Journal of Sustainable Development in Africa (Volume 15, No.6, 2013)
ISSN: 1520-5509
Clarion University of Pennsylvania, Clarion, Pennsylvania

NEXUS BETWEEN AGGLOMERATION AND VIABILITY OF COMMERCIAL LAND USES IN SUB-SAHARAN AFRICA

Joseph Obaje Ataguba, Michael Ayodele Olukolajo and Folashade Florence Falana
Federal Polytechnic Idah, Kogi State, Nigeria

ABSTRACT

The impact of sustainable urban development is manifested through positive externalities arising from agglomeration of commercial activities. The knowledge gap in the relationship between agglomeration of commercial land uses and perception of viability which commercial business operators attach to a given location motivated the conduct of this research. With recourse to Cantonment neighbourhood of Lokoja, Nigeria as study area, questionnaires were used to elicit data from business tenants customers and estate surveyors and valuers. The study indicates accessibility and external economies of scale as principal indicators for viability of commercial land use in the study area. Rank correlation analysis and Wilcoxon signed rank test indicates no significant variation in location factors accounting for agglomeration and viability of commercial land uses. Implication of these findings is a synergy between spatial policy of agglomeration, concentration of economic activities, and viability of land use decisions which are essential requirements for sustainable urban development.

Keywords: Agglomeration, Viability, Location factors, Commercial land uses, Business operators, Cantonment

INTRODUCTION

The process of urbanization evokes agglomeration economies among commercial land uses to the extent that competition for space and provision of essential services continue to attract attention of customers and other stakeholders in the urban economy (Bergsman, Greenston & Healy, 1972). This phenomenon informs the importance which operators of commercial property and business premises have attached importance to the viability of their location decisions. Agglomeration in the context of land use is a process whereby business firms cluster around themselves spatially for the purpose of deriving mutual benefits and profits (Arnott & McMillen, 2006; Bergsman et al, 1972).

With strong emphasis on spatial and socioeconomic decisions of commercial land use operators, agglomeration is therefore linked to environmental-, economic-, and social dimensions of sustainable development, which is defined as pathways to economic and social development that does not compromise the needs of future generations (Pearce, Atkinson, & Mourato, 2006; Riddel, 2004). Within the context of this research, sustainable development connotes any spatial development with enhanced economic-, social-, and environmental criteria for realizing better living conditions over time (Isaac, Leary, & Daley, 2010). With respect to environmental dimensions, agglomeration fosters proximity of land uses to efficient access nodes and a diversity of transportation means. Secondly, the economic dimension of agglomeration is underpinned by its affinity with economies of scale in the diversity of mutually dependent commercial activities, while the social dimension is drawn from the importance of adjoining land uses and infrastructure such as healthcare and leisure facilities among others (Isaac et al, 2010).

Commercial land use agglomeration is a spatial attribute of commercial land uses in terms of pattern and distribution of mutually dependent of activities (Papageorgiou & Thisse, 1985). With respect to pattern, agglomeration of commercial land use implies clustering spatial arrangement among different types of commercial activities in the urban space (Bergsman et al, 1972; Rosenthal & Strange, 2001). However, the spatial dimension of commercial land use agglomeration is inadequate to support evaluation of its determinants vis-à-vis location decisions that simultaneously drive agglomeration and viability of land use. This is because location decisions of commercial business operators and business entrepreneurs in the urban economy depend on a collection of physical and socioeconomic factors. In other words, there is a synergy between location decisions of business operators and their overarching goal of viable commercial land use in order to warrant a spatial manifestation of agglomeration. According to Fraser (1993) and Morley (2002), viability from a developer's perspective implies profit accruing from a project. However, within the context of this paper, viability implies the economic benefits accruing to operators of commercial properties. In other words, agglomeration of commercial activities is aimed at harnessing the benefits of external economies of scale (Arnott & McMillen, 2006), which is an indicator of a viable land use decision.

In a review of researches on agglomeration, Quigley (1998) concludes that agglomeration has direct impact on city size and diversity. Conducting a study across neighbourhood, municipality and state levels in the United States, Rosenthal and Strange (2001) further bridged the gap between theory and empirical analysis which lead to the discovery of significant variation in production inputs and transport costs across these geographical units as principal determinants of agglomeration. Although agglomeration is one of the viability drivers for commercial land uses, there has been no recent study aimed at identifying the synergy between these two urban phenomena in Sub-Saharan Africa. In other words, it is

not known whether the spatial manifestation of commercial land uses agglomeration is anchored on perception of viability which commercial business operators attach to a given location.

This research aims to examine the relationship between agglomeration and viability of commercial land uses. Specific objectives of this research include to:

1. identify the principal indicators of agglomeration and viability of commercial land uses, and
2. evaluate the correlation between agglomeration and viability of commercial land uses.

Besides identifying the hierarchy of factors which commercial property operators consider in choosing a viable location, a significant contribution to knowledge is the evaluation of these factors and their impact on the agglomeration and viability of commercial land uses in cantonment district of Lokoja, a paradigm of Sub-Saharan African neighbourhood.

REVIEW OF LITERATURE

Commercial land uses

Commercial land uses comprise development (building) on land utilized for shopping purposes; business premises and any property utilized for a related purpose. The agglomeration of commercial properties at city centres and sub-centres places pressure on demand for space, effect of which is competitive bidding of urban lands, moderate transportation cost between proximate locations, and higher prices of urban lands (Caldas, et al., 2007; Kauko 2001). Examples of commercial land uses include retail shops, offices, and other rented or owner occupied service outlets operated by small-, medium-, and large scale entrepreneurs. These service outlets include workshops for shoe cobblers and repair of electronic household goods among others.

Concept of agglomeration economies

In addition to being the very essence of urbanization, Arnott and McMillen (2006) and Barkham (2002) described agglomeration as the spatial concentration of economic activities. This concept of agglomeration economies is drawn from viable production of goods and services facilitated by the concentration of economic activities and specialization in the urban economy. Agglomeration economies can also be viewed from the perspective of external economies of concentration or complementarities (Harvey & Jowsey, 2003), which include availability of skilled labour, common services, infrastructure and spatial reputation. A notable snag with agglomeration of commercial land uses is the possible impact it exerts on urban growth, congestion and decay (Jelili, Adedibu, & Egunjobi, 2008; Rosenthal & Strange, 2006; Wyatt, 2007). In spite of limitations posed by agglomeration, this phenomenon underscores the importance of economic benefits which firms operating in the same industry stand to gain from exercising location decision in the urban space.

