

Magnetic Developments and Urban Growth: Urban Design Lessons from LAUTECH Neighbourhoods, Ogbomoso, Nigeria

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Abstract— *Urban growth phenomenon in cities is hinged upon the presence of certain magnetic developments which serves as growth factors and catalysts. These include institutions of higher learning, roads, airports, industrial developments, among many others. The study examined the contribution of Ladoke Akintola University of Technology (LAUTECH) off-campus accommodation system to the physical development, being the hub of the socio-economic development, of abutting neighbourhoods. The aim is to measure the physical growth impacts of the institution to glean lessons for spatial planning. The number and type of building plans approved by the town planning authority for development in the neighbourhoods abutting the university over the span of ten years was compared with the university population during the period under examination based on ratio scale. This was coupled with cross-sectional study of environmental quality of the neighbourhoods. Result of analysis of the data shows a significant relationship between the university population growth rate and growth rate of physical development in the university neighbourhoods. Sprawl, low environmental quality, progressively increasing land value, violation of planning regulations, and poor urban aesthetics were the outcomes of lack of pre-planning of the neighbourhoods. Based on these findings, the study recommends that neighbourhoods abutting institutions of higher learning should be pre-planned since such institutions would always be magnetic and serve as catalysts of growth.*

Keywords - *off-campus, physical development, catalyst, LAUTECH neighbourhood, planning.*

I. INTRODUCTION

University campuses when newly established as a miniature educational neighbourhood is symbolic of a seed. At the germination of the seed, the impact of the presence of such environmental living organism [1] with a growth character is not limited to the primary space it occupies but has catalytic effect on the growth of adjoining land uses. This magnetic growth impact is particularly enhanced by the urban fringe location of such institution being surrounded by mass of virgin land yet to be developed and not pre-planned, especially in developing nations. In view of Tisdell's [2] distilled definition of urbanization as a process of population concentration, the internal growth process of the university campus is evident in

the growth product exemplified by the high rate of developmental projects that are attracted to the adjoining neighbourhoods. They are analogous to Eco-cities of living organisms. Like living organisms, these miniature cities, among other attributes, exhibit growth by evolving/changing over time [3].

This environmental product can be conceptualized into physical, social, cultural, economic impacts, among others. The campus thus creates an entirely new urban order especially when a major aspect of the land use like residential is not provided as part of the campus facilities in off-campus accommodation systems. In a second level, residential land use also attracts other land uses like commercial, religious and recreational services. These include restaurants, neighbourhood shopping places, hotels, churches, petrol stations, and a host of others in the informal economy sector. Consequent upon the difference in the strength of the pull factors like roads in each adjoining neighbourhood to the university campus, there exist inter and intra-neighbourhood differentials in the rate of growth.

II. LITERATURE REVIEW

A. *Magnetic Developments*

The resultant effect of magnetic physical developments has never been doubted. For instance, in a study carried out by Emmanuel [4] on the "effects of road dualisation on physical development along *Owode Onirin-Ikorodu* road and *Ikorodu* town of Lagos state", Nigeria, it was discovered that the development resulted to increase in land value, traffic volume, noise pollution, evolution of church buildings and educational institutions aside from population surge. At other times, the effect is socially sporadic as is the case of Vance, Alabama and Mercedes Benz Factory in the rural south of United States [5]. However, the cumulative effect of these magnetic developments on the social life of residents is often neglected because of their economic justification [6] at face value at the expense of the sustainability of the built environment. There is pollution effect of industrial developments in cities despite economic gains which the residents desires to be mitigated while still enjoying the resultant economic benefits that accrues to them [7]. Haphazard development was also discovered through the study and suggests master planning and prescription of standards for physical developments.

Uncontrolled urbanization is a common feature in Nigeria [8] and other developing nations of the world. It is evident in sprawling characteristics of the cities. From a study of large-scale Urban Development Projects (UDPs) in Europe, Swyngedouw et al [9] concluded that the UDPs were poorly integrated at best into the wider urban process and planning system.

B. *Magnetic Developments versus Environmental Quality*

Lack of adequate pre-planning of UDPs is the bane of cities of today. Ordinarily, poor environmental quality should have been limited to the urban core areas of cities characterised by decay but has permeated the various strands of the urban tissue including intermediate areas and, surprisingly, the urban fringe where university campuses are usually located. This is as a result of the lack of cognisance of the magnetic effects of such large-scale UDPs in attracting other physical developments.

