1 = λ25 X25 + d 16: Bid Evaluation
η1 = λ26 X26 + d 17: Bid Comparison
η1 = λ27 X27 + d 18: Bid Evaluation Report

Notation description:
ξ(ksi) : Exogenous latent variable (independent variable)
e(eta) : Endogenous latent variable (dependent variable or independent variable in other equation).
γ (gamma) : Direct correlation exogenous variable to endogenous variable
ß (beta): Direct correlation between endogenous variable to endogenous variable.
λ (lambda) : Direct correlation between exogenous latent variable or endogenous latent variable to its indicators.

X1 – X5: Exogenous variable indicators of latent construct Procurement governance.
X6 – X10: Exogenous variable indicators of Transaction Costs.
X24 – X27: Exogenous variable indicator of tendering process.
X19 – X23: Endogenous indicator of latent construct contracting business
Ø (phi): covariance/correlation between exogenous variable
ε (epsilon): Measurement error from exogenous variable indicator
delta (delta): Measurement error from endogenous variable indicator
ξ(zeta): Error in equation between exogenous variable and/or endogenous variable to endogenous variable.

Result and Discussion
The validity and reliability of the five constructs are presented in Table 1. All Cronbach’s alpha coefficients are satisfactory because they are all above 0.70. All the average variance extracted are above 0.50 and all composite reliability values are larger than 0.70. These results suggest that the internal consistencies of the construct are satisfactory. The factor loadings of the respective variables are presented in Fig. 2-5. All factor loadings are above 0.50. In conclusion, it can be stated that all constructs on reliable.

Table 1. Reliability and Validity of constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Cronbach's Alpha</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
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<tr>
<td>Procurement Governance</td>
<td>Tender packaging by contractors when bidding</td>
<td>0.809</td>
<td>0.527</td>
<td>0.906</td>
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<td></td>
<td>Procurement management knowledge in bidding process</td>
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<td></td>
<td>Level ground among bidder in the use of PPA 2007</td>
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<td></td>
<td>Contract not awarded to the lowest bidder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Procurement monitoring by civil society organization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction Costs</td>
<td>Owner’s Behavior</td>
<td>0.724</td>
<td>0.604</td>
<td>0.881</td>
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<tr>
<td></td>
<td>Contractor’s Behavior</td>
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<tr>
<td></td>
<td>Project Management Efficiency</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transaction Environment Uncertainty</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Tendering Process</td>
<td>Bid examination</td>
<td>0.871</td>
<td>0.617</td>
<td>0.939</td>
</tr>
<tr>
<td></td>
<td>Bid evaluation</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Bid comparison</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Bid Verification</td>
<td></td>
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<tr>
<td>Contracting Business</td>
<td>Profit retained margin</td>
<td>0.771</td>
<td>0.882</td>
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<tr>
<td></td>
<td>Competition</td>
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</table>
Sources: SPSS Output

**Confirmatory factor analysis (CFA)**

According to the result of CFA the model fit was examined by inspecting the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the parsimonious goodness-of-fit index (PGFI), the comparative fit index (CFI), the root mean square residual (RMR), and the root mean square error of approximation (RMSEA) (Hair et al. 2006). The $\chi^2$ value was 1.345 > 3.00. For the acceptable model fits, the GFI, NFI, TLI and CFI indices should be greater than 0.90, the AGFI greater than 0.80, the RMSEA between 0.05 and 0.08, $\chi^2/\text{df}$ less than 3.0, the RMR less than 0.05, and the PGFI greater than 0.5 (Brown and Cudeck 1993; Teo and Yu 2005). The model fits the data well. As seen in fit indexes figure 2, all parameters are within recommended boundaries. Furthermore as seen in Fig. 2-5, all the observed variables load highly and significantly onto their respective latent variables. In addition, all the constructs are positively and significantly correlated with each other except one construct.

![Figure 2: Structural Equation Modeling for Procurement governance Influence](image-url)
The structural model presented in Fig. 2 explains the relationships between the latent variables by means of the direction of the paths between the variable and the strength of the path coefficients. Whereas the numbers on the arrows directed to the variables in the rectangular boxes represent the factor loadings, the numbers on the arrows between the latent variables in the oval boxes represent the path coefficients. As seen in list of fitness indexes, all parameters conform to recommended values, for both GFI, AGFI, NFI, TLI, CFI, Chi-Sq/df and RMSEA being within the recommended 0.90.

Furthermore, according to Hu and Bentler (1998) and Marsh et al. (1988), most fit indices, but particularly GFI and AGFI, are influenced by sample size and should not be interpreted independently of sample size. A larger sample could generate higher fit indices (Jackson 2001). Given the relatively small size of the sample, one can state that the model fits the data well.

**Discussion**

The result of Hypothesis I Test: Procurement Governance influences transaction cost.

The first hypothesis will be tested by seeing the paradigm reflecting its hypothesis which is the influence of procurement governance (x) to transaction cost (h1). The result of Hypothesis 1 test is presented in figure 2. However, the model indicates that a procurement governance on the part of the government does not increases transaction costs of a contractor because the path coefficients are not significant at \( \alpha = 0.05 \). It appears that the procurement governance does not have an effect on transaction costs. According to the factor loadings presented in Fig. 2, to achieve minimum transaction costs, the contracting firms should have a good understanding of the procurement law (such as good tender packaging, knowledge on procurement, and try to be the lowest responsive tender among the bidders). Similarly, the contracting firms should always maintain a good behavior with the client in any bidding process and engage the services of professional to prepare and supervise all his tendering aspect. This will reduce the contracting firms transaction cost. It is believed that the procurement governance will always improve contracting activities by eliminating unnecessary costs incurred by contractors when tendering as stated by the Act 2007. Therefore, procurement governance does not have negative effect
to transaction costs as hypothesis (Onyema, 2011; Jacob, 2010), but rather improves it.

**The Result of Hypothesis II Test: Transaction Cost Influences Contracting Business**

From figure 3 below the path (Arrow) and it coefficients, which indicates how much the effects of Transaction costs (exogenous) construct on the respective contracting business (endogenous) construct. From the path coefficient of Transaction costs to Contracting business is 0.27. This value indicates that for every one unit increase in transaction costs, its effects would contribute 0.27 unit increase in contracting business. And more importantly, the effect of transaction costs on contracting business is not significant (p > 0.05). Thus, the hypothesis that transaction costs have significant influence on contracting business is not supported. This could be true looking at the nature of profit or gain contracting firms made for any contract they won, which can cover almost all their transaction costs spent in bidding other projects. It has always seen that contracting firms have improved their behavior with the clients, sub-contractors and consultant, which is believed to have reduced their transaction costs (Li et al., 2012). Another factor to such effect is proper project management, understanding the environment and well experience in the projects they bid. It could be explained that the higher the transaction cost, the less the growth, profit and competition in the contracting business. It happens because of insufficient understanding, knowledge and technical knowhow from company’s owner about business and company knowledge, all regulations about the procurement and owner’s behavior in order to make quick decision, and improvement of internal control system (Eddy, Maryunani, Ghozalimazkie, Khusaimi, 2014).

The emergence of economic transaction cost, according to Williamson (1990) is because of market failure as the consequence of opportunistic behavior and limited rationality of transacting parties. In economic transaction cost assumes that companies tend to search for the cheapest transaction cost, such as comparing transaction cost between market transaction with transaction cost in the company itself (hierarchical transaction) or as known as a term “make or buy” In accordance with Milgron and Roberts’s (1992) statement stating that transaction cost includes all loss which emerge from decision makings, plans, regulations, or
inefficient agreement, and imperfect enforcement of agreement. In summary, transaction cost covers all costs that affect performance from various natural resource organization and production activity.

Figure 3: Structural Equation Modeling for Transaction Costs Influence

The Result of Hypothesis III Test: Procurement Governance Influences Contracting Business

In this paper, the third hypothesis that procurement governance influences contracting business is verified by the data because the path coefficient has a positive sign and is significant at a $\alpha = 0.05$. Figure 4 above shows the result of the path coefficient of procurement governance to contracting business as 0.83. This value indicates that for every one unit increase in procurement governance, its effects would contribute 0.83 unit increase in contracting business. And more importantly, the effects of procurement governance on contracting business is significant ($p<0.01$). thus, the hypothesis that procurement governance has significant effect on contracting business is supported as shown in Table 1.

Table 1: Standardized Regression Weights

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTING_BUSINESS</td>
<td>0.759</td>
<td>0.151</td>
<td>5.026</td>
<td>***</td>
<td></td>
</tr>
</tbody>
</table>

Source: AMOS OUTPUT

This could be attributed due to the reformed in the procurement governance by the government which has helped to confront the problems caused by
corruption, fiscal irresponsibility, non-value for money, absence of public financial control, paucity, and non-use of certified procurement staff. This problem has resulted in time and cost overrun in much government expenditure (Ogbanna & Kalu, 2012). In addition, the huge cost incurred by the government in the procurement of goods and services could not be reasonably justified. With the improvement in the procurement governance many contracting firms were affected due to non-compliance and poor performance in terms of competition, growth and retained profit margin. Only contracting firms that mean business and are ready to comply with the Act are performing very well in the last 10 years. Uncertainty in the transaction environment also reduces project management efficiency, whereas predictable owner and contractor behavior enhance project management efficiency, which in turn affects transaction costs.

![Figure 4: Structural Equation Modeling for Procurement Governance Influence on Contracting](image)

Based on the analysis result above, it's proved that procurement governance has significant effect to contracting business. Positive marked coefficient indicates that the higher the procurement governance the higher the contracting business resulting value for money, certified procurement professionals and accountability in all government expenditure when carrying out procurement activities. On the contrary, the fewer contracting firms will result in the less competition in the sector.

The result of this research supports the statement of Onyema (2011), and Jibrin, Ejura and Augustine, (2014)) that procurement governance (PPA
2007) could influence the contracting business, in which one of parties tries to minimize information gap by making some efforts to expense some amount of transaction cost which has to be guaranteed by parties who transact in condition such as fake information situation, actors who behave opportunistically, and actors with limited rationality. Transaction cost approach acknowledges that many business trades characterized as imperfect or asymmetric in which the underlining concepts of transaction cost are limited rationality, opportunistic behavior, specified asset, and asymmetric information. (Hobbs,1997).

The Result of Hypothesis IV Test: The mediation effect of Procurement governance to Contracting business through tendering process

The fourth hypothesis test in accordance with the paradigm of this research was done to test the mediation effect of procurement governance (X1) toward contracting business (Y2) through tendering process (Y1). Figure 5 shows diagram of structural equation modeling as a result of calculation using a program AMOS. The significance of the effect of procurement governance to contracting business through tendering process is (0.68*0.27)= 0.18. Procurement governance to contracting business is 0.98. It means that the direct effect is higher and significant at (P<0.05) than the indirect effect 0.18 and not significant at (P>0.05) as shown in Table 2 below. Therefore, the hypothesis is not supported and tendering process does not mediate the effect of procurement governance on contracting business.

This mean tendering process is not a mediating variable in the relationship between procurement governance and contracting business

Table 2: Standardized Regression Weights

<table>
<thead>
<tr>
<th>Construct</th>
<th>Constructs</th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENDERING_PROCESS</td>
<td>---&gt; PROCUREMENT_GOVERNANCE</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTRACTING_BUSINESS</td>
<td>---&gt; TENDERING_PROCESS</td>
<td>-0.320</td>
<td>.422</td>
<td>-.759</td>
<td>.448</td>
</tr>
<tr>
<td>CONTRACTING_BUSINESS</td>
<td>---&gt; PROCUREMENT_GOVERNANCE</td>
<td>1.707</td>
<td>.588</td>
<td>2.904</td>
<td>.004</td>
</tr>
</tbody>
</table>

Source: AMOS OUTPUT

In addition, contracting business is not been affected by introducing tendering process as stated by the procurement governance. Therefore, contracting firms should give more emphasis on how the procurement governance operate in terms of bidding, awarding, packaging and responsiveness. Since they are part of the factor the construction client will
give more emphasis during the tendering process. The direct effect of the procurement governance is more than the tendering process as shown in figure 5 and almost all the guidelines or procedures stated in the tendering process are extracted from the procurement governance, since it is the legal framework for contractual business between the private firms and the government in Nigeria. This indicates that a sound knowledge on procurement governance can increase the chances of a construction firms in winning any federal government works as shown by the result.