Conceptual drivers of viable commercial land uses

Umeh (1977) provided an outline of the indicators of the viability of real estate investment to include economic-financial-, physical-, technological-, socio-cultural- and political factors. Ogbuefi (2002) further conceptualized economic indicators to include economic- and financial factors; while physical-, technological-, socio-cultural- and political factors were conceptualized under non-economic criteria of viability. A cursory examination of these factors

indicate that they are synonymous to factors affecting land use decisions with outcomes including intensive and extensive land use, agglomeration, and viability of land use decisions.

Commercial property operators are concerned with economic rent and economies of scale which accrue to them for the use of land as a factor in the production of goods and services. Rosenthal and Strange (2006) reiterated that economies of scale occur when an increase in the scale of an activity leads to a corresponding reduction in long-run cost per unit of output produced. Internal economies of scale arise when average cost per output dips in response to an increase in the level of activity within a given sector of the urban economy. However, economies of scale is external when long-run average cost dips in response to an increase in an industry, urban size, intensive- or extensive land uses. It is on the basis of these economic and non-economic criteria that this research shall examine the factors and co-variables which exert impacts on agglomeration- and viability of commercial land use.

Factors- and co-factors for location of commercial properties

A cursory examination of the various factors driving the viability of land use decisions indicates that each factor exhibits myriads of co-factors/variables which are synonymously the drivers for the agglomeration of commercial properties and associated business premises.

Physical indicators

With respect to physical indicators of location, business occupiers and operators of commercial ventures consider topography, weather conditions, accessibility, urban size, parking spaces, and environmental hygiene. In land use economics, an activity's demand for land is influenced by the physical condition of the site among which is a gentle topography (Hoover & Giarratani, 1984). However, amidst scarcity of land in a fast developing urban area, disadvantaged topographical features may still appeal to operators if they have the technological capacity to surmount that physical threshold to location decision. It implies that in spite of limitation posed by topography in urban areas characterized by land scarcity and severe competition for available space, operators may decide to optimize their land use decision in the bid to reap internal and external economies of agglomeration. Operators in recent times have recognized weather conditions as one of the factors that influence quality of urban life as well as their location decisions (Arnott & McMillen, 2006). Good weather conditions tend to evoke palatable shopping experience and patronage of business premises. On the part of the operator, it reduces the cost of air-conditioning and provision of associated technologies to counter the adverse tropical climate conditions. Urban size has been empirically proven to drive agglomeration of commercial land uses and viability of land use decisions (Arnott & McMillen, 2006; Jacobs, 1969, Thorns, 2002). For instance, large urban areas characterized by high population tend to attract industrialist, service providers, and potential employees and job seekers. Good hygiene and high quality environment tend to attract the location of business premises and commercial properties (Hoover & Giarratani, 1984; and Wyatt 2007). To buttress this fact, patronage of business premises and shops increases when there are evidences of environmental cleanliness as well as adequate measures put in place by business operators towards hygienic handling of household goods and consumables displayed for sale. Accessibility and availability of parking space also contributes to the agglomeration of commercial land uses (McCann & Shefer, 2004). According to Carter and Vandell (2005), parking spaces are standard requirements for shopping centres and business premises as they attract customer patronage. By implication, customers will be confident to patronize shops that can afford them ample parking facilities as against the dangerous practice of parking along thoroughfares and

highways. A survey conducted by Aguayo, et al (2007) indicated that distance to access roads, densities of the urban road system and urbanized area at various scales are among the predictors of urban growth pattern. In other studies, it was concluded that accessibility to customers, suppliers and business associates were the most important considerations in business location decision (Dent & White, 1998) and agglomeration (Truong, 2008) respectively. While these findings emphasize the importance of accessibility in the viability of business location decision, a gap still exists in the correlation between agglomeration and viability of commercial land uses using all these physical indicators as the qualitative basis of the hypothesized relationship.

Economic indicators

Co-variables of economic indicators for the location of commercial land use and associated activities in urban areas include business cycle, fiscal policies of the state government, financial incentives, external economies of scale, product/service information and marketing strategy, and product packaging. While the first three issues address fundamental macro-economic co-variables and their impact on the viability of commercial land use decision, the other issues are essentially micro-economic co-variables arising from decision of the firm/business operator. Wyatt (2007) posits that property market responds short- and long-term macroeconomic indicators. These indicators account for the business cycle which affects commercial property location decisions and the operators (business tenants and landlords) alike. Drivers of business cycles in the economy include employment and unemployment, house prices, oil prices, inflation rate, gross domestic product, trade deficit, interest rates, cost and availability of finance, and rental growth rate among others (Witkiewicz, 2002; Wyatt, 2007). These drivers facilitate simple assessment of the viability of location decisions and agglomeration of commercial land uses. Fiscal policies of the state among which include taxation, public expenditure, and government borrowing influences location- and land use decisions (Inman, 2006). While financial incentives may be put in place to attract agglomeration of commercial land use operators and business premises in fast developing urban area, Rosenthal and Strange (2006) opined that agglomeration economies through such means may be difficult to achieve because the predominantly private sector business operators will prudently weigh external economies of scale they may likely gain from agglomeration in such locations. External economies forms the basis for today's large urban agglomerations (Arnott & McMillen, 2006) and accounts for the viability of commercial land use decisions taken by operators. Besides these economic indicators, location decision of commercial properties is also anchored on marketing strategy and product packaging (Gibson & Barkham, 2001). Critical to the location and survival of business premises is flexibility in the production of goods and services which is anchored on innovation, information and communication technology and reorganization of the workplace (Byrne, Lizieri, &Worzala, 2002). In other words, agglomeration would be beneficial if operators of shopping premises and allied commercial land uses adopt attractive marketing campaigns and package their products and services in order attract customer during a single shopping.

Technological indicators

Related to economic indicators is technological advancements which can be a positive externality from one firm to the benefit of other firms (Asafu-Adjaye, 2005), other wise known as technology spillover (Koo, 2005). As a vital infrastructure, technology plays a vital role in the location of commercial land uses. Egbenta (2012) and Rondinelli et al., (1998) reiterated that technological development is among the drivers of optimum location and enhanced economic activities. Questions which operators ask when adopting technology that drives urban land use decisions include ability of the existing technology to:

- enable viable use of available land in the urban space;
- cope with the pace of agglomeration and intensive land use ; and
- adapt to change and improvement over time.

The first question relates to the feasibility and viability of technology options, while the last questions relates to the sustainability of the technology options. These vital questions attract economic implications for operators in their quest to cope with the technological demands posed by agglomeration. The capital intensive nature of land uses at commercial nerves of urban areas calls for a proactive technological innovation capable of surmounting constraints to modern commercial enterprises. In a study of economies of scale arising from research and development activities of adjoining firms, it was found that technology plays an important role in agglomeration (Koo, 2005). Hence, relevant dimensions of technological indicators which influence location include the construction technology, quality of finishing in shops/business premises, building maintenance practices, availability and quality of power supply from national grid and availability of alternative source of power supply (Babatunde, 2011), and pollution and waste management practices.