While the key environmental quality factors at the macro scale and key building quality factors at the micro scale that are germane to overall built quality are either lacking or meagrely present, the sprawling problems of urban fringes has immensely contributed to their inhabitability. This precludes the satisfaction of users. According to the UN Commissions of Sustainable Development [10], serious challenges continue to exist in urban settlements especially in the third world countries including Nigeria ranging from scarcity of public services to diverse environmental problems. Olotuah and Adesiji [11] observed that the provision of public infrastructure and social services has suffered neglect in Nigeria leading to the “preponderance of large proportion of urban dwellers living in housing and environmental conditions that are clearly affronts to human dignity.” This is constituted by lack of reasonable access to safe and ample water supply and means of hygienic waste disposal, endangered environmental health condition and other built anomalies [12].

C. *Purpose of Study*

This study seeks to measure the physical growth of the neighbourhoods that abut LAUTECH Campus vis-a-vis the students’ population growth and the resultant use-pressure on the unplanned neighbourhoods and their facilities. This becomes necessary considering the rate of establishment of institutions of higher learning in Nigeria with similar off-campus accommodation systems without pre-planning of their abutting neighbourhoods. Also, a casual observation of the study area reveals many spatial planning transgressions. The purpose of the study is to glean spatial planning lessons that could be applicable to the existing and future institutions with off-campus accommodation systems considering the dearth of such institution-specific research outcomes in literature in

Nigerian context. The outcome of the study also promises to be added to the existing body of knowledge on UDPs and could find application in other countries of the world.

III. RESEARCH METHODS

Fadamiro and Adedeji [13] argued that statistical factor in term of population growth can be singled out as the only measure of growth and is a precursor to urbanization process. It moves us away from ambiguity and other forms of intellectual distress [2]. Thus, the study employed numerical increase in student population of the university between 1998 and 2007, a 10-year period, and physical development during the same period by the number of building plans approved for construction by the Local Planning Authority. The required data on the number and types of building plans approved and the students’ enrolment was adapted as secondary data from previous study [14].

The data reasonably assumed that the building plans approved by the Ogbomoso North Local Planning Authority during the period was eventually constructed as evident in the progressive rate of physical development in the studied neighbourhoods. This approach was adopted in view of a peculiar limitation of the study in ascertaining the specific year each of the buildings in the neighbourhoods would have been constructed being occupied by tenants who were the only available source of information during the field work.

Furthermore, the data on building and environmental quality was obtained primarily from administered questionnaire on 180 respondents. Each respondent was randomly selected from each of the 180 randomly sampled buildings, 60 from each zone named as Zone A, Zone B and Zone C (Table I and Figure 1), of various land uses as shown in Table 2.

TABLE I: SAMPLING DISTRIBUTION

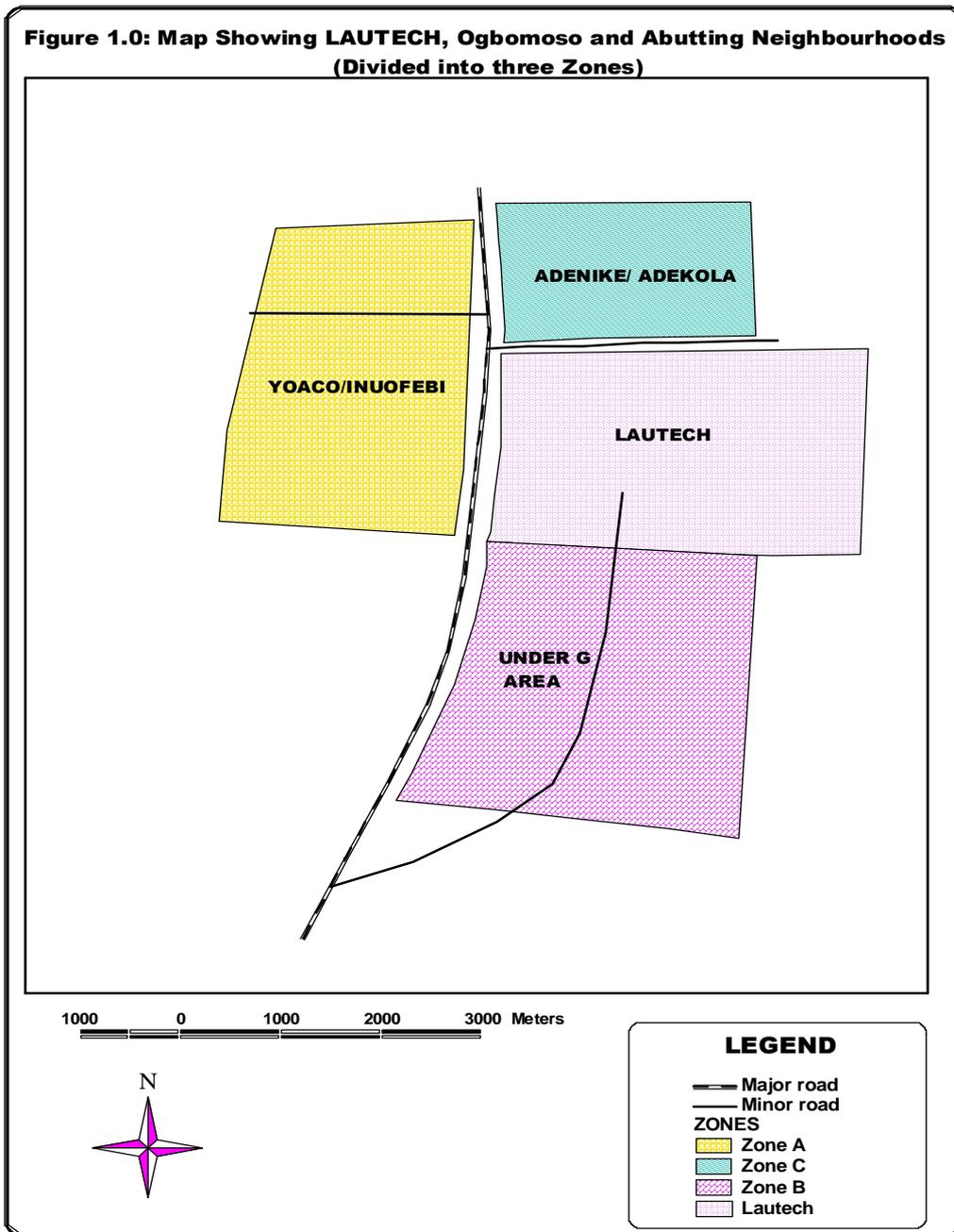
Zone	Name	Sample size
Zone A	Inuofebi Area	60
Zone B	Under-G Area	60
Zone C	Adenike Area	60
	TOTAL	180