Figure 5: Structural Equation Modeling for mediating effect of tendering process on Procurement Governance

Conclusions and Recommendations
The purpose of this study is to the effect of procurement governance, transaction costs to contracting business and tendering process in Nigeria. Procurement governance (PPA 2007) is to ensure transparency, competitiveness, value for money and professionalism in the public sector procurement system. In addition, the law is to ensure openness of the procurement procedure, free competition of suppliers as well as equal and fair attitude thereto, effective use of state and local government funds and to reduce the risk of the commissioning party to the minimum. Public procurement is important because of its role in the development process, the amount of resources it consumes, and its susceptibility to undue influences. A 2006 study by Transparency International found that public procurement amounts to about 15-30% of GDP or more in many countries (Ekwekwuo, 2016). It estimated procurement-related corruption at normally
10% to 25% and in some cases as high as 40 to 50%, of the contract value. It also found that few activities create greater temptations or offer more avenues for corruption than public procurement. In this paper, procurement governance in relation to construction projects was established by reconciling the views of different researchers, PPA 2007 and an empirical study was conducted to find the effects of procurement governance, transaction costs to contracting business and tendering process. The effects procurement governance on (1) transaction costs, (2) contracting business, and (3) tendering process, and their relationship between them were investigated. Data were collected by means of a questionnaire survey that was administered to the contractors of ministry, department and agencies MDAs listed by the Bureau of public procurement BPP website. The collected data were analyzed using structural equation modeling. The reliability of the constructs used in the model is high, and the fit indices of the final structural model are satisfactory. The findings of the study and their implications are as follows:

1. Procurement governance has no significant effect to transaction cost. It indicates that when the value of procurement governance arises by 1 unit, it will increase transaction cost by 0.26. It means that the more improvement in procurement governance the less increase in transaction cost. This result supports a research conducted by (Onyema, 2011; Jacob, 2010) in which stated that improvement in procurement Act will minimize unnecessary costs spent by contracting firms in bidding projects in Nigeria.

2. Transaction cost has significant effect to contracting business. It indicates that the transaction costs of contracting firms are not significant, in which it can affect their business. These result confirms the argument by the Bureau of public procurement, that the Act has bring accountability and transparency in the procurement sector in Nigeria. In which the transaction cost are very minimal in such a way that it cannot affect the contracting firms (PPA 2007).

3. Procurement governance has significant effect to contracting business. It indicates that the higher improvement in procurement governance the higher the improvement in the contracting business sector and in the contrary, the less Improvement in the procurement governance the worse in the contracting business area. The result of this research supports the statement of Onyema (2011), and Jibrin, Ejura and Augustine, (2014)) that procurement governance (PPA 2007) could influence the contracting
business, in which one of parties tries to minimize information gap by making some efforts to expense some amount of transaction cost which has to be guaranteed by parties who transact in condition such as fake information situation, actors who behave opportunistically, and actors with limited.

4. Procurement governance has insignificant influence to contracting business, through tendering process as a mediator. By having negative indirect effect, it means that the more improvement in procurement governance the less contracting business activities if the procedures of tendering process is also improved.

Based on the findings of this paper, the procurement governance effects can be reduced if the contractor and the client minimize transaction uncertainties formulate in the bidding process, understands well the procurement guideline as stipulated by the Bureau, and pays attention to project management efficiency. Unlike most other research in this field, this paper provides a complete picture of the procurement governance effect on contracting business and transaction costs in construction projects, and concludes that both client and contractors can reduce procurement governance effects by promoting (1) fairness in the award of contract to the lowest bidder, (2) harmonious relationships between project client and contractor, (3) sound knowledge on construction project procurement by both parties, (4) effective project management practices, and (5) Procurement monitoring by civil society organization approved by the Bureau of public procurement (BPP).

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THE NEXUS BETWEEN INFORMATION AND COMMUNICATION TECHNOLOGY IN THE 21st CENTURY AND REAL ESTATE SURVEYORS AND VALUERS ROLES IN NIGERIA.

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ABSTRACT
Hitherto, real estate activities are performed by the estate surveyors and valuers manually thereby proved to be hectic, cumbersome and time-consuming. This paper exploits the connection between information and communication technology in the 21st century and real estate sector. The paper examined the immense roles played by estate surveyors and valuers and the contribution that ICT gives in the various functions performed by estate surveyors and valuers in the discharge of their duties. It also affirms that ICT has the capacity and capability to influence the activities of estate surveyors and valuers in relation to their roles such that when properly exploited, a lot of dealings can be done at the comfort of the office giving room to carry out transactions with people in the outside world in safety and comfort.

Keywords: information and communication technology, real estate surveyors and valuers, roles,

Introduction
Progress in all spheres of human activities necessitates changes. It is impossible for individual, private, corporate or governmental organization to improve by always staying at the same level of development. No change may be an option but it involves risk because others may change and in a competitive sense move ahead (Porter, 1995).
Information and communication technology has been in existence in the developed countries for quite a long period of time and therefore its application can be witnessed in almost every sector of their respective economies. In the developing nations however, modern information and communication technology was introduced in the recent past and as such it
is considered a current issue which is given serious attention from both private and public sectors because of it is enormous importance (Charles, 2005).

**CONCEPT OF INFORMATION AND COMMUNICATION TECHNOLOGY**

Most new ideas consist of technological innovations and it has been observed that in the recent past it has become the most widely discussed issue globally (Rogers, 1995).

Information and communication technology (ICT) is an umbrella term that includes any communication device or application encompassing: radio, television, cellular phones, computer and network hardware and software satellite system and so on, as well as the various services and applications associated with them. It is the application of products of scientific research that is used in the development process and other economic activities (AL-Agba, 2006).

Information and communication technology which is an electronic based system of information transmission, reception processing and retrieval has drastically changed the way we think, the way we live and the environment in which we live and the dynamic change in all aspect of human existence is the key by-product of the present globalization period of information and communication technology revolution (Cartelli and palmer, 2004). The world telecommunication system, the convergence of computer technology and communication into the information technology, with its components and activities, is distinctive in its extension and complexity and is also undergoing a rapid and fundamental change which inherent economic incentives as transaction costs could be lowered and the horizon of activities could expand beyond local business to the one that is global (Anan, 2001).

According to Twiss (1992) technology is widely accepted as a major stimulus for change in the society. Willcocks (1997) opined that information and communication technology (ICT) has provided more than just a new competitive weapon for commerce, industries and governmental organizations.

As Faye (2000) has pointed out, information and communication technologies are offering even less developed countries a window of opportunities to leapfrog the industrialization stage and transform their
economics into high-value added information economies that can complete with the advanced economics on the global market. According to McMahan (2006) the revolution taking place in information and communication technology has been the central and driving force for globalization process. Both developed and less developed countries cannot afford to miss out on the opportunities these technologies are creating. This is further buttressed by Sun (2004), as he opines that the impact of information and communication technology on modern society is profound and its growing speed has enabled globalization especially through the introduction of a global system of interconnected computer networks known as the “internet” used for communication between individuals, companies and institutions for sharing and exchanging information and data.

CONCEPT OF REAL ESTATE
Real estate is a term that encompasses land with improvements to the land, such as buildings, fences, well and other site improvements that are fixed in location, that is to say they are immovable (Littlefield, 2001). According to Woychuk (2004) the term real estate surpasses land and buildings but rather it include all the various “interests” subsisting in them. The “interest” can mean either an ownership interest (also known as freehold or a fee-simple interest), or a leasehold interest. In the freehold or ownership interest, the owner is entitled to the full rights of ownership, that is to say they are immovable (Littlefield, 2001). In the other side of the relationship, a leasehold interest only exits when a land owner agrees to pass some of his rights temporarily to tenants in exchange for a payment of rent. Any interest in landed property giving risk to a measure of control and for estate management purpose, it may be regarded primarily as the unit of control (Thorncroft, 1965). It can be surmised that the components of real estate are land and buildings and anything that is not permanently fixed to the land is regarded as a personal property. According to Kemerman (2001) land is any portion, large or small, of the earth surface, considered by itself, or as belonging to individual or a people, as a country, estate, far, or tract. It is the earth’s surface over which ownership rights may be exercised. These rights relate not just to surface
area of land but it also include things permanently fixed by nature such as trees, and to the things attached by man such as buildings and to those objects that are considered of value embedded either above or below the surface of the earth. Land could mean resources and the forest that are given freely by nature for man’s aid. It was further stressed that land also include materials in land and water, in air, light and heat (Marshall, 1920). Land is the most fundamental of all factors of production that is needed for physical development to realize. Land is limited in supply and there is the need to carefully manage and maximize its use (Raleigh, 1961).

The concept of land as a property involves real estate and has legal consideration. It is concerned both with the areas over which individuals, groups or sovereign power exercise rights of ownership and use with the nature of the rights and responsibilities they hold in land (Tinrer, 1975). According to Simpson (1970) land is the source of material wealth. Land is a surface upon which life takes place (marc, 1987). In this sense, land is fixed in quantity and supply and is indestructible.

A building is any human-made structure used or intended for supporting or sheltering any use or continuous occupancy (Mccowney, 1992). A building is a permanent or temporary structure enclosed within exterior walls and a roof, and including all attached apparatus and equipments which are also part of the building (Drindeur, 1990).

Real estate which is information-intensive business has witness gigantic changes in the way transaction are carried out. It has move from its former cachet of slow, time wasting, energy requiring and high capital demanding to the one that is fast, consistent, efficient, energy and money saving brought about by a ‘monster’ called information and communication technology (Zaman, 2010).

According to Allbritton (2001) carrying out activities in the field of real estate has now been made easy by the introduction of information and communication technology as it provide a speedy means of sending and retrieval of information from one person to another, or organization to organization and also provides a more faster opportunities to users, a sheer amount of information organization and storage for later identification and retrieval. This saves time and energy as a very large amount of information and data can be stored in a simple electronic device with efficiency which can be retrieved at will. This, certainly, also reduces the enormous task of going through stack of files to find out information and also provides a space...
in the office for optimum utilization which would have been occupied by drawers and shelves containing files.

REAL ESTATE PROFESSION & THE ROLES OF ESTATE SURVEYORS AND VALUERS IN THE SOCIETY.
This is a discipline known in Britain as Estate Surveying, in United States it is called Land appraisal, in other places it is called land economics. While in Nigeria, it is popularly known as Estate Surveying and Valuation/ Estate Management.

In Nigeria the real estate profession is vested on the Estate surveyors and Valuers who are professionals by qualification and the profession is regulated by the Nigerian institute of estate surveyors and valuers in conjunction with the Estate Surveyors and Valuers Registration Board of Nigeria.

ROLES OF ESTATE SURVEYORS and VALUERS IN THE SOCIETY
The following are considered as the various roles of Estate Surveyors and Valuers in all matters relating to land and landed properties in the National economy;

Property Valuation Services
According to Laremo (2000) valuation is the art of estimating the monetary worth of an interest in property for a particular purpose at a particular time taking into consideration all the features of the property and any other factors likely to affect the value being estimated. According to the Royal institution of charted surveyors (1998) valuation is the provision of written opinion as to the capital value or price or rental value or price on any given basis in respect of an interest in property with or without associated information, assumption or qualification.

Olusegun (2002) asserts that Carrying out valuation exercise in determining the monetary worth/value of land and buildings, plant and machinery, furniture and fixtures etc, for whatever purpose (sales and purchase, foreclosure, compensation, mortgage, probate, going concern, Rating, auction, etc) is one of the sole responsibilities of an Estate Surveyor and Valuer as he/she is statutorily authorized to do likewise through the provisions of the Estate Surveyors and Valuers (Registration, Etc) Decree.