Socio-cultural indicators

Socio-cultural indicators are behavioural traits which emanates from cultural attitudes, custom and tradition, habitual ways of thinking, and household practices among other exerts strong influence on intensity of land use, agglomeration and viability of land use decision (Barlowe, 1986). Critical among these factors include personal/household consideration, security, quality of education and enlightenment, custom and habit, religious institutions, urban population dynamics, and landlord-tenant relationship in business premises. Location decisions emanating from household decisions can be traced to influence of individual family units, which constitute the consuming unit in the economy (Antwi & Omirin, 2006; Eccless, Sayce, & Smith, 1999). It should be recalled that commercial property operators hail from a family such that business decisions reached at the family level may tend to shape the pattern and intensity of commercial land uses thereby charting the course for agglomerations and viability of land use decisions along urban growth trends. Security of commercial and business premises is an increasingly important socio-cultural indicator of agglomeration and viable land use. McMahan (2007) reiterated that there may be advance warning about the occurrence of natural disasters contrary to a wide spectrum of security issues ranging from armed banditry and terrorism which occurs with little or no early warning signals. Therefore the best form of response to security threat is prevention, which may take the forms best known to private security guards and the state security agencies. Areas with records of security threat and terrorism may not attract agglomeration of commercial land uses let alone viability of commercial ventures because victims of security threats usually shut down business operations and relocate to safer areas. Business operators should appreciate that measures put in place to check security breaches should be top secret as these bandits cleverly seek new and sophisticated tactics towards defiling security checks and achieving their destructive goals. Keivani, Parsa, & Younis (2003) posits that essential ingredients of success are continuous learning and the competence to use what is learned. To this end, education and play vital role in intensity of commercial land uses let alone being a driver of agglomeration. It implies that educated business operators always take advantage of available business opportunities offered by commercial land uses in urban areas. A corollary to education is the enlightenment drive provided by print- and electronic mass media. McCann (2004) however observed that media reports may tend to exaggerate the beauty of an urban area while ignoring negative consequences of urbanization in such places. Hence, it behoves on potential and existing operators of commercial ventures to exercise commonsense in their location decision. Custom and tradition still play dominant role in the allocation and use of landed property in Nigeria (Aluko & Amidu, 2006; Ikejiofor, Nwogu, &

Nwanunobi, 2004) in spite of the dichotomy between state allocation system and the customary tenures. This factor can influence intensity of commercial land uses and attractiveness of properties for business purposes. Religious beliefs also constitute another socio-cultural indicator of commercial property location, owing to the fact that certain trade practices and products are considered inappropriate by certain religious groups. Therefore, operators of shops and allied commercial premises seek to avoid marketing and selling of certain products and services that is inimical to the religious practice of their host communities. Population dynamics constitute a co-variable of socio-cultural factor that affects agglomeration, ordering of commercial land uses, and determines the structure of urban areas. According to Brueckner (1987), increase in urban population leads to intensification of urban development with attendant implications for agglomeration. Bertaud and Renaud (1995) reiterated that as economy of cities and their population grow, these cities expand through the progressive addition of concentric rings such that each ring reflects the combined effects of demography, technology, and the economy at the time when it was developed. The addition of new concentric zones is to enable the accommodation of population dynamics arising from birth rate, death rate, rural-urban migration, and tourism. A large proportion of commercial ventures are operated within rented commercial apartments owned by landlords who tend to fall back on rent proceeds accruing from these properties. However, consistency of landlords' earnings from rent depends to a large extent on the contractual agreement reached with their business tenants as well as the mutual understanding between them (Dubben & Sayce, 1991), which may serve as foundation for future referrals, agglomeration of business tenants, viable contract rent (for the landlord) and viable economic rent (for the business tenant).

Legal indicators

Legal indicators for the location of commercial land uses are basically drawn from the various sources of laws comprising customary laws; received law; Acts of Parliament and Statutes; Edicts; and case laws (Smith, 2007). For the purpose of this study, legal indicators capable of influencing agglomeration of commercial land uses and the possibility of enabling viable location decisions have been drawn from studies conducted by Lichfield and Connellan (2000) and EU (2004) to include compliance with development control tools; compliance with zoning regulations; quality and duration of interest held in land; vulnerability of land to compulsory acquisition; and land disputes. In order to exercise development rights attached to land units, operators must obtain planning permission (Lichfield & Connellan, 2000). The level of operators' compliance with development control influences sustainable commercial land uses in urban areas. An operator's violation of planning regulations (zoning and development control laws) could trigger diseconomies of scale for adjoining land uses that depend on the services they offer. From a rational economic perspective, developers and business operators who depend on land for their commercial and productive venture are entitled to pecuniary benefit from their land use decision; this according to UN-Habitat (2004) is only possible within their limits of duration of interest held in land. Powers of land expropriation vested in the state can adversely affect viability of land use decisions of the private sector since relocation may become imminent thereby leading to trade disturbances like temporary loss of income and goodwill (Rowan-Robinson & Hutchison, 1995). The situation evokes further worries for business premises operators given the fact that compensation for trade disturbances such as loss of earnings are not properly captured by the Nigerian Land Use Act which provided for land expropriation and compensation (Famuyiwa, & Omirin, 2011). Not left out is the possibility of disputes over ownership and control of family- and individual estates serving the productive needs of business tenants, which is capable of frustrating land use decision. Absence of disputes could imply peaceful co-existence and sustainable agglomeration and intensity of commercial land use.

Political indicators

Economists have identified the three key players in the urban economy to include the household, the firm, and the state (Eccless et al., 1999). Greed (1993) affirmed that the regulatory powers of the state exert significant impact on the physical development and dynamics of urban development at large. Hence, the political influence of those in governance exerts a measure of impact on land use decisions of the household and the firm. This political influence arises from co-variables comprising the quality of political institutions, working political agenda of the government, and the quality of urban governance, which according to Hansen, Andersen, & Clark (2001) is a vital tool for unlocking the wealth in land use decisions. A common argument in support for these co-variables is that the government is expected to adopt democratic principles in the distribution of resources and creation of favourable investment opportunities (EU, 2004). These political best practices are indispensable tools for realizing agglomeration of commercial land uses, vibrant socio-economic wellbeing of the citizenry, and sustainable development.

To conclude this literature review, there are six indicators and thirty-three co-variables exerting impact on land use. These indicators and their co-variables shall form the basis upon which the objectives of this study shall be addressed.