Real Estate Agency Services
According to Stapleton (1998) ‘’ the spatial relationship between an agent who agree on behalf of a person (principal) concludes a contract between the principal and the third party is referred to as agency’’ the principal is the party that directs and control the actions of the agents while the agent is that person that acts on behalf of the principal (client). Also, third party seekers to deal with the principal through the agent.

Thorncroft (1965) viewed estate agency as a relationship resulting from agreement authorizing agent to respect, act for and be subject to control of a principal in dealing with a third party

The function of estate surveyor and valuer in this context involves buying, selling and leasing of land and landed properties for any purpose. It may also include advisory function to the client on the sales /purchase value, rental value and to establish the authenticity of ownership or otherwise. In other words, he represents his client in matters relating to land such letting, buying, selling etc. (Bello, 2013).

Property Management and Maintenance Services
The roles of estate surveyor and valuer here includes; the selection of good tenants who are expected to pay their rent as and when due, carrying out proper maintenance( routine, preventive, or corrective) on the property which he is managing to ensure optimum returns as well as to ensure that the property retains both its functional and aesthetic values, run a background check on all prospective or would-be tenants to ensure their rent payment ability, preparation of a lease agreement document for both tenant and landlord, advertising the landed property through various mediums which may include electronics and the print media to prospective tenants, carry out moving-in inspection to ascertain the condition of the property when a tenant is occupying it, carry out a schedule of property dilapidation prior to the tenant moving out, supervision of all minor and major remedial works on the client’s property been managed, and finally, he represents the beneficial interests of the property owner (Bello, 2013).
Facility Management Services
This is primarily concerned with supporting business organizations irrespective of their size and scope to focus on the core competencies of their business activities, which in turn contributes to broader business and financial goals. The professional Estate Surveyor and Valuer here is; to carry out regular, scheduled inspection and maintenance of office building’s air-conditioning, electrical/mechanical, plumbing and fire-fighting systems, among others on the building facilities as well as performing all forms of maintenance, cleaning, and to perform health and safety management functions for the occupants of the building and to ensure that all building assets and components are in good condition.

Feasibility and Viability Services
Hofstrand (2009) revealed that feasibility study is the study or analysis of the viability of an idea of business. The feasibility studies focuses on helping to answer the question of ‘’ should we proceed with the proposed project idea?’’

A viability study is the in depth investigation of the profitability of a business idea to be converted into a business enterprise (Mandell, 2002). This is therefore, undertaken by an estate surveyor and valuer, on behalf of his client to ascertain the profitability and the practicability of a contemplated line of action in relation to real property investment. A feasibility and viability report that is well prepared by an Estate Surveyor and Valuer will help reveal and identify to project initiators/owners if the proposed property development will be a failure or success, as it will highlight all the likely problems and risk factors that might break or make the entire project. Real estate investors that want to determine the value/worth of the type of properties they are to purchase and/or develop in order to know how much income/profits the investment will generate in the short and long term must make it mandatory to employ the services of a professional Estate Surveyor and Valuer. In carrying out the investment appraisal exercise, the Estate Surveyor and Valuer relies on the various investment appraisal techniques and tools in advising prospective real estate investors about the returns on their real estate investments as well as its market value in the short and long term.
Project Management Services
The role of estate surveyor and valuer here is to; act as project manager to the project owner/initiator, Screen and select allied professionals and construction team, carry out preliminary project design and cost estimate prior to project execution, help the client to obtain necessary building permit/approval prior to development activities, advise and assist the client with project funding, and to carry out post-construction management and maintenance.

Project Development Services
Lesser (1963) state that real estate development or property development is a multifaceted business, encompassing activities that range from the renovation and re-lease of existing structures or buildings to the procurement of a bare land and the sale of improved land or parcels to others.
The role of estate surveyors is to buy land, finance the real estate deal either with personal money or money obtained through loan. Build or have builders build the project, create, control and orchestrate the process of development from the beginning to the end (Louis, 1974).

Expert Witness Services
In court cases relating to various types of real estate disputes involving different classes of people, the professional services of the Estate Surveyor and Valuer can be sought either by the court, plaintiff or appellant as an expert witness to shed light and his professional expertise on the real estate area that is not clear or known to them, so as to help present the client’s case to the court depending on who requires the services of the Estate Surveyor and Valuer in the court of law (Babawale, 2002).

Property Arbitration Services
The Estate Surveyor carry out different types of property arbitration and mediation services arising from all forms of disputes which may arise between landlord and tenant or property buyer and seller. The aggrieved parties instead of taking their grievances to court of law may decide to employ the services of an estate surveyor and valuer to mediate between them using his professional knowledge and skills to settle the matter amicably in a non-judicial manner any property arbitration matter is to seek
for ways to solve the dispute between the aggrieved persons amicably and peacefully without any form of bias been felt by either side.

CONCLUSIONS
Having reviewed some literatures on Information and Communications Technology, real estate, and the roles of estate surveyors and valuers, it is glaring that the way real estate dealings are been done in the past has clearly improved with the introduction and use of information technology in the real estate sector. Phones and other communication gadgets such as internet can be used by estate surveyors at the comfort of their offices to carry out one form of transaction or the other such as property marketing through advertisement on the internet, property valuation and management using software, portfolio and asset management software and so on. This helps in making the job easier, saves time and operational cost, increased productivity, facilitation of decision making, and providing the users with competitive advantage over others. All these promotes efficiency in the way estate surveyors and valuers perform their functions.

However, there is still the need for professionals to explore more on the use of ICT which they have not adopted and the need for training and re-training in order to meet the challenges of the 21st century in the area of information and communication technology as the world has become a global village.

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PROPERTY RATING: A PARADIGM FOR COMPARATIVE STUDY BETWEEN MALAYSIA AND NIGERIA

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Abstract
Local government was enjoined to look inward for their revenue generation; specifically revenue from property rating offers an attractive source of internal revenue. To this end, several countries set up rating machineries to help administer it, this research work tries to examine the viability of property rating in Malaysia and Nigeria by examining the revenue generated and ways which it can be improved, also assessing its potentials and problems with a view towards solving the problems. The data was obtained through preliminary investigation using structured interview, observation and document review. Analysis was made using tables, simple charts and percentages; the study shows that there is justification and worthwhileness in the imposition of property rating in the municipalities of the two countries, the study also revealed that there is a wide gap between the expected revenue and the revenue realized in both countries, the potentials of property rating can never be harnessed until this vacuum is filled through employing professionals at local authority and application of technology for social and economic development.

Keywords: Economic Development, Property Rating, Revenue Generation, Technology, Viability.

Background of the Research
Historically, both Malaysia and Nigeria are British colonies. Property rating and taxation was introduced to ameliorate the poor with provision of basic amenities and infrastructures and to the local populace. It is part of government responsibility to its citizenry; this is this kind of services that is
in high demand in the local governments. “Local government is any
government that covers an area smaller than a state; this includes: villages,
towns, school districts, counties, fire protection districts and the
likes”. (Bryon, 2007). Local government is categorized as the third tier of the
government and more closer to the local communities hence tied up with the
enormous task of task of providing adequate facilities and utilities to the
immediate society and also to promote social and community development
within the same said area such as schools, water supply, road construction,
market stalls, street lights etc. More so, as government is the means by which
common problems and needs of a community is catered for, so as local
community revolves jointly to those common problems and needs and
redirect them to the local authority according to (Olaoye, et.al, 2009).

However, this paper intends to examine property rating as a viable source of
finance to local government administration in Malaysia and Nigeria. The
amount of revenue generated is below the expected turnover due to issues
of tax arrears according to (Soeb Pawi, et.al, 2011). The measurement of
performance of property rating is very important in order to efficiently
manage the services and maintenance for development of sustainable local
authorities. While in the Nigerian context the problem of insufficient
working materials, inadequate staff, poor system of property rating which
has its base in poor administrative set-up, there is also the problem of the
rating edict and host of other problems has seriously cripple the revenue that
is generated from property rating. Some of the obvious logistic problems of
property rating administration in the country include lack of basic equipment
like computers that could have been used for processing and information
storage for future use (Falodun, 1996). It’s in this regard that an attempt is
made to establish the merit of property rating as a source worthy of
consideration in local government decisions and to what extent did property
rating contribute financially to the local government and how does it affects
the administrative system as a corollary to the delivery of infrastructural
facilities, utilities and services by the local authorities.

A Comparative Analytical Framework
The first criteria that compelled the researcher to choose the two countries is
both Malaysia and Nigeria was colonized by Britain. The structure of the
administrative set-up of Malaysia and Nigeria are offspring of the British
system, therefore they have similar institutions serving similar functions,
hence the name of rating authority Batu Pahat Municipal Council (Malaysia) and Kaduna Municipal Area Council (Nigeria), these local councils are saddled with the responsibilities, part of which is property assessments, property rating, tax collection at local level, also to use these resources for provision of infrastructure e.g. roads, transportation systems, sewage disposal, health care services e.t.c. This establishes a baseline for comparison. However, the framework specifically examines the following aspects.

➢ Property assessment
➢ Land tenure system
➢ Property Gain Tax

<table>
<thead>
<tr>
<th>Malaysia</th>
<th>Nigeria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Tax = Tax base x Capital Value + Value of Land</td>
<td>Tax Revenue = Tax basis x Depreciated cost of replacement + land value</td>
</tr>
<tr>
<td>Real Property Gain Tax 1976</td>
<td>Capital Gain Tax/Profit Tax</td>
</tr>
<tr>
<td>An Act to provide for the imposition, assessment and collection of a tax on gains derived from the disposal of real property and Matters incidental thereto. [7 November 1975]</td>
<td>Capital Gains Tax (GGT) is presently chargeable at 10% on Capital gains arising from disposal of assets. The act of 1976 defines chargeable assets as meaning all forms of property whether situated in Nigeria or not and including:</td>
</tr>
<tr>
<td>Taxation of chargeable gains 5% (w.e.f, 2010).</td>
<td>(a) Options, debts and incorporeal property generally;</td>
</tr>
<tr>
<td>3. (1) A tax, to be called real property gains tax, shall be charged in accordance with this Act in respect of chargeable gain accruing on the disposal of any real property (hereinafter referred to as “Chargeable asset”).</td>
<td>(b) any currency other than Nigerian currency; and</td>
</tr>
<tr>
<td>(2) Subject to this Act, the tax shall be charged on every ringgit of the total amount of chargeable gains accruing to a chargeable</td>
<td>(c) any form of property created by the person disposing of it, or otherwise coming to be owned without being acquired. In respect of assets outside Nigeria and CGT is chargeable on that part of the gains (if any) received or brought into Nigeria when they are dealt</td>
</tr>
</tbody>
</table>

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Person in a year of assessment in respect of each category of disposal of chargeable assets specified in Schedule 5.

Rate of tax

4. (1) The tax shall be charged at the appropriate rate specified in Schedule 5 in respect of each category of disposal stated therein.

Tax Base 0.4% of CV (Residential), 0.7% of CV(Commercial), 0.2% (Agricultural lands)

with “Capital loss on disposal of any asset is not deductible from capital gains on disposal of any other asset even if both are of the same type

Tax Base 0.4k in N (Residential)

➢ Property tax generate

Table 1.1 showing Different Comparable Variables
Source: Farida Ahmad; Loo Chen (2008), Kuye (2002).

Properties Rating in Malaysia
The Malaysian government has entrusted the local government to create sources and to generate their revenues, the local government act of 1976 (LGA, 1976) allocated the taxing powers among local government units to collect property taxation rates. The tax is applicable to all range of real estate such as land and landed properties while exemption is given to real estate’s owned by government, charitable institution and religious buildings. The property rating is based on improved/market value or an annual value, It varies from one local government to another, sometimes based on targeted amount set forth by each local authority. (Zulkarnain, et.al, 2011). The targeted amount is set so as to meet their pre-determined annual financial budget which comprises of the cost to provide public services, infrastructures, maintenance etc.

Capacity Gap Assessment Among Local Authority
The research has acknowledged the key factors of areas in which, the local authorities recently having inadequate capacity and identifies the future gaps by means of the data collected. Consequently this would guide most of the
councils to understand the immediate environmental factors responsible, these are:

a) Lack of application of advance technology
b) Long-time frame for policy implementation
c) skilled personnel
e) Revaluation/ assessments issues

Figure1.1: A Conceptual illustration of Capacity Gap Source: (Zulkarnain, Chitrakala.2011)

For example, the basic real property tax rate was set at 0.1%-0.5% of improved/market value (0.4% of annual value) for residential properties 0.7% of market value of annual value for commercial and industrial properties. Agricultural property is imposed at lower rates compared to residential, commercial and industrial properties. The rate is highly dependent on the targeted amount of tax to be collected and also on the market/annual value of the property. The higher the market/annual value, the lower the tax rate will be imposed.

Review of Problems Associated with Property Rating in Malaysia

Property rating in Malaysia is an offshoot of the British administration. Property rating in the country in some areas of the country is experiencing a declining trend. According to the Economic Report of the Ministry of Finance, revenue of tax collection performance in local authorities throughout the country reveal a worrying decline in the rate of decrease of 11.7% recorded in 2007 and 0.3% in 2008. The implications of the tax reduction has resulted in a deficit spending of RM75 million and RM179
million in 2007 and 2008 due to the growing prevailing costs. Collection of property tax revenue statistics generally show the majority of Malaysian local authority generate property rating tax of less than 60% of the total tax collectible. Johor state, for example, the amount of property rating arrears recorded for all local authorities amounted to about RM168 million in 2009 it is considerably an issue of concern. The issue of lower tax revenue in Malaysia that is collected from the monthly and annually report are examine to indicate the percentage of property rating performance. The extent to which property tax are levied is mostly determined by central authorities as such there is reluctance in granting autonomy to the local government when it comes to taxation. “One explanation is simply that central authorities are reluctant to grant such autonomy to the local governments.”(Ebel & Taliercio 2005). The problems faced by the local authorities are:

i) Tax collection issues as such led to high debt.
ii) Inadequate up-to-date record of taxable properties.
iii) Tax assessment issues
iv) Challenges in application of process and technology integrated systems: This enable an individual to manipulate high technology according process integrated framework ‘it reduces errors, increase accuracy, consistency and reduce work load, its referred to as computer assisted mass appraisal system for property tax administration.(Zulkarnain,et.al 2010).

**Property Rating in Nigeria**

Local administration in Nigeria can be traced to the colonial period. Available record shows that the first local administration ordinance was the Native Administration Ordinance No. 4 of 1916 which was designed to evolve from Nigeria’s old institutions the best suited form of rule based on the people’s habits of thought, prestige and custom (Bello-Imam 1990). These local administrations were used in the north eastern expected to take on larger developmental responsibilities. The revenue allocation has continued to vary in proportion over time. At present, local government receive 20 per cent of the federation account. In addition, proceed from the value added tax (VAT) are also allocated to them. Presently, VAT’s allocation is 35 per cent based on equity of states (50 per cent), population (35 percent) and derivation (2 percent).The 1976 local government reforms states the internal revenue sources of local governments to include:

a) Rates, which include property rates, education rates and street lighting.
b) Taxes such as community, flat rates and poll tax.

c) Fines and fees, which include court fines and fees, motor park fees, forest fees, public advertisement fees, market fees, regulated premises fees, registration of births and deaths and licensing fees; and
d) Miscellaneous sources such as rents on council estates, royalties, interest on Investment and proceeds from commercial activities.

Review of Tax Associated Issues in Nigeria

Some of the issues facing rating administration are:

i) Issues of tenement rate edict

ii) Administrative issues

iii) Lack of proper records

iv) Unrealistic rate collection machinery

v) Poor rating administration and valuation

vi) Misconception of taxation relating to real estate

vii) Poor technical staff at local government level.

Methodology

The methodology adopted was observation and document review. Sampling technique was employed using six municipalities which were selected at random in both countries. The discussion of findings was based on issues related to the prevailing situation with regards to the system of property tax in the two countries. The research paper surprises by literature review from journals, conference papers, articles and internet, with objectives stated and problems identified and scope is determined, which of course is selected municipals in Malaysia and Nigeria. Data was collected through structured interview, observation, and reviewed literature, and then analyses were made based on findings, then conclusion, was made and recommendation.

Findings

The research discovers that property rating is indeed a very lucrative source of revenue if administered efficiently. Within the time frame earmarked for the research each municipal area has a minimum of RM 1,000,000.00 with places like pulang with more than RM 100, 000, 000,00. Result of findings is described in detailed below.
Table 1 shows the rates for different types of properties imposed by local governments in Malaysia.

Table 1: The Property Tax Rate Imposed by Local Governments in Malaysia

<table>
<thead>
<tr>
<th>Type of property</th>
<th>Annual Value</th>
<th>Improved Value (Market Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>5% - 13%</td>
<td>0.15% - 0.35%</td>
</tr>
<tr>
<td>Commercial</td>
<td>6% - 13%</td>
<td>0.2% - 0.5%</td>
</tr>
<tr>
<td>Industrial</td>
<td>6% - 13%</td>
<td>0.25% - 0.75%</td>
</tr>
<tr>
<td>Agricultural / Vacant Land</td>
<td>2% - 7%</td>
<td>0.05% - 0.25%</td>
</tr>
</tbody>
</table>

Source: Zulkarnain, Chitrakala (2011)

Table 2: Performance and Level of Achievement of Property Rating in Malaysia

<table>
<thead>
<tr>
<th>Grade</th>
<th>No of LA</th>
<th>Score/Performance %</th>
<th>Comment/Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>28</td>
<td>90-100</td>
<td>EXCELLENT</td>
</tr>
<tr>
<td>A</td>
<td>32</td>
<td>80-89</td>
<td>VERY GOOD</td>
</tr>
<tr>
<td>A-</td>
<td>17</td>
<td>75-79</td>
<td>GOOD</td>
</tr>
<tr>
<td>B+</td>
<td>14</td>
<td>70-74</td>
<td>MODERATE</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>65-69</td>
<td>MODERATE</td>
</tr>
<tr>
<td>B-</td>
<td>6</td>
<td>60-64</td>
<td>SATISFACTORY</td>
</tr>
<tr>
<td>C+</td>
<td>5</td>
<td>55-59</td>
<td>LESS SATISFACTORY</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>50-54</td>
<td>LESS SATISFACTORY</td>
</tr>
<tr>
<td>C-</td>
<td>3</td>
<td>45-49</td>
<td>LESS SATISFACTORY</td>
</tr>
<tr>
<td>D+</td>
<td>2</td>
<td>40-44</td>
<td>NOT SATISFACTORY</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>35-39</td>
<td>NOT SATISFACTORY</td>
</tr>
<tr>
<td>D-</td>
<td>0</td>
<td>30-34</td>
<td>NOT SATISFACTORY</td>
</tr>
<tr>
<td>E</td>
<td>2</td>
<td>0-29</td>
<td>WEAK</td>
</tr>
</tbody>
</table>

Total: 119
The table above shows 28 local authorities scored A+, Excellent while 32 of the local authority representing the highest percentage is graded A very good, 17 scored A-, good and 14 LA moderate with B+ and 5, 4, 3, scored C+, C, C-. Respectively Less satisfactory then 2, 3, 0, scored D+, D, D- Not satisfactory. 2 LA scored E, Weak performance.

Table 3.Total Property Rating Revenue Generated in Six Selected Municipals in Malaysia from 2004-2007

<table>
<thead>
<tr>
<th>State</th>
<th>Average Revenue RM</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulau Pinang</td>
<td>103,961,313.57</td>
<td>94.12</td>
</tr>
<tr>
<td>Perak</td>
<td>8,292,980.58</td>
<td>87.43</td>
</tr>
<tr>
<td>Negeri Sembilan</td>
<td>10,628,481.39</td>
<td>86.78</td>
</tr>
<tr>
<td>Selangor</td>
<td>59,612,590.77</td>
<td>84.82</td>
</tr>
<tr>
<td>Johor</td>
<td>17,098,607.68</td>
<td>84.08</td>
</tr>
<tr>
<td>Melaka</td>
<td>26,716,941.53</td>
<td>82.64</td>
</tr>
</tbody>
</table>

Source: Soeb Pawi, et.al. (2011)

Fig. 2 Local Property Tax Revenue Performance for the Year 2004 -2007
Table 1 and Fig. 3 Clearly display the performance of local authority property rating revenue generated between the municipals for 2004 to 2007. Decision analysis found that the state had recorded the percentage of property tax collection is Excellent Penang by 94.12%. This was followed by Perak, Negeri Sembilan, Selangor, Johor; melacca scored a point where the performance is Very good is between 80% to 87%. Only the state is in the Excellent recorded 75.71%. According to the system applied on all the local authorities in the country 4 scored A+ (Excellent), 8 LA scored A- and 10 of LA scored A, Good, very Good where they are placed and For score B + and B, there are 10 units of the District Council was graded Moderate. While a District Council is at the grade of B-Satisfied. A total of 6 function representing C +, C and C-, the status is Not Satisfied. Grade D + and D, 10 LA are in the position where is Not Satisfied. However, the majority of the LA with 49 categorized in a low (grade E) in the performance of property tax arrears. Overall, the average performance of the property tax proceeds to LA is about 41%. This represent that the outcome and performance of the property rating revenue of the Local District Council for afore mentioned period.

Table 5: Relationship between Direct Allocations and Internally-Generated Funds at the Local Government Level in Nigeria

<table>
<thead>
<tr>
<th>Date</th>
<th>Direct Allocation N</th>
<th>%</th>
<th>Grant N</th>
<th>%</th>
<th>Internal Tax Efforts N</th>
<th>%</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>18569.5</td>
<td>93</td>
<td>269.4</td>
<td>1</td>
<td>1035.6</td>
<td>5</td>
<td>19874.5</td>
</tr>
<tr>
<td>1994</td>
<td>17787.7</td>
<td>93</td>
<td>229.5</td>
<td>1</td>
<td>1205.9</td>
<td>6</td>
<td>19223.1</td>
</tr>
<tr>
<td>1995</td>
<td>22059.0</td>
<td>90</td>
<td>242.9</td>
<td>1</td>
<td>2110.8</td>
<td>9</td>
<td>24412.7</td>
</tr>
<tr>
<td>1996</td>
<td>21842.5</td>
<td>92</td>
<td>72.5</td>
<td>0</td>
<td>2027.1</td>
<td>8</td>
<td>23642.1</td>
</tr>
<tr>
<td>1997</td>
<td>20399.7</td>
<td>91</td>
<td>302.9</td>
<td>1</td>
<td>2615.6</td>
<td>8</td>
<td>21910.3</td>
</tr>
</tbody>
</table>


Ursula Hicks (1961:347) argued that property taxes were the most appropriate for municipal governments. She gave five reasons: automatic localization, clear jurisdiction, ability to pay, steady revenues for local governments and its suitability for budget balancing. Bahl & Linn (1992) have added two further reasons for a complete utilization of the property rating in developing countries. First, property rating is the most significant
local government income, it generate one-third of the local tax in cities where huge liability and benefits accrued in municipalities. Where sufficient information bank is gathered, it is debated that where tax from local authority is very significant in funding urban services; the property rating is a lucrative source of income.

Table 7. Total Property Rating Revenue Generated in Six Selected Municipals in Nigeria
From 1986-1991

<table>
<thead>
<tr>
<th>Municipals</th>
<th>Average Revenue (Naira)</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onitsha</td>
<td>123,000,000.00</td>
<td>38</td>
</tr>
<tr>
<td>Jos</td>
<td>104,000,000.00</td>
<td>25</td>
</tr>
<tr>
<td>Lafiya</td>
<td>59,500,000.00</td>
<td>27</td>
</tr>
<tr>
<td>Kaduna</td>
<td>189,600,000.00</td>
<td>54</td>
</tr>
<tr>
<td>Kano</td>
<td>92,8000,000.00</td>
<td>62</td>
</tr>
<tr>
<td>Zaria</td>
<td>89,600,000.00</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: Dele Oluwo, (2002)

Fig 3.Local Tax Revenue Performance for the Year 1986-1991

From the fig 3 above it is depicting the score point of each municipal area against what is expected to be generated from property rating which is rated in percentage. Kano score the highest 62% out of 100% expected to be
generated (B-) satisfactory. While Kaduna derived about 34% out of 100% (C) less satisfactory, and Zaria derived only 13% (E) weak turn over.