THE STUDY AREA

Lokoja, the capital of Kogi state is located at about latitude 7^{o} 48' N and longitude 6^{o} 42' E (Figure 1) and is about 200 kilometres from Abuja, Nigeria's capital city. Remarkable features in Lokoja, include the confluence of Rivers Niger and Benue and Mt. Patti. The 2006 population census figures documented in the Official Gazette of the Federal Republic of Nigeria put the population of Lokoja, at 195,261 with an annual growth rate of 3.0% per annum. Land use zones in Lokoja are stratified into low density-, medium density- and high density neighbourhoods.

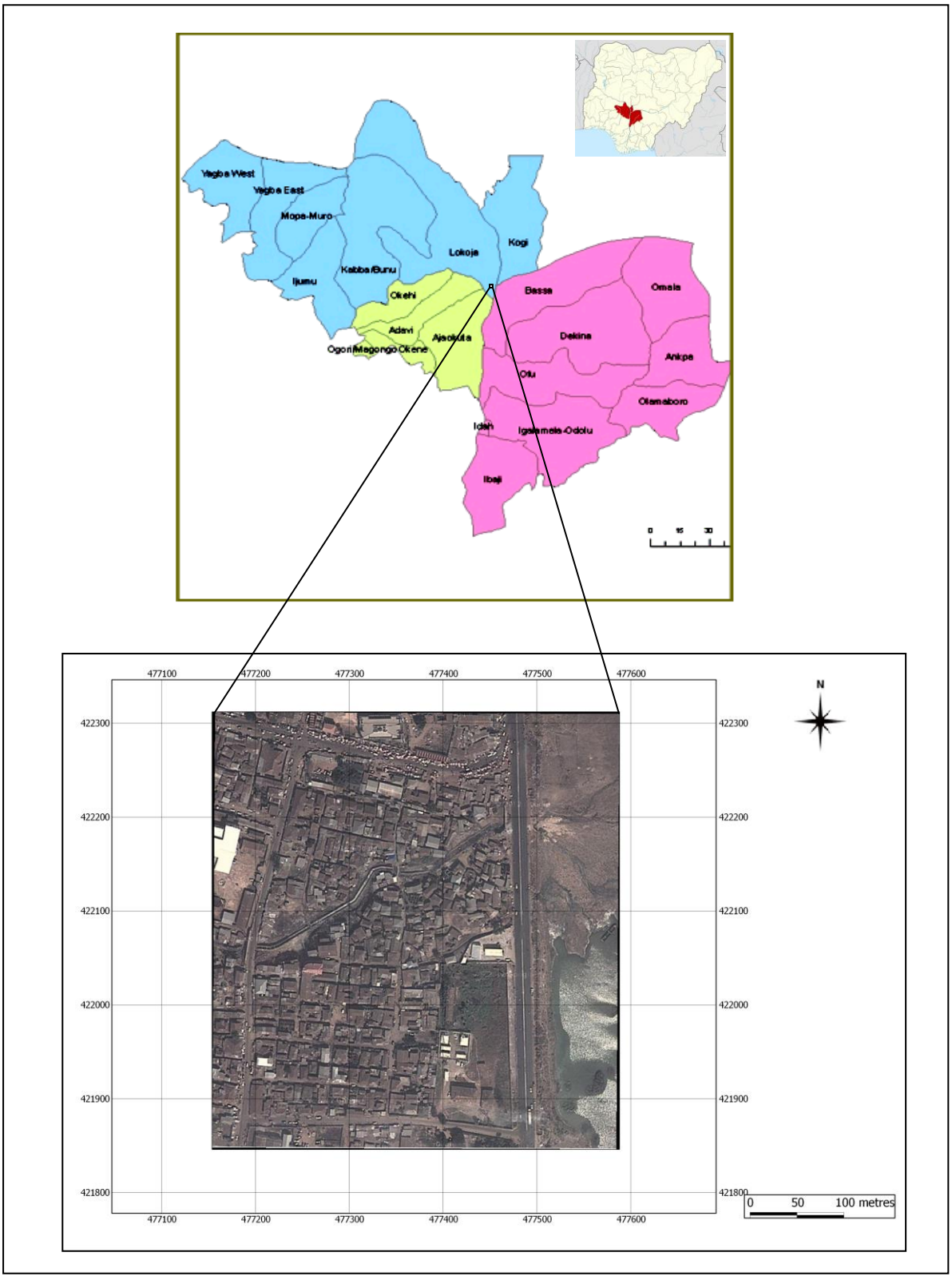

Figure 1: Map and satellite imagery of Cantonment, the study area

Source of maps retrieved 1st September, 2013

Map of Nigeria: http://upload.wikimedia.org/wikipedia/commons/3/3e/Nigeria_Kogi_State_map.png

Map of Kogi state: http://www.ncocusa.com/images/map.kogi1.gif

Satellite image: Google maps

Low density neighbourhoods comprise Government Residential Area (GRA) and Ganaja, while Medium density neighbourhoods include Lokongoma phases I, II, and III, New layout, workers village, and Adankolo New layout. High density neighbourhoods comprise Gadumo, Cantonment, Kabawa, Ajara quarters, Karaworo, Felele and Sirkin Noma. While commercial activities are concentrated in the central business district of Lokoja, cutting across Ibrahim Badamasi Babangida (IBB) Way, and Murtala Muhammed Way, this study shall be delimited to Cantonment neighbourhood of Lokoja where the satellite imagery of (Figure 1) reveals agglomeration of commercial activities. Rationale for the choice of Cantonment as the study area is anchored on its historical significance as the pioneer commercial neighbourhood in Lokoja.

RESEARCH METHODOLOGY

Besides the adoption of text-based method of literature review, this research adopted a case study methodology. According to Singh (2006) and Yin (2003), case study researches are aimed at providing answers to research questions posed for social units. Approaches to case study methodology include exploratory approach which seek to identify relevant variables for further assessment (Creswell, 2003) and explanatory approach to determine relationship among variables (Sing, 2006), which in this research is the relationship between agglomeration and viability of land use within the context of Cantonment, the study area.

Primary data for this research was harnessed using questionnaire administered to the three categories of respondents comprising business tenants, customers and Estate Surveyors and Valuers as indicated in Table 1 below, while instruments of secondary data for this research include access to relevant scholarly publications. The main intent of the questionnaire is to elicit perceived importance of variables and co-variables of commercial land use agglomeration and viability in the study area.

Table 1: Sample size and study questionnaire successfully retrieved

Study group	Population	Sample	Questionnaire retrieved	Percentage successfully retrieved (%)
Business tenants	226	92	83	90.2
Customers	227,963	156	118	75.6
Estate Surveyors and Valuers	11	11	11	100.0
Total		259	212	

The average population of business tenants in the study area was determined to be 226 following the researchers' census count conducted at the peak business hours of 1:00pm to 3:00pm from Monday to Saturday. Furthermore, an update of the 2006 population census figure of Lokoja from 196,643 to 227,963 in the year 2012 was carried out using exponential growth rate of 3% per annum. With reference to the minutes of meetings of the Kogi State chapter of the Kwara/Kogi branch of the Nigerian Institution of Estate Surveyors and Valuers, there are only eleven (11) Registered Estate Surveyors and Valuers in Lokoja. In addition to eliminating spatial competition among firms, Papageorgiou and Thisse (1985), reiterated that agglomeration is anchored on spatial interdependence between firms and households. This explains the rationale behind the involvement of customers in this research as their perception of location factors influencing agglomeration and viability of land use decisions is crucial. A sample of 92 business tenants and 156 customers were drawn for this study using an estimated population of 226 tenants and 227,963 inhabitants of Lokoja in 2012 and recourse to the application of the equation suggested by Cochran (1977) in a similar exercise:

$$n = \frac{n_o}{1+(n_o/N)}$$

Where the approximate representation of sample size, $n_o = (S^2)/(V^2)$, standard error of sampling distribution, V = 0.02; the maximum standard deviation in population elements, S = p(1 - p) on assumption of an estimated proportion of 0.5 for business tenants. Contrary to the other respondents, the sample size of Estate Surveyors and Valuers in Lokoja was purposively determined to be the study population of 11 in order to surmount the risk of small samples. Out of the 259 questionnaire administered the three categories of respondents, 212 were successfully retrieved (Table 1), and represents an overall success rate of 82.8%.

A collection of statistical tools of data analysis were deployed in this study. These include mean item score, ranking, ANOVA test, spearman's rank correlation analysis and the Wilcoxon signed-rank test of significance which were deployed to examine the relationship between agglomeration and viability of commercial land uses.

RESULTS AND DATA ANALYSIS

Analysis of location factors accounting for commercial land uses

Results in Table 2 indicate that technology is a major driver for the agglomeration of commercial land uses in the study area. This result is consistent with the important role which technology plays in the agglomeration of firms (Koo, 2005). Ranked 2nd, 3rd, and 4th, and statistically significant at $p < 0.05$ are legal-; socio-cultural; and physical indicators respectively, while political- and economic indicators ranked 5th and 6th are statistically significant at $p < 0.01$ implying that they exhibit very strong impact on agglomeration of commercial land uses irrespective of the low ranking accorded them by respondents.

Table 2: Analysis of Group means for location factors accounting for agglomeration of commercial land uses

Indicators for activity location	Mean item score			Group mean	Rank	F-ratio	p-value
	Business tenants	Customers (Cust.)	Estate Surveyors and Valuers (ESV)				
Technological indicators	4.00	3.90	4.09	4.00	1	8.730	0.010*
Legal indicators	3.95	3.97	4.05	3.99	2	6.360	0.022*
Socio-cultural indicators	4.08	3.87	3.99	3.98	3	7.385	0.015*
Physical indicators	3.68	4.01	4.11	3.93	4	6.240	0.023*
Political indicators	3.93	3.82	3.85	3.87	5	9.220	0.008**
Economic indicators	3.82	3.67	3.91	3.80	6	13.658	0.003**

*Significant at $p < 0.05$
**Significant at $p < 0.01$

Inference from Table 3 reveals that physical indicators is ranked first as influencing viability of commercial land uses in the study area. Ranked 2nd, 3rd, and 4th, are economic-; technological-; and legal indicators respectively, while socio-cultural- and political indicators are ranked 5th and 6th. All these factors are statistically significant at $p < 0.05$ thereby exhibiting very strong impact on viability of commercial land uses irrespective of ranking accorded them by respondents. It is on the basis of these preliminary analyses that these location factors shall be further decomposed into co-variables to pave the way for an analyses of their cross sectional impact on agglomeration- and viability of commercial land use.

Table 3: Analysis of Group means for location factors accounting for viability of commercial land uses

Indicators for activity location	Mean item score			Group mean	Rank	F-ratio	p-value
	Business tenants	Customers (Cust.)	Estate Surveyors and Valuers (ESV)				
Physical indicators	3.79	4.14	4.14	4.02	1	5.510	0.031*
Economic indicators	4.06	3.93	4.05	4.01	2	8.460	0.011*
Technological indicators	4.03	4.01	3.95	4.00	3	7.223	0.016*
Legal indicators	3.98	3.98	3.91	3.96	4	9.293	0.015*
Socio-cultural indicators	4.00	4.01	3.84	3.95	5	6.950	0.018*
Political indicators	4.04	3.87	3.88	3.93	6	7.379	0.015*

*Significant at $p < 0.05$

Table 4: Location co-variables accounting for agglomeration- and viability of commercial land uses