Table 8. Revenue generated in Malaysia and Nigeria

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulau Pinang</td>
<td>103,961,313.57</td>
<td>94.12</td>
<td>Onitsha</td>
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<td>38</td>
</tr>
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<tr>
<td>Johor</td>
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<td>Kano</td>
<td>92,800,000.00</td>
<td>62</td>
</tr>
<tr>
<td>Melaka</td>
<td>26,716,941.68</td>
<td>82.64</td>
<td>Zaria</td>
<td>89,600,000.00</td>
<td>13</td>
</tr>
<tr>
<td>TOTAL</td>
<td>RM46,360,912.00</td>
<td></td>
<td>N1,493,100,000.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In Malaysia each municipal council is averagely generating around RM 551,915.6 with some councils a little below the stated amount monthly, while in Nigeria N 17,775,000. is averagely generated monthly. The revenue generation can be improved in various ways which will boost the provision of social services.

**Conclusion**

Property rating is an avenue for community development; it is a good basis for transformation. Local government can generate internal revenue through property rating for developmental projects. In this research it shows that local authorities are faced with challenges but to curb it is expected that an evaluation of property tax performance will be employed to act as a background to put in place a viable and dynamic approach by the local
councils in Malaysia and Nigeria. Thus the revenue might significantly improve to pave way for the provision of essential services to the communities. However, if it is negatively employed, it may affect property tax generation, hence repulsion from the public for failing to deliver. This would culminate into non-compliance behavior. Re-evaluation of properties at least at an interval of five years should be enforced to address any depreciation or increment in value, by applying the principle of ad valorem and rebus sic stantibus. Professionals should be incorporated at the local level to improve the performance standard. In addition, adequate provision for planned evaluation of performance in order to measure progress and with the set standard.

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Dele Oluwo, (2002)
EVALUATING THE EFFECTS OF COMMUNICATION IN CONSTRUCTION PROJECT DELIVERY IN NIGERIA

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Quantity Surveying Department, Faculty of Environmental Technology, Abubakar Tafawa Balewa University, Bauchi–Nigeria.

ABSTRACT
All construction project execution requires communication between professionals in all the various stages of construction. These professionals transfer appropriate and relevant information to develop a buildable design that meets the client’s requirements. As the project unfolds and the design is realized, information in the form of drawings, specifications and construction methods must be communicated from one expert to another. Therefore, using an appropriate communication method and communication medium to resolve construction and design problems is essential. The research sampled 40 professionals working in the construction industry in Bauchi, Nigeria. The study established that within the Nigeria construction industry, there is a strong appreciation of the importance of project communication and its effects within the industry. In spite of that, there have been many hindrances to effective communication on construction projects in Nigeria. These include: unclear communication objectives, unclear channels of communication, ineffective reporting system, ineffective communication between the parties on the project, stereotyping and language difficulties. Finally, the research established that poor communication had resulted in project delays, project cost overrun and project abandonment. Project communications/communication management was also shown to strongly affect the performance of professionals within the construction industry.

Keywords: Effective Communication, Nigeria Construction industry, Communication Channel, Construction Project Delivery

INTRODUCTION
Although managers in different industries and sectors undertake diverse tasks and activities, it has long been recognized that they spend most of their time involved in communication (Baguley, 1994). If viewed as a fundamentally social activity, communication activities can include engaging in conversations, listening to colleagues, networking, collecting
information, directing subordinates, writing letters or transferring information through electronic devices such as telephones or computers. Hence, in many ways the communication affectivity of managers defines their performances as managers; superior performance demands superior communication. This introductory chapter defines the concept of communication and its importance in the context of the contemporary construction industry. It outlines the role and importance of the project manager in the communication process and discusses the way in which the issues central to effective communication are explored within this text. Thus, it provides a contextual backdrop to the ways in which communication will be explored in relation to the construction industry in the remaining section (Carlsson, B.).

Communication plays a vital role in all stages of construction such as design, production, organization and management. Statistics show that over fifty percent of projects are unsuccessful. One of the many factors that contribute to the failure of these projects is poor or insufficient communication. Information must be properly managed, transferred and understood so that the various aspects of the project can be assembled to realize the design. In Nigeria, the construction professionals who are regularly engaged in the industry are Architects, Quantity Surveyors (QS), Geodetic Engineers (GE), Structural Engineers (St.E), Electrical Engineers (EE) and Services Engineers (SE).

Statement of the problem
Ineffective communication management system in construction project delivery in Nigeria is the major cause of failures associated with construction projects. The role of communication in construction projects cannot be over emphasized as various professionals in the construction industry must communicate effectively in any given project for it to be successful. As such, the problems of communication in construction project delivery in Nigeria are enormous. As the project unfolds and the design is realized, information in the form of drawings, specifications and construction methods must be communicated from one expert to another (Foley, 2005), and communication poorly managed will lead to de-motivated workforce, design errors, slowdown in the entire job and failure in production. Therefore, using an appropriate communication management system to resolve construction and design problems is essential.

LITERATURE REVIEW
Construction Industry
Construction is the physical act of carrying out designs created by engineers or architects. The construction industry is important to the public, as business owners need buildings and offices from which to work, people need homes
to live, children need schools to attend. Construction workers are responsible
for erecting structures that offer safety protection and convenience.
The need for construction professionals to communicate throughout all the
stages of construction is inevitable. A successful project demand that
professionals involved are experienced, appropriate, have the same mindset,
are team players with complimentary skill sets and are managed to bring out
their best work to meet the vision and goals of the project. Furthermore,
communication between these professionals is an integral part of the
construction process in any successful project. Given that construction is
such a fragmented, dynamic and disparate sector, effective communication
becomes essential “for the successful delivery of performance goals
(productivity, profitability and repeat working opportunities” (Dainty et.al,
2006). Scope of work and details of construction are communicated by
means of drawings, contract documents, addenda and specifications (Mehra,
2009). Therefore, the need for professionals within the construction industry
to effectively communicate with each other in order to accomplish their
production and social functions within the organizations cannot be
overemphasized and the effects of communication and communication
management has a great impact on any project delivery.

Nigerian Constructions Industry
Organized construction contracting in Nigeria began in the 1940s with few
foreign companies coming into operation (Gorse, 2002). The major source
of capital formation in the construction industry is from the public sector,
with the traditional approach in the major infrastructure procurement process
of funding through annual capital budgetary provision. However, with the
rising emphasis and growing interest of stakeholders in bridging Nigeria
infrastructure gap, the future growth of construction as a tool for sustainable
economy is somewhat optimistic.
The construction industry in Nigeria is a multibillion dollar industry with
hardly any year befalling successful contractors who bid for construction
projects, the last few years has witnessed increasing patronage and profits
for most construction companies in Nigeria.

Challenges Facing the Nigeria Construction Industry
Major milestones over the decade which includes self sufficiency in cement
production which guarantees material price stability, procurements, health
and safety, access to credit, project abandonment, escalating cost of projects
cost and projects failing to meet client’s expectations are major challenges
facing the Nigeria construction industry amongst other factors. While Some
specialists will be able to visualize aspects of the building with a high degree
of accuracy, possibly with little information, other aspects of the building
will hold little relevance unless the information is conveyed in a way which
allows them to develop an understanding (mental model), hence, communication is extremely relevant in the management of projects.

**Communication Channels**

During a project, communication can occur in various directions depending on who is communicating. There is upward communication to management from one’s organization and the customer’s organization. Lateral communication takes place with customers and within project teams. Machinery needs to be put in place for further communication to take place, either downward communication (from superior to sub-ordinate), horizontal communication (between colleagues) or upward communication (from subordinates to superior). (Mehra, 2009) stated that communication will always involve more than one person. In the figures 3.1, the number of communication channels required to communicate with five other team members in a team of six is shown.

![Communication Channels Diagram](image)

Fig. 3.1 The Three Communication Channel of the Project Manager (Adopted from Keyton, 2011)
RESEARCH METHODOLOGY
This research covers project participants in construction projects, primarily Quantity surveyor, Architects, Project Managers and others who are part of construction projects team. The study collected data from construction professionals with an experience from 5-year and 15 years above. Data collection was done through a questionnaire self administered on 50 project participant, 40 were returned. The research results can be generalized to a larger population within acceptable error limits. The question which this research sorts to explore was how much effect communication/communication management has on construction project delivery in Nigeria, and how professionals in the industry communicate.
A 3-point ranking system low, moderate, and high were utilized where the respondents were asked to indicate from the list of how communication is achieved currently on site, how much effect each has and how frequent those occurs.

RESULTS AND DISCUSSIONS
Table 4.1: Designation of respondents

<table>
<thead>
<tr>
<th>DESIGNATION</th>
<th>FREQUENCY</th>
<th>PERCENTAGE</th>
<th>CUMMULATIVE PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity Surveyor</td>
<td>13</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>Project Manager</td>
<td>7</td>
<td>0.18</td>
<td>0.51</td>
</tr>
<tr>
<td>Architect</td>
<td>9</td>
<td>0.23</td>
<td>0.74</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
<td>0.28</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>1</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

From the table 4.1 above, 33% of the respondents representing thirteen (13) respondents were quantity surveyors, 18% of the respondents were project managers which represent 9 respondents, while 23% were Architects and 28% represents other professionals such as Builders, engineers, and clerk of works. Fig. 4.1 below
Table 4.2: Working experience of the respondents

<table>
<thead>
<tr>
<th>YEARS</th>
<th>FREQUENCY</th>
<th>PERCENTAGE%</th>
<th>CUMMULATIVE PERCENTAGE%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0- 5years</td>
<td>13</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>6 – 10 years</td>
<td>10</td>
<td>0.25</td>
<td>0.58</td>
</tr>
<tr>
<td>11 – 15 years</td>
<td>9</td>
<td>0.23</td>
<td>0.81</td>
</tr>
<tr>
<td>Above 15 years</td>
<td>8</td>
<td>0.20</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>1</strong></td>
<td></td>
</tr>
</tbody>
</table>

From the table above, it shows that;

a. 13 respondents are below 5 years in working experience representing 33%

b. 10 respondents are between 6-20 years in working experience representing 25%
c. 9 respondents are between 11-15 years in working experience representing 23%

d. Only 8 respondents are above 30 years in working experience representing

**Table 4.3:** Amount of effects of communication in construction project delivery

The following factors of communication that affect construction project has been ranked on the order of highest effect (7) to least effects (1)

<table>
<thead>
<tr>
<th>Effects of communication in projects</th>
<th>Low (D%)</th>
<th>Medium (50%)</th>
<th>High (100%)</th>
<th>Mean</th>
<th>Variance</th>
<th>standard deviation</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inexperience</td>
<td>0.00</td>
<td>0.10</td>
<td>0.80</td>
<td>0.90</td>
<td>0.22</td>
<td>0.47</td>
<td>1</td>
</tr>
<tr>
<td>Delay</td>
<td>0.03</td>
<td>0.14</td>
<td>0.70</td>
<td>0.87</td>
<td>0.17</td>
<td>0.41</td>
<td>2</td>
</tr>
<tr>
<td>Site meetings</td>
<td>0.05</td>
<td>0.20</td>
<td>0.55</td>
<td>0.80</td>
<td>0.12</td>
<td>0.34</td>
<td>3</td>
</tr>
<tr>
<td>Late dissemination</td>
<td>0.10</td>
<td>0.19</td>
<td>0.53</td>
<td>0.82</td>
<td>0.11</td>
<td>0.33</td>
<td>4</td>
</tr>
<tr>
<td>Unclear channel</td>
<td>0.18</td>
<td>0.17</td>
<td>0.50</td>
<td>0.85</td>
<td>0.10</td>
<td>0.32</td>
<td>5</td>
</tr>
<tr>
<td>Language problem</td>
<td>0.10</td>
<td>0.23</td>
<td>0.45</td>
<td>0.78</td>
<td>0.09</td>
<td>0.30</td>
<td>6</td>
</tr>
<tr>
<td>Training operatives</td>
<td>0.43</td>
<td>0.19</td>
<td>0.20</td>
<td>0.82</td>
<td>0.09</td>
<td>0.29</td>
<td>7</td>
</tr>
</tbody>
</table>

**Inexperience interpretation of working drawings can cause a failure in building components**

With regards to inexperience interpretation of work drawing can cause a failure in building components. 80% of the respondents responded high for that statement, with 20% answering very medium for the same statement. Ranking first (1) amongst other factors has the greatest effect on construction project delivery.