Co-variables of activity location	Agglomeration of commercial land uses					Viability of commercial land uses				
	Mean item score			Group Mean	Rank	Mean item score			Group Mean	Rank
	tenants	Cust.	ESV			tenants	Cust.	ESV		
topography	3.00	3.85	4.09	3.65	30	3.06	3.72	4.00	3.59	33
weather	2.87	3.91	3.64	3.47	33	3.02	4.07	3.82	3.64	31
Accessibility	4.53	4.22	4.64	4.46	1	4.51	4.37	4.55	4.48	1
urban size	3.71	4.20	4.00	3.97	15	3.90	4.28	4.45	4.21	4
parking spaces	4.23	3.92	4.09	4.08	9	4.28	4.23	4.00	4.17	6
environ. hygiene	3.75	3.97	4.20	3.97	15	3.99	4.15	4.00	4.05	12
business cycle	3.64	3.64	4.09	3.79	25	3.87	3.82	4.18	3.96	16
fiscal policies	3.67	3.53	3.82	3.67	29	3.89	3.68	3.91	3.83	26
financial incentives	3.40	3.53	3.64	3.52	32	4.01	3.69	3.73	3.81	27
external economies	4.40	4.01	4.45	4.29	3	4.53	4.36	4.55	4.48	1
marketing strategy	3.88	3.54	3.64	3.69	28	4.00	3.84	3.91	3.92	20
product packaging	3.95	3.77	3.82	3.85	22	4.07	4.21	4.00	4.09	10
construction techn.	3.71	3.69	4.00	3.80	24	3.99	3.86	3.82	3.89	25
quality of finishing	4.30	4.07	3.73	4.03	11	3.96	4.09	4.09	4.05	12
building maintenance	3.84	3.81	3.55	3.73	27	4.00	3.97	3.82	3.93	19
national elect. power	4.00	3.84	4.45	4.10	7	4.25	4.01	4.09	4.12	9
alternative power	4.35	4.06	4.55	4.32	2	4.22	4.14	4.27	4.21	4
waste management	3.82	3.93	4.27	4.01	12	3.75	3.99	3.64	3.79	28
household influence	3.94	4.07	3.64	3.88	20	4.00	4.04	3.82	3.95	18
security	4.31	4.06	4.00	4.12	6	4.41	4.20	3.91	4.17	6
enlightenment	4.27	3.77	4.00	4.01	12	4.16	4.06	3.55	3.92	20
custom & habit	3.86	3.70	3.82	3.79	25	3.66	3.75	3.64	3.68	30
religious institutions	3.89	3.90	3.82	3.87	21	3.48	3.97	3.73	3.73	29
population dynamics	4.27	3.96	4.18	4.14	5	4.27	4.05	4.09	4.14	8
landlord-tenant bonds	4.00	3.66	4.45	4.04	10	4.02	4.00	4.18	4.07	11
development control	4.00	4.01	4.45	4.15	4	3.83	4.04	4.00	3.96	16
zoning regulations	3.94	3.99	3.82	3.92	18	4.04	3.97	3.73	3.91	22
interest held in land	3.96	3.99	4.09	4.01	12	3.77	4.03	3.91	3.90	23
land expropriation	4.01	4.00	3.91	3.97	15	4.22	3.91	3.82	3.98	15
land disputes	3.83	3.86	4.00	3.90	19	4.06	3.98	4.09	4.04	14
political institutions	3.86	3.97	3.73	3.85	22	3.95	3.92	3.82	3.90	23
agenda of govt.	3.90	3.58	3.45	3.64	31	3.84	3.63	3.36	3.61	32
urban governance	4.04	3.91	4.36	4.10	7	4.33	4.06	4.45	4.28	3

Analysis of location co-variables accounting for agglomeration commercial land uses

It can be drawn from Table 4 that accessibility as a physical factor is ranked among the first which influences agglomeration of commercial land uses in the study area. This results is consistent with similar studies by McCann and Shefer (2004) and Truong (2008) regarding the importance of accessibility in location and agglomeration of firms. Ranked 2nd and 3rd include the availability of alternative source of power supply and external economies. On the basis of average consensus, it was found that respondents do not attach much importance to topography, political agenda of government, financial incentives and weather conditions.

Analysis of location co-variables accounting for viability of commercial land uses

Turning attention to co-indicators of viable land use decision, there is a tie in accessibility and external economies of scale which both account for the first co-variables influencing the viability of commercial land uses in the study area. Quality of urban governance (efficiency of government in handling urban management issues) is ranked 3rd among the co-variables accounting for viability of commercial land use.

Ranked 4th are urban size and alternative source of power supply which underscores the importance of physical- and technological indicators of viable commercial land use. The two co-variables that tied 6th position in the order of impact they exert on viability of commercial land uses in the study area include availability of parking spaces for customers and adequacy of security for business activities, while topography is ranked the least among these co-variables. These thirty-three co-variables of activity location in Table 4 were used to determine the nexus between both urban phenomena in the study area.

Relationship between agglomeration- and viability of commercial land uses

Table 5 indicate that 78.6% of co-variables accounting for the viability of commercial land uses is explained by the agglomeration of same commercial land uses. Statistical test further reveals that the relationship between these two urban phenomena is significant at $p < 0.01$. This analysis has revealed that there is indeed a significant relationship between agglomeration- and viability of commercial land uses in the study area. This is in consonance with position of Arnott and McMillen (2006) that spatial concentration of economic activities leads to specialization in the urban economy as well as viable production of goods and services. The contribution to sustainable regional development is the spillover effect of positive externalities arising from the cluster of business activities (Koo, 2005).

Table 5: Statistics of spearman's rank-order correlation

			Agglomeration of commercial land use	Viability of commercial land use
Spearman's rho	Agglomeration of commercial land use	Correlation Coefficient	1.000	0.786**
		Sig. (2-tailed)	.	0.000
		N	33	33
	Viability of commercial land use	Correlation Coefficient	0.786**	1.000
		Sig. (2-tailed)	0.000	.
		N	33	33

** Correlation is significant at the 0.01 level (2-tailed)

Test for differences between agglomeration- and viability of commercial land uses

The ordinal paired-data samples in Table 6 warrants the adoption of Wilcoxon signed-rank to test for difference or otherwise in the distribution of respondent's ranking of co-variables influencing agglomeration- and viability of commercial land use respectively. Table 6 indicates a negative sum of rank (mean rank) to the tune of 372.00 (16.91) and positive sum of rank (mean rank) to the tune of 156.00 (15.60). With $p < 0.05$, inference can be drawn from Table 7 that there is no significant difference in respondents ranking of location co-variables accounting for agglomeration- and viability of commercial land use respectively. This result further confirms the positive relationship between spatial concentration of economic activities and viability of land use decisions in the study area.

Table 6: Summary of signed-ranks

		N	Mean Rank	Sum of Ranks
Agglomeration of commercial land use – Viability of commercial land use	Negative Ranks	22[a]	16.91	372.00
	Positive Ranks	10[b]	15.60	156.00
	Ties	1[c]		
	Total	33		

a Agglomeration of commercial land use < Viability of commercial land use
b Agglomeration of commercial land use > Viability of commercial land use
c Viability of commercial land use = Agglomeration of commercial land use

Table 7: Wilcoxon signed-ranks test

	Agglomeration of commercial land use – Viability of commercial land use
Z	-2.020[a]
Asymp. Sig. (2-tailed)	0.043

[a] based on negative ranks.

CONCLUSION AND RECOMMENDATIONS

Agglomeration is an attribute of commercial land use which is driven by firms. In order to address the need for agglomeration, these firms will have to assess the viability of location decisions leading to that agglomeration itself. In other words, an assessment of the relationship between economies of scale arising from mutually dependent commercial activities and the viability of stakeholder decisions is crucial as firms evaluate the impact of location and spatial developmental decisions on their earnings. Owing to the knowledge gap on the relationship between agglomeration of commercial land uses and perception of viability which commercial business operators attach to a given location, this research was undertaken to examine the relationship between agglomeration and viability of commercial land uses.

Following the analysis of location factors accounting for agglomeration, it was found that technology is very crucial factor. Although economic factors were not ranked first by respondents, it was found to exert the most significant impact on agglomeration of commercial land use in the study area. In other words, firms in the study area pay more attention to the economic benefits of agglomeration arising mainly from their location decisions.

Contrary to the preceding results, physical factors was ranked as the most important factors that influence viability of commercial land use. However, economic factors still dominates as a significant indicator of viable commercial land use in the study area just as in the case of agglomeration. Others notably legal-, technological-, political-, and socio-cultural

indicators were discovered to be significant. The only snag with these analyses is that they do not provide any insight into specific dimensions of the impact of these indicators. In order to surmount this limitation, the analysis was further carried out at the level of co-variables of each indicator.

Analysis of location co-variables accounting for agglomeration commercial land uses indicates that accessibility as a physical factor is very crucial. This is consistent with similar studies on the importance of accessibility in location and agglomeration of firms (McCann & Shefer, 2004; Truong, 2008). A peculiar problem confronting firms in Nigerian cities is erratic power supply from the National grid (Babatunde, 2011). This accounts for the rationale behind the ranking of alternative source of power supply as the second co-variable of agglomeration to be given due consideration by firms. Others among the top five include external economies, compliance with development control and population dynamics.

Among the top five location co-variables accounting for viable commercial land uses in the study area include accessibility, external economies of scale, quality of urban governance, alternative power supply, urban size. The importance which respondents have attached to accessibility and external economies of scale is consistent with the results from similar studies on location and land use (Dent & White, 1998; Hoover & Giarratani, 1984; McCann & Shefer, 2004). Just as the case of agglomeration, dependence on alternative power supply was viewed by respondents as being crucial to viability of commercial land uses. Opinion of respondents is rational given the energy dependent attribute of modern firms and business in this 21st century. The contribution of good urban governance towards realizing viable commercial land uses is drawn on the need for government to regulate decisions of firms and households regarding the use of urban space as a vital resource for sustainable development (Rindell, 2004). Findings of this research with respect to the importance of urban size on viability of commercial land use is consistent with results from similar studies by Quigley (1998), who held that there is a correlation between city size and productivity.

Fulfilling the explanatory case study approach to this research is the evaluation of the relationship between agglomeration and viability of commercial land uses with recourse to ranks accorded each co-variables of physical-, economic-, legal-, technological-, political-, and socio-cultural indicators respectively. Results from a spearman's rank-order correlation indicates a strong correlation between agglomeration and viability of commercial land uses in the study area. Concluding the analysis was a Wilcoxon-signed rank test which indicates that there is no significant difference in respondents ranking of location co-variables accounting for agglomeration- and viability of commercial land use respectively. These results are consistent with findings of Arnott and McMillen (2006) regarding spatial concentration of economic activities and productivity as well as Koo (2005) regarding positive externalities arising from the cluster of business activities.

Besides the emphasis that viability of commercial land uses cannot be realized in isolation of agglomeration economies, this research draws the attention of the state, firm and household in the study area to the importance of economic-, technological- and physical indicators for viable commercial land use and agglomeration. The implication of these findings for these stakeholders is that agglomeration policies are not just aimed at concentration of economic activities but have far reaching implications for the viability of land use decisions of firms and sustainable urban development. Therefore, it is recommended that economic evaluation of location decisions by operators of commercial activities in

urban areas of Sub-Saharan African countries should accord considerable attention to accessibility and external economies of scale.

REFERENCES

Aguayo, M. I., Wiegand, T., Azocar, G. D., Weigand, K., and Vega, C.E. (2007). Revealing the Driving Forces of Mid-Cities Urban Growth Patterns Using Spatial Modelling: A Case Study of Los Ángeles, Chile. Journal of Ecology and Society. 12(1), Retrieved 30th August 2013 from http://www.ecologyandsociety.org/vol12/iss1/art13/ES-2006-1970.pdf

Aluko, B. T. and Amidu, A-R. (2006). Urban Low Income Settlements, Land Deregulation and Sustainable Development in Nigeria. Paper presented at the 5th FIG Regional Conference Accra, Ghana, March 8 -11.

Antwi, A. and Omirin, M. (2006). The investment performance of informal properties in Accra, Ghana and Lagos, Nigeria. RICS Research paper series, 6(4).

Arnott, R.J. and McMillen, D.P. (Eds)(2006). A Companion to Urban Economics. UK: Blackwell Publishing Ltd.

Asafu-Adjaye, J. (2005). Environmental Economics for Non Economists: Techniques and Policies for Sustainable Development. (2nd ed). Singapore: World Scientific Publishing Co. Ltd.

Babatunde, M.A. (2011). Keeping the Lights on in Nigeria: Is Power Sector Reform Sufficient? Journal of African Business. 12(3), 368 - 386.

Barlowe, R. (1986). Land Resource Economics: The Economics of Real Estate. (4th ed.). New Jersey: Prentice-Hall.

Barkham, R. (2002). Market research for office real estate. In S. Guy and J. Hennebery (Eds), Development and Developers: perspectives on property. (pp. 53-72). Oxford: Blackwell Science Ltd.

Bergsman, J. Greenston, P., & Healy, R. (1972). The Agglomeration Process in Urban Growth. Urban Studies, 9, 263 - 288.

Bertaud, A and Renaud, B. (1995). Cities without Markets: Location and Land use in the Socialist City. The World Bank Policy Research Working Paper No. 1477. Washington, D.C.: World Bank.

Brueckner, J. (1987). The structure of urban Equilibria: a unified treatment of the Muth-Mills Model. In E. S. Mills (Ed), Handbook of Regional and Urban Economics, Volume II. Netherlands: Elsevier Science Publishers.

Byrne, P., Lizieri, C. and Worzala, E. (2002). The Location of Executive Suites and Business Centers in the United States. Journal of Real Estate Portfolio Management, 8(3), 255 - 270.

Caldas, M., Walker, R., Arima, E., Perz, S., Aldrich, S. and Simmons, C. (2007). Theorizing Land Cover and Land Use Change: The Peasant Economy of Amazonian Deforestation. Annals of the Association of American Geographers, 97(1), 86 - 110.

Carter, C.C. and Vandell, K.D. (2005). Store Location in Shopping Centres: Theory and Estimates. Journal of Real Estate Research, 27(3), 237 - 265.

Cochran, W.G. (1977). Sampling Techniques. New York: John Wiley & Sons.

Creswell, J. W. (2003). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. California: Sage Publications.

Dent, P. and White, A. (1998). Corporate real estate: changing office occupier needs - A case study. Facilities, 16(9/10), 262 - 270.

Dubben, N. and Sayce, S. (1991). Property Portfolio Management: An Introduction. London: Routledge.

Eccless, T., Sayce S., and Smith, J. (1999). Property and Construction Economics. London: International Thomson Business Press.

Egbenta, I.R. (2012). Essentials of Estate Management with Entrepreneurship. Enugu: Ezu Books Ltd.

EU (2004). Guidelines for support to land policy design and land policy reform processes in developing countries. Geneva: EU Task Force on Land Tenure.