**Poor and distorted information will affect the level of work done on site**

Poor communication had often resulted in project delays, project cost overrun, project abandonment etc. however, 3% ticked low, 27% answered medium for that statement. An overwhelming majority of 70% ticked high, that poor and distorted information relayed do affect the level of work done onsite. It ranked second (2) which highly affect construction projects
Site meeting is important channel of communication between the consultants and contractor on site
From the table 4.1 above, 55% of all the respondents said that site meetings is of high importance in channels of communication between the consultants and contractors on site, while 40% said that site meetings is of medium importance in communication channels between the contractors and the consultants and 5% of the consultants ranked it low. Overall, amongst other factors of communication that affect construction project, site meetings ranked third (3).

Late dissemination of information will affect output on site negatively
Finally, 53% of the respondent also agreed that late dissemination of information will affect work output on site negatively, and 38% ticked medium on that same statement. Ranking fourth (4) amongst other factors of communication that affects construction project delivery.

Unclear channels of communication results in project.
Unclear channels of communications results in project delay. Also 50% of the respondents ticked high, while 33% ticked medium that the sort of language used among operatives is very essential for effective communication onsite. While 17% ticked low. It ranked fifth (5) amongst other factors which affects construction projects.

Training of operatives is necessary for onsite communication
With regards to training of operatives being necessary for on-site communication, 20% answered high while, 38% answered medium and 43% said low. It ranked (1) as the least factor that affects construction projects.

Table 4.5: Effects of communication management on construction project delivery.

<table>
<thead>
<tr>
<th>Effects of communication in projects</th>
<th>Low (0%)</th>
<th>Medium (50%)</th>
<th>High (100%)</th>
<th>Mean</th>
<th>Variance</th>
<th>standard deviation</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan &amp; strategies</td>
<td>0.05</td>
<td>0.25</td>
<td>0.45</td>
<td>0.75</td>
<td>0.09</td>
<td>0.94</td>
<td>1</td>
</tr>
<tr>
<td>Plan reviewed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-going communication</td>
<td>0.00</td>
<td>0.13</td>
<td>0.75</td>
<td>0.88</td>
<td>0.19</td>
<td>0.44</td>
<td>3</td>
</tr>
<tr>
<td>Meetings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unclear objectives</td>
<td>0.00</td>
<td>0.15</td>
<td>0.70</td>
<td>0.85</td>
<td>0.17</td>
<td>0.41</td>
<td>4</td>
</tr>
<tr>
<td>Clarified roles</td>
<td>0.03</td>
<td>0.20</td>
<td>0.56</td>
<td>0.79</td>
<td>0.12</td>
<td>0.34</td>
<td>6</td>
</tr>
</tbody>
</table>

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Communication plans and strategies established at the outset of projects do improve project

From the Table 4.5 above, 45% respondents scored high (1) that communication plans and strategies established at the outset of projects do improve project communication, while 50% respondents ticked medium (0.5) and 5% respondent ticked low (0), and this communication management tool ranked first (1) on the table 5.2 above having great effect on construction project delivery.

Communication plan reviewed regularly and adjusted is necessary for project success

Also, on the issue of communication plan reviewed regularly and adjusted is necessary for project success, 45% respondents scored high (1), 44% respondents scored medium (0.5) and 5% respondents scored low (0), and ranking second (2) has the highest effect on construction project.

On-going communication between project team members and its stakeholders improve project success

When asked how does on-going communication between project team members and its stakeholders improve project success? 75% people ticked high (1) and 25% people ticked medium (0.5) and it ranked third (3).

Meetings help overcome communication barriers and increase performance level

Meetings help overcome communication barriers and increase performance Level 65% people ticked high (1) and 10% people ticked medium (0.5) and 25% ticked low and it ranked fourth (4)

Unclear objectives between project proponents and its stakeholders leading to project failures and disputes

70% people ticked high (1), and 30% people ticked medium (3) on the issue of unclear objectives between project proponents and its stakeholders leading to project failures and disputes and it ranked fourth (4).
Clear communication clarifying roles of stakeholders drawn in the project plan improve successes in project delivery
When asked how clear communication clarifying roles of stakeholders drawn in the project plan improve successes in project delivery, 56% people scored it high (1), while 40% people agreed medium (0.5) and 3% persons said low and it ranked sixth (6).

Appropriate communication media for specific purposes/audiences are necessary
53% respondents ticked high (1), 43% respondents ticked medium (0.5), 4% respondents ticked low (0) and 1 respondent ticked very low (1) when asked how appropriate communication media for specific purposes/audiences are necessary. It ranked seventh (7).

Unclear communication channel affect project objectives
33% people also scored high (1), 53% people scored medium (0.5), 15% people scored low (0), when asked how unclear communication channel affect project objectives and it ranked eight (8). From the responses gotten concerning the effects of communication management on construction project delivery, an overwhelming majority agreed that communication management has great significant effects on construction project delivery in Nigeria.

Table 4.6: Importance of communication channels in construction project delivery?

<table>
<thead>
<tr>
<th>Communication channels</th>
<th>very often</th>
<th>often</th>
<th>Not mean</th>
<th>variance</th>
<th>standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Review Meetings</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>1.00</td>
<td>0.33</td>
</tr>
<tr>
<td>Notice board</td>
<td>0.7</td>
<td>0.15</td>
<td>-</td>
<td>0.85</td>
<td>0.17</td>
</tr>
<tr>
<td>Project Annual Report</td>
<td>0.5</td>
<td>0.2</td>
<td>0.04</td>
<td>0.74</td>
<td>0.10</td>
</tr>
<tr>
<td>Forma Comm (emails, phone calls)</td>
<td>0.5</td>
<td>0.19</td>
<td>0.05</td>
<td>0.74</td>
<td>0.10</td>
</tr>
<tr>
<td>Work breakdown structure</td>
<td>0.5</td>
<td>0.16</td>
<td>0.07</td>
<td>0.73</td>
<td>0.09</td>
</tr>
<tr>
<td>Project Status Report</td>
<td>0.45</td>
<td>0.19</td>
<td>0.07</td>
<td>0.71</td>
<td>0.08</td>
</tr>
<tr>
<td>Customer Satisfaction Survey</td>
<td>0.38</td>
<td>0.19</td>
<td>0.1</td>
<td>0.67</td>
<td>0.06</td>
</tr>
</tbody>
</table>

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From the channels of communication responses as seen in Table 4.6 above, it shows that site review meeting ranked first as an important factor in construction project delivery.

CONCLUSION
From the responses gathered from project professionals within the construction industry in Nigeria, there was a strong appreciation of project communication and its effects within the industry. With regards to the specific communication issues, there were unanimous agreements of the importance of each on communication on project site. For instance, many of the professional respondents agreed that site meetings are an important channel of communication between the consultants and contractors thus, has a significant effect on construction project delivery Nigeria.

Further, all the players within the industry agreed that lack of proper communication management has a great effects on construction project delivery. For instance communication plan reviewed regularly and adjusted becomes necessary for project successes.

Within the Nigerian construction industry, there is a strong appreciation of the significance of project communication/communication management and its effects within the industry. Indeed, various levels and channels of
communications have been established within the construction industry, for example, communication between consultants and contractors. This research has shown that, project communication strongly affect the performance of professionals within the construction industry. Therefore, clearly establishing and managing the structures of communication on project must always be on the agenda of team leaders and management before the commencement of every project.

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APPLICATION OF LEAN THINKING TO THE BUILT ENVIRONMENT IN DEVELOPING NATIONS FOR SUSTAINABILITY

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Abstract
Sustainable Development was defined as humanity’s ability to meet the needs of the present without compromising the ability of future generations to meet their own needs. Many countries, especially in the developing world, did not meet the UN target of 2002 to achieve sustainable development because the issue of existing buildings which form the bulk of building stock were not adequately addressed. This paper is a literature review on how existing buildings could be sustained through improvement as against maintenance and rebuild; it reviewed major improvement models that can be applied for elimination of perceived waste and inefficiencies in existing buildings for their sustainability. The Lean Thinking model was adopted for use. The paper revealed that the maintenance of unsustainable buildings could at best be returned to their unsustainable original standard at construction, compared to improvement. There is no doubt that there are a number of other factors and barriers that affect our ability to sustainably improve our existing building stock. However, until we are also able to address these two major issues of waste and inefficient facilities from end-users’ perspectives, the pace of SD in developing countries may remain slow.

Key Words: Sustainable Development, Maintenance, Improvement, Existing buildings, Waste.

Introduction
In its bid to reach the goal of environmental sustainability, the UN Earth Summit of 1992 in Rio de Janeiro, Brazil called on its member States to adopt and integrate the principles of SD into their national policies and
programmes that will build upon and harmonize the various sectoral economic, social and environmental policies and plans operating in their respective countries. In 1997, the special session of the UN General Assembly set a target in the United Nations Millennium Declaration, to formulate and elaborate by year 2002.

However, over twenty years after the Earth Summit (termed Rio + 20); many countries especially in the developing world are yet to make headway in the SD of their built environment. Wood & Muncaster (2012) observed that the “developed world as a whole has huge numbers of buildings designed and constructed to standards that were barely adequate in their day and inadequate for today and tomorrow; and (that) those in the developing world are even poorer.” Jiboye (2009) reported that despite efforts at both the local and international levels, current realities suggest that the goal of achieving sustainability in Nigeria (a developing nation) is yet to be realized.

One of the major reasons attributed to this include the neglect of existing buildings which form the bulk of built assets in our cities; they were developed decades ago when sustainability was not a consideration (Miller & Buys, 2008). According to Wood (2006), “sustainability cannot be achieved without addressing the existing building stock. Even if every new building was a ‘sustainable building’, their impact on sustainability as a whole will be minimal for some time.” Thus, for any noteworthy impact on SD in the built environment by developing nations, it is essential that existing building stock should be given more considerations.

Problem Statement

In Nigeria as in most other countries, the improvement of existing buildings’ standards (hence the performance) for sustainability have mainly been through retrofitting for energy and carbon dioxide emission reduction (Ofori, 2000; Nwafor, 2006; Nwokoro & Onukwube, 2011; Ma et al., 2012). Some research have however showed that even green building performance does not always reflect occupants’ expectations (Monfared & Sharples, 2011; Deuble & de Dear, 2012; Gou, Lau, & Chen, F. 2012). Hebert & Chaney (2012) observed that fewer published studies have reported the use of end-user surveys during the design process to inform the renovation of a facility. According to Love & Bullen (2009), current assessment systems of performance of existing buildings pose challenging problems because they do not provide a full profile of sustainability since they excluded inputs from
occupants; the performance of an end-user satisfaction survey can identify ways to improve the building performance and create a sustainable environment at little cost. Scott (2008) observed that the scale and nature of interventions for any improvement measure can only be ascertained after gaining detailed knowledge of the building. For the sustainability of existing buildings to be achieved, perceived waste and inefficiencies should first be identified from the end-users’ perspectives, since their contributions were not initially taken into consideration (Majamaa et al., 2008; Pemsel, Widén & Hansson, 2010) after which improvement measures should be well-thought-out to upgrade the original building standard by minimizing or possibly eliminating inherent wastes and inefficiencies; thus enhancing the building performance.

A shortcoming of existing buildings is that they were constructed based on past standards, while standards as measured by building regulations have tended to increase over time in as far as they improve sustainability, both in quality and quantity. According to Wood (2006), there is no requirement generally to bring existing buildings up to the standards applicable to new buildings; thus most existing buildings are some way below sustainable standard. Therefore, the question that had risen is – can exist building’s standard be sustainably improved through the identification and eventual elimination of perceived waste and inefficiencies inherent in the design from occupants’ viewpoints in developing countries? There is a claim that UK businesses throw away £18 billion a year through the inefficient use of space (Bootle & Kalyan, 2002; Haynes, 2008). This paper equally promotes a ‘Bottom-up’ approach, whereby improvement strategy and subsequent implementation would stem from occupants, being (as it were) closest to the ‘scene of action’ (Martimort & Stole, 2002).

**Literature Review**

Sustainable Development (SD) was defined as humanity’s ability to meet the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). Ofori (2000) observed that SD has emerged as a guiding paradigm to create a new kind of built environment, while Kibert et al. (2000) opined that the creation, operation and disposal of the built environment dominate humanity’s impact on the natural world. Figure 1 is an illustration of typical issues involved in SD:
Several other definitions were given to explain this concept; one of such is by Mediawiki (2008) who defined SD as the process of building communities and living comfortably without consuming all resources, implying that SD is a way of conserving more of the things we all need to share; not just about consuming resources, but includes change of our culture to make conservation a way of life. Brandon (2012) also viewed SD as a process of change in which exploitation of resources, the direction of investments, the orientation of technological developments and institutional change are all in harmony, enhancing current and future potential to meet human needs and aspirations. Gervásio & Simões da Silva (2012) went on to say that SD is a multidimensional concept gaining increasing relevance in all spheres of life and aiming to balance at least the social, economic and environmental impacts of all human actions, now and in the future. Gilmour & Banks (2011) however argued that SD is a complex issue that is not consistently definable in practical terms owing to its very broad nature. Pezzey (1989) and Hartshorn et al. (2005) estimated about 60 separate definitions of SD; and they both observed that there is little agreement as to its meaning in practical or even theoretical terms. According to Mansfield (2009), despite the efforts of the EU and national governments to provide a cohesive policy to address the negative impacts of SD, there is still considerable difficulty in providing a consensus definition of these terms.”

Slessor, cited in Abley & Heartfield (2001) suggested that the Bruntland’s commission definition only serves as a starting point and hardly sufficed as an analytical guide or policy directive. Hartshorn et al. (2005) went on to explain that, a particular difficulty with the considerable disagreement over its precise meaning is that it combined the political, philosophical and technical issues that remain unresolved from the ‘environment versus growth’ debate. Lee & Huang (2007) also identified SD as the most challenging and controversial issue with respect to its interpretation and application.
In spite of vagueness in its meaning, Strzelecka (2008) suggested SD as a universal challenge, in which practical responses can only be defined nationally and locally. Hence, it is more feasible for developing nations to define responses to SD within their local environmental, economic and social content. The application of SD principles should therefore be tailored to local settings within a particular country, which will include the ethnic origin, culture, class, religion, gender, population, etc. as demonstrated by Nawawi & Khalil (2008) in their study on public buildings in Malaysia.

Setiawati et al. (2013) also reported that, “Based on the results of research and discussion, it could be concluded that the institutions, environment, technology selection, financial/economy and socio-cultural conjointly affect sustainability.”

Many other writers have agreed that the same approach cannot be used universally to achieve SD, for example, Myllyla & Kuvaja (2005) argued that approaches to urban environment that have originated for the North carry inherently northern inferences and policy solutions that may have particular constraints when scrutinizing sustainable development’s societal context in the South. Rana (2009) also observed that SD goals cannot be addressed the same way for all nations because of peculiar urban population growth in some regions. He wrote thus:

The making and remaking of a sustainable city is a great challenge, particularly in the cities of the global South where urban population growth is unpredictable and even uncontrolable... This unprecedented urbanization and urban growth has stimulated academics and policymakers to search for sustainable urban development options that can pre-empt major ecological and social upheavals... the hope of fulfilling the goals by the developing countries is a utopia, where overwhelming rural-urban migration is uncontrollable, good governance is rare, unequal resources distribution is explicitly visible. In this unpredictable and complex situation, any goal-based development policies will certainly be misleading or partially achievable. Therefore, the same goal of sustainable city will not be suitable in quest of sustainability in all cities of the world, while societal and cultural resources are different. (pp. 506-507)

This paper therefore adopted the concept of addressing the issue of SD locally (i.e. considering ethnicity, culture, class, religion, gender, politics, etc.) from the perspective of occupants in existing buildings.
Methods and Procedures

Waste and Inefficient Facilities in Existing Buildings

The basic function of a building is to provide structurally sound and environmentally controlled spaces to house and protect occupants and contents. This basic function is not achieved if some aspects of the building fail and the needs of the occupants are not met according to the definition of SD. Failures of basic building functions can range from defects in single components such as windows to extensive deficiencies in an entire exterior wall system. The source of these deficiencies can include inadequate design, improper execution of the work, defective materials, or simply normal and expected aging perhaps coupled with lack of maintenance.

Waste is any activity, which absorbs resources but creates no value (Womack & Jones, 1996). The Advanced English Dictionary AED (2013) defined waste as any material unused and rejected as worthless or unwanted, while inefficient was defined as not producing desired results, or lacking ability to perform effectively. Adopting these to buildings, ‘waste’ could be seen as those partitions within or without the building(s), which the occupants do not need or find useful, for example, multiple passages or corridors in a building which could have been more useful to the occupants if converted to store(s). Bullen & Love (2011) referred to such as inefficient spatial layout. Utility costs for a building can also be decreased when daylighting is properly designed to replace electrical lighting.

‘Inefficiencies’ in built assets can also be viewed as a building or its components not having the qualities (or ability) to function efficiently. An example is a building having two-ply sliding window in a humid and hot environment without provision for artificial ventilation; in such situation, the window can only provide a maximum 50% opening as compared to louvres that can provide up to 95% opening. Thus the former has more of aesthetic value than functional value, which is the opposite of the latter. Therefore, the sliding window may be regarded as inefficient because it does not have the ‘ability’ to provide enough ventilation in a hot and humid environment without further provision for artificial ventilation, whereas it can be more efficient in temperate regions or in built assets with further provision for artificial ventilation such as air conditioners. This problem is more pronounced in developing countries where electricity supply is very erratic and thus, even the provision of artificial ventilation may still not solve the problem of the ‘inefficient’ windows.
Again, day lighting is essential and can provide substantial benefits to occupants, but improper usage can lead to unpleasant conditions within the structure. The benefits of day lighting will only be realized if it is implemented correctly. Improper use of day lighting due to wrong design or placement of window(s) can reduce productivity in offices and increase employee absenteeism due to the possibility of extremely high lighting levels, excessive glare, and high temperatures (Haynes, 2008).

This paper appreciates that waste is extensively used in a different perspective in environmental management, especially for garbage, refuse, scraps, etc.: these could be termed tangible waste. However, in recent times intangible waste had also been identified, especially in production and management processes and has been promoted by models such as Lean Thinking and Zero Emissions. The intangible waste is been emphasized in this paper and it is considered as anything that does not provide value to the ultimate use. Thus, the improvement strategy of identification and eventual minimization or elimination of perceived waste and inefficiencies inherent in existing buildings from the perspectives of end-users would further ensure their sustainability. There is no doubt that there are a number of other factors and barriers that affect our ability to sustainably improve our existing building stock. However, until we are also able to address these two major issues of waste and inefficient facilities from end-users’ perspectives, the pace of SD in developing countries may remain slow.

Concept of Maintenance

BS 3811 (1984) defined building maintenance as holding, keeping, sustaining, or preserving the building or structure to its original standard. Maintenance is the act of maintaining, in which repairs or indeed replacement may well be necessary, but the primary objective of all maintenance procedures is to avoid as far as practicable the need to repair or replace the structure or its...
components (Seeley, 1987). Figure 2 illustrates the classification of basic maintenance works.

Figure 2: Classifications of Maintenance Work (consultations.rics.org, 2012)

The real problem in defining maintenance therefore is a lack of universal agreement as to what constitutes an acceptable standard (Chanter & Swallow, 2007). This is of course a matter of conjecture and is generally subjective as each owner or tenant will have to establish his own standards based on factors such as usage of building; anticipated life; availability of capital, materials and manpower; changes in usage and personal or business prestige.

According to Mansfield (2002), the process of fabric and structural decline can be slowed by the implementation of repair and maintenance programmes, although buildings have no infinite economic life. There will come a time in the life of any property when the decision will have to be taken as to whether the building should continue to be maintained or improved, since the only alternative to these options is to demolish and rebuild.

It should also be noted that deterioration and decay are the major reasons for building maintenance because they bring about degradation. Deterioration is where the condition of a structure or a building and/or its components degenerate or become worse, it refers to the cumulative physical distress buildings are subjected to from completion, whereas decay is the condition when a structure or building and/or its components rot, waste or decompose, very often to the point where replacement is the only option or solution. These terms should be differentiated from depreciation, which deals with the gradual loss in monetary terms of the economic value of the building, although deterioration and decay induce depreciation.

In as much as maintenance is used to address deterioration and decay, it cannot adequately solve the problems of obsolescence. Obsolescence with regards to building is a relative term and it denotes that a property does not possess any useful life as it stands, inferring that a building can only be regarded as obsolete in the context of one time and place. Signs of functional or economic (including social) obsolescence may not be obvious as against physical obsolescence wear and tear, while upgrading is their apparent solution as against maintenance strategies.
Concept of Improvement
This paper re-evaluated existing buildings and their role to sustainability through the improvement (as against maintenance) of their standards and it adopted the definition of improvement as a condition superior to an earlier condition (AED, 2013). Thus, in maintenance the original standard at construction is restored, while in improvement, the original standard is upgraded. Maintenance strategy carried out on non-sustainable existing building can at best reinstate it to its original non-sustainable standard (Figure 3).

Figure 3: Maintenance and Improvement (Adeyemi, 2010).

Most existing buildings are some way below the standard of new buildings and according to Nicholas & Soni (2006), there is need for standards to be continuously revised to keep pace with continuous improvement. The improvement of existing buildings’ standard (hence performance) is considered by many authors to be an effective strategy for their sustainability (Brand, 1994; Pickard, 1996; Ball, 1999; Kohler, 1999; Latham, 2000; Cooper, 2001; Kohler & Hassler, 2002; Douglas, 2002; Gregory, 2004; Langston et al., 2007). Bullen & Love (2011) also observed that, “Improvements carried out during adaptive reuse were considered to provide the opportunity to link the performance of a building directly to the objectives of sustainability.”

In this paper, the improvement strategy emphasized is the upgrading of existing buildings’ original standard at construction through the identification (from occupants’ perspective) and eventual elimination of
perceived waste and inefficient facilities within and without the building structure. Nelson (2008) noted that, capital sustainable improvement “resets the building life, improves performance, and makes the building’s use more predictable for an extended period of time”.

Improvement entails the upgrading of existing buildings’ original standard at construction, and while many other terms have been used in literature to describe its strategies, such terms have not been used in this paper save in relevant quotations in a bid to produce consistency. Such terms include adaptation, refurbishment, rehabilitation, remodeling, retrofitting, revitalization, among others; they have ambiguous meanings, as observed by some authors. Mansfield (2002) observed that “there is a surfeit of terms used to cover retrofit such as adaptation, refurbishment, upgrade, conversion, renovation and exist in a “state of happy confusion”.” Mansfield (2011) noted that, “across the literature there continues to be some confusion regarding the term refurbishment; many terms have been used as synonyms, including alteration, retrofitting, restoration, renovation and upgrading.” Brandon (2012) suggested that in a discipline, there is need for a common language which allows communication across related topics without fear of misunderstanding.

**Occupants’ Requirements and Satisfaction**

According to Jylhä & Junnila (2013), facility management literature in recent years had discussed the shift from bricks and mortar to an end-customer-driven mindset; the focus is no longer only on cost minimization and real estate operations but rather on supporting end-customer functions and users. Black (2008) observed that world class companies have intense customer focus in which the customer is an indispensable part of the process. He gave the example of Boeing who involves customers’ views in its production process in what is termed aggressive listening. The building industry also needs to focus on end-users satisfaction in order to create world class facilities.