Famuyiwa, F., and Omirin, M. M. (2011). Infrastructure Provision and Private Lands Acquisition Grievances: Social Benefits and Private Costs. Journal of Sustainable Development, 4(6), 169 - 180.

Fraser, W.D. (1993). Principles of Property Investment and Pricing. (2nd ed). Basingstoke: Macmillan.

Greed, C. (1993). Introducing Town Planning. Harlow: Longman.

Gibson, V.A. and Barkham, R. (2001). Corporate Real Estate Management in the Retail Sector; Investigation of Current Strategy and Structure. Journal of Real Estate Research, 22(1/2), 107 - 127.

Hansen, A. L., Andersen, H. T. and Clark, E. (2001). Creative Copenhagen: Globalization, Urban Governance and Social Change. European Planning Studies, 9(7), 851 - 869.

Harvey, J. and Jowsey, E. (2003). Urban Land Economics. London: Palgrave-Macmillan.

Hoover, E. M., & Giarratani, F. (1984). An introduction to regional economics (3rd ed.). New York: Knopf.

Ikejiofor, C., Nwogu, K., and Nwanunobi, C. (2004). Informal Land Delivery Processes in Enugu, Nigeria: Summary of Findings and Policy Implications. Birmingham: International Development Department, University of Birmingham.

Inman, R.P. (2006). Financing Cities. In R.J. Arnott and D.P. McMillen (Eds). A Companion to Urban Economics. UK: Blackwell Publishing Ltd.

Isaac, D., Leary, J. O., & Daley, M. (2010). Property Development: Appraisal and Finance. (2nd ed.). London: Palgrave Macmillan.

Jacobs, J. (1969). The Economy of Cities. New York: Vintage.

Jelili, M.O., Adedibu, A.A. and Egunjobi, L. (2008). Regional Development Planning in Nigeria: The General and Particular. Journal of Social Science, 16(2), 135-140.

Kauko, T. (2001). Combining Theoretical Approaches: the Case of Urban Land Value and Housing Market Dynamics. Housing, Theory and Society. 18, 167 - 173.

Keivani, R., Parsa, A. and Younis, B. (2003). Development of the ICT Sector and Urban Competitiveness: The Case of Dubai. Journal of Urban Technology, 10(2), 19 - 46.

Koo, J. (2005). Technology Spillovers, Agglomeration, and Regional Economic Development. Journal of Planning Literature, 20(2), 99 - 115.

Lichfield, N. and Collenan, O. (2000). Land Value and Community Betterment Taxation in Britain: Proposals for Legislation and Practice. Working Paper WP00NL1. Cambridge, MA: Lincoln Institute of Land Policy.

McMahan, J. (2007). Professional Property Development. New York: McGraw-Hill.

McCann, E. J. (2004). Best Places: Interurban Competition, Quality of Life and Popular Media Discourse. Urban studies, 41(10), 1909 - 1929.

Morley, S. (2002). The financial appraisal of development projects. In S. Guy and J. Hennebery (Eds). Development and Developers: perspectives on property. (pp.73 - 95). Oxford: Blackwell Science Ltd.

Ogbuefi, J.U. (2002). Aspects of Feasibility and Viability Studies. Enugu: Institute of Development Studies

Papageorgiou, Y. Y., & Thisse, J. F. (1985). Agglomeration as spatial interdependence between firms and households. Journal of Economic Theory, 37(1), 19-31.

Pearce, D., Atkinson, G., & Mourato, S. (2006). Cost-Benefit Analysis and the Environment: Recent Developments. France: OECD Publishing.

Quigley, J.M. (1998). Urban Diversity and Economic Growth. Journal of Economic Perspectives, 12(2), 127 - 138

Riddell, R. (2004). Sustainable Urban Planning Tipping the Balance. Oxford: Blackwell Publishing Ltd

Rondinelli, D. A., Johnson, J. H. and Kasarda, J. D. (1998). The changing forces of Urban Economic Development: Globalization and City Competitiveness in the 21st century. Cityscape Journal of Policy Development and Research. 3(3), 72 - 105.

Rosenthal, S.S. and Strange, W.C. (2006). The Micro-Empirics of Agglomeration Economies. In R.J. Arnott and D.P. McMillen (Eds). A Companion to Urban Economics. (pp. 7 - 23). UK: Blackwell Publishing Ltd.

Rosenthal, S. S., & Strange, W. C. (2001). The Determinants of Agglomeration. Journal of Urban Economics, 50(2), 191-229.

Rowan-Robinson, J., & Hutchison, N. (1995). Compensation for the compulsory acquisition of business interests: Satisfaction or sacrifice. Journal of Property Valuation and Investment, 13(1), 44 - 65.

Singh, Y. K. (2006). Fundamental of Research Methodology and Statistics. New Delhi: New Age International Ltd.

Smith, I. O. (2007). A Practical Approach to Law of Real Property in Nigeria. (2nd ed.). Lagos: Ecowatch Publications Nigeria Ltd.

Thorns, D.C. (2002). The Transformation of Cities: Urban Theory and Urban Life. Basingstoke: Palgrave Macmillan.

Truong, C. B. (2008). Factors of Agglomeration in Vietnam and Recommendations. In M. Ariff, (Ed.). Analyses of Industrial Agglomeration, Production Networks and FDI Promotion. ERIA Research Project Report 2007-3, (pp.155-189), Chiba, Japan: IDE-JETRO.

Umeh, J.A. (1977). Feasibility and Viability Appraisal. Ibadan: Onibonoje Press

UN-HABITAT (2004). Urban Land for All. Nairobi: The United Nations Human Settlements Programme (UN-Habitat)

Witkiewicz, W. (2002). The Use of the HP-filter in Constructing Real Estate Cycle Indicators. Journal of Real Estate Research, 23(1/2), 65 – 87.

Wyatt, P. (1999). Can a geographical analysis of property values aid business location planning? Paper presented at the 1999 RICS Cutting Edge Research Conference, 6th - 7th September.

Wyatt, P. (2007). Property Valuation in an Economic Context. London: Blackwell Publishing Ltd.

Yin, R. K. (2003). Case Study Research: Design and Methods. (3rd ed.). London: Sage Publications.

ABOUT THE AUTHORS:

Joseph Obaje Ataguba is a Lecturer in the Department of Estate Management, at the Federal Polytechnic Idah, Kogi State, Nigeria.

Michael Ayodele Olukolajo is a lecturer in the Department of state Management, at the Federal University of Technology Akure, Nigeria.

Falana, Folashade Florence is a Senior Lecturer in the Department of Estate Management, at the Federal Polytechnic Idah, Kogi State, Nigeria.