The degree to which the building component will satisfy internal and external load bearing or resistance requirements in reality is called performance in the building construction field, while the demands on building components, on the other hand, are referred to as requirements (Birkeland, 2012). Occupants derive satisfaction in a building based on the degree at which their requirements are met, while satisfaction could be
improved through the provision of adequate space, services and equipment thereby increasing performance (Pride, 2001).

Shah (2007) suggested involvement of end-users in building design as shown in Figure 4. The idea is that facilities manager pass information regarding users’ requirement to the design and construction team. Kaya (2004) revealed two important lessons in his research on need for knowledge of users’ requirements thus: (1) when not involved in the design stage of buildings, the users become more reactive and critical of the building. This puts a greater burden on those managing the completed space. (2) When the people own the space and are committed to it, they change their environment and overcome their territoriality. Therefore, as activities change, people start to change their habitat.

![Figure 4: Current and Proposed Role of FM in Design (Shah, 2007).](image)

The facilities manager deals with the end-users after all other professionals have ceased to be involved in the building immediately after construction (Belo & Agbatekwe, 2006; Johnson, Davis, & Shapiro, 2005). Thus based on his management experience and dealings with occupants, he is more suitable to advice on deficiencies in designs from occupants’ perspectives. According to Sinou & Kyvelou (2006), comfort is an essential parameter, “since the building should not be perceived as an object separated from its tenants or occupants. Furthermore, users, their perception of the environment and their participation during the initial planning and design phases should play an important role in the process of sustainable design.”
Rey (2004) also noted that the question of user requirements also plays a prominent role during the site phase in an improvement project, unlike new builds. Shika et al. (2012) observed that in order to achieve sustainability objectives in buildings, a coherent strategy and action plan is needed to address occupants’ expectations and needs in existing buildings. It is perceived that the identification and eventual elimination of waste and inefficiencies would improve existing building standard and thus enjoy the following benefits of sustainability:

- Lower utility bills forever;
- Cleaner, quieter, more durable, and more comfortable offices;
- Reduced maintenance and savings;
- Peace of mind about working in a healthier place;
- Positive impact to the environment; and
- Improved functional, capital and aesthetic values.

**Sustainable Improvement Strategy Models**

Three sustainable improvement models identified during the literature review that deal mainly with the identification and eventual elimination of perceived waste and inefficiencies are: (1) **Lean Thinking**, (2) **Zero Emissions**, and (3) **Green Building**.

*(a) Concept of Lean Thinking*

Lean thinking has the underlying philosophy that by identifying and eliminating *muda* (Japanese word for waste), quality can be improved and costs reduced (Kempton, 2006). According to Averill (2011), *lean thinking* is an improvement strategy model that emphasizes continuous minimizing (or ultimately eliminating) all types of waste (*muda*) and non-value-added activities in delivering high quality products at the lowest possible cost. It has its origin in the philosophy of achieving improvements in most economical ways with special focus on reducing *muda* (Womack & Jones, 1996).

The concept of *muda* (seen as the opposite of value) became one of the most important concepts in quality improvement activities primarily originated by Taiichi Ohno’s famous production philosophy from Toyota in the early 1950s. Ohno (1988) realized on his visit to Ford Motors in USA that there was too much *muda* (waste) everywhere and classified them into seven categories namely: *transportation, motion, inventory, over-processing, waiting, overproduction, and defects*; Womack & Jones (1996) however
added the eighth - unused human talent. This Toyota production system in Japan later metamorphosed into what is now branded as lean thinking by Womack et al. (1990).

According to Nicholas & Soni (2006), the two overarching philosophy of lean thinking for sustainability are elimination of waste and continuous improvement (or kaizen in Japanese). Wang (2011) explained that kaizen is a system of continuous improvement in quality, technology, and safety, while Jylhä & Junnila (2014) defined it as the effort for perfection which is never reached, but creates the urge to make improvements: there is no end for waste elimination. The concept also emphasized that value is defined by the end-user. Nicholas & Soni (2006) went on to say that the concepts of lean production applies to a vast range of operation and processes in widely differing industries, offices, health care, etc. with only “tweaking of details”.

Thus, varying industries have since adopted the concept, including the construction industry from whence terms such as lean construction and lean design emerged. The substantial argument was the claim that the approach had delivered large improvements in manufacturing, in particular the motor vehicle industry, and where already applied in construction.

The Lean thinking project methodology aimed at improving existing projects or designs originally composed of five phases, bearing the acronym and DMAIC (De Feo & Barnard, 2005); some organizations however added a Recognize step (i.e. recognizing the right problem to work on) at the beginning hence yielding a RDMAIC methodology. Thus, the useful framework for undertaking improvement in a systematic way is RDMAIC; it comprises the following stages:

- **Recognize** the right problem to work on.
- **Define** the problem, voice of the end-user, and project goals, specifically.
- **Measure** key aspects of the current design and collect relevant data.
- **Analyze** the data to investigate and verify cause-and-effect relationships. Determine what the relationships are, and attempt to ensure that all factors have been considered.
- **Improve** or optimize the current standard based upon data analysis.
- **Control**: the need to ensure that the goal is achieved and held. Putting a control plan in place is vital to ensure that the process is carried out consistently. There is also need for the design to be flexible.
(b) Concept of Zero Emissions

The Zero Emissions concept was postulated by Gunter Pauli in 1994 and it represents a shift in our concept of industry away from linear models in which wastes are considered the norm to integrated systems in which everything has its use. According to Pauli (1998), sustainability can only be achieved if the final target is Zero Emissions in which waste from a source becomes the input of another. It advocates for complete elimination of waste (termed zero waste) by converting waste in value as an improvement strategy; waste is seen as a measure of inefficiency in the use of resources (Pauli, 1998). The concept of Zero Emissions derived its motivation from the ecosystem in which nothing in nature is a waste, but rather what is waste for one is food for another (www.neri.org, 2013). The three main objectives of Zero Emissions are: (a) No waste; (b) all inputs are used in production; and (c) when waste occurs, it is used to create value elsewhere, such that no waste of any kind is produced (www.neri.org, 2013).

(c) Concept of Green Building

According to Nwokoro & Onukwube (2011), SD gave rise to green buildings, because a primary goal of sustainability is to reduce humanity’s environmental or ecological footprint on the planet, while Averill (2011) observed that the concept of green building is also an improvement strategy just like lean thinking. Green building mainly represents climate-friendly buildings that consume lower energy and with low CO2 emission and retrofitting had been the major improvement strategy of converting existing buildings into green buildings; it was defined as the practice of increasing the efficiency with which buildings and their sites use energy, water and minerals; and reducing building impacts on human health and the environment (Shah, 2007). A green building uses an average of 30% less energy than conventional building (Nwokoro & Onukwube, 2011).

Santamouris & Dascalaki (2002) observed that the objective of Green building actions is to improve the energy performance of the building, while maintaining thermal and visual comfort as well as acceptable air quality for the occupants. Figure 5 illustrates major key components of Green building.
Green buildings are mainly for energy and carbon-dioxide reduction for climate change, while the scope of this paper does not involve technical issues in pure science, more so issues of day lighting, air quality, thermal comfort, water conservation and occupants’ comfort can be addressed through lean thinking. Rey (2004) reported that different case studies have demonstrated the possibility of improving different aspects of the building at one go.

Discussions
The lean thinking model was adopted in this paper because its scopes, research framework and paradigms, and application falls within the boundaries of this study as outlined in Table 1. On the contrary, a major objective of the Zero Emissions model is that it does not search for traditional scientific proof for each step it undertakes. It combines intuition with traditional knowledge and technologies: intelligence accumulated by cultures from all around the world over millennia (i.e. conceptual framework), as opposed to the theoretical framework adopted for this research. In addition, although zero emissions had achieved successes in many of its application; the researches are chiefly in pure sciences (www.zeri.org, 2013), which is outside the scope of this study.
Past researches have shown that retrofitting for green buildings are essentially for reduction in energy consumption and CO₂ emission in buildings, which can also be incorporated in lean. More so, green building model addresses mainly the environmental component of the TBL of SD.
whereas lean touches on all the three dimensions of environment, social and economy. Lean in addition identifies perceived waste in a system and plans for its eradication (which is the aim of this paper), while Zero Emissions primarily converts waste to value. However, both models see waste as the opposite of value but lean emphasized the importance of end-users more.

Table 1: Research Approaches of the Improvement Models.

<table>
<thead>
<tr>
<th>Description</th>
<th>Lean</th>
<th>Zero Emissions</th>
<th>Green Building</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope</strong></td>
<td>Identifies and eliminates waste wherever it exists</td>
<td>Converts waste into value</td>
<td>Energy and CO₂ emission reduction for climate change</td>
</tr>
<tr>
<td><strong>Triple Bottom Line of SD addressed</strong></td>
<td>Environment, Social and Economy</td>
<td>Mainly the Environment and Economy</td>
<td>Chiefly the Environment</td>
</tr>
<tr>
<td><strong>Research Framework</strong></td>
<td>Theoretical framework</td>
<td>Conceptual framework</td>
<td>Theoretical/Conceptual framework</td>
</tr>
<tr>
<td><strong>Philosophies &amp; Paradigms</strong></td>
<td>Positivism (realism); objective (value free); deductive</td>
<td>Interpretivism (idealism); Subjective (value laden); Inductive</td>
<td>Positivism (realism); objective (value free); deductive</td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td>Social sciences</td>
<td>Pure science</td>
<td>Pure science</td>
</tr>
</tbody>
</table>

The varied types of *muda* in Lean Thinking were modified to give them meanings in the built environment as shown in Table 2 below:

Table 3.9: Modified Types of *Muda* in Buildings (Adeyemi, Martin & Kasim, 2014).

<table>
<thead>
<tr>
<th>S/ N</th>
<th>Type of Muda</th>
<th>Modified Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Waiting</td>
<td>Delay, due to inadequate provisions for access to carry out maintenance activities, etc.</td>
</tr>
<tr>
<td>2</td>
<td>Overproduction</td>
<td>Large accommodation space, too many corridors, etc. not needed or appreciated by users.</td>
</tr>
</tbody>
</table>
3 **Inventory**  
Building materials kept for maintenance that are not necessary or have short life spans.

4 **Motion**  
Wasted human motion is related to workplace: ergonomic design negatively affecting productivity, quality & safety e.g. walking, reaching and twisting (Dennis, 2007).

5 **Over-processing**  
Adding design features not needed by users, e.g. bathubs in general convenience; irregular office shapes thereby reducing functionality; etc.

6 **Transportation**  
Distant location of complimentary offices causing unnecessary movements for users.

7 **Defects & Errors**  
Inadequate design, improper execution of the work, defective materials: including inflexibility; wrong specifications leading to dampness, excessive condensation and possibly electrical faults, etc.; inadequacies (e.g. toilets, ventilation, lightening); etc.

8 **Human Talent**  
Non-inclusion of end-users’ input in design, maintenance or improvement. How could people be better involved in continuous improvement?

## Conclusion

World Commission on Environment and Development WCED (1987), set up by the United Nations General Assembly coined the most often-quoted definition of SD which is “development that meets the needs of the present generation without compromising future generations to meet their own needs”. In order for the needs of the present to be met in the built environment, there is urgent need to address the issue of existing buildings through feasible improvement, thereby conserving resources simultaneously; whereby we do not ‘steal’ from future generations by spending more resources than necessary today (Wood 2006). A way of achieving this is by improving the standards of existing buildings for sustainability through the identification and eventual elimination of perceived waste and inefficient facilities in the design, specification and layout from end-users’ point of view. There is no doubt that there are a number of other factors and barriers that affect our ability to make existing building stock more sustainable. However, until these two major issues of ‘waste’, and ‘inefficient facilities’ are addressed in built assets, the pace of
SD in the developing countries may remain slow. This also creates an opportunity for the facilities manager to be involved in the multidisciplinary/multi-stakeholder approach in built environment in which each would contribute his own expertise or discipline-specific data to SD.

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