Source: Authors’ fieldwork.

TABLE II: USE OF SAMPLED BUILDINGS

Use of Building	Frequency	Percentage
Students Hostel	139	77.2
Private Residence	33	18.3
Mixed Development	6	3.3
Guest House	1	0.6
Military Zone	1	0.6
TOTAL	180	100.0

Source: Authors’ fieldwork.



The variables contained in the questionnaire include the following among others: water supply, refuse disposal, source of electric power supply, accommodation cost per annum and duration of increase, building quality and users' satisfaction with various aspects of building quality and use. Statistical analysis was carried out on the data obtained.

IV. ANALYSIS, RESULTS AND DISCUSSION

A. Pattern of Physical Development

Table III shows the naturally occurring pattern of the rate of physical development in the three zones of the neighbourhood.

Beginning with a very low threshold of 13 approved building plans as total for the three zones in 1998 and assuming that all were constructed to give 13 buildings in addition to those existing prior to 1998, the figure rose to 318 at the end of 2007. This result agrees with that of a study on changes in land use in the study area [15] from agricultural through residential to mixed land use. This geometric growth pattern is very similar to that of the pattern of students' enrolment of the university.

TABLE III: NUMBER OF BUILDING PLANS APPROVED IN LAUTECH NEIGHBOURHOOD BETWEEN 1998 AND 2007

Year	Zone A		Zone B		Zone C		Year total	
	No of approved plans	No of buildings	No of approved plans	No of buildings	No of approved plans	No of buildings	No of approved plans	No of buildings
2007	4	70	25	163	6	85	35	318
2006	6	66	42	138	9	79	27	283
2005	4	60	32	96	4	70	40	226
2004	14	56	23	64	15	66	52	186
2003	3	42	12	41	7	51	22	134
2002	5	39	19	29	13	44	37	112
2001	10	34	4	10	7	31	21	75
2000	10	24	5	6	10	24	25	54
1999	6	14	1	1	9	14	16	29
1998	8	8	0	0	5	5	13	13

Source: Adapted from Adedeji et al [14]

B. Pattern of Students' Enrolment of the University

Table IV below shows the students' enrolment of the university during the period under study. A progressive increase in

population is observed with the minimum of 8,624 during the 1997/1998 academic session to 20,403 in the 2006/2007 academic session.

TABLE IV: ADMISSION AND TOTAL POPULATION OF STUDENTS OF LAUTECH OGBOMOSO BETWEEN 1998 AND 2007

Academic Session	Total Students' Admission	Total Students' Population including graduating students
2006/2007	8,779	20,403
2005/2006	7,918	18,028
2004/2005	8,111	16,359
2003/2004	3,346	14,761
2002/2003	5,853	13,815
2001/2002	5,407	13,740
2000/2001	5,638	12,834
1999/2000	5,441	12,432
1998/1999	4,016	10,524
1997/1998	3,932	8,624

Source: Adapted from Adedeji et al [14]

The progressive increase in the number of buildings derived from the cumulative number of building drawings approved by the Ogbomoso North Local Planning Authority during the period is a reflection of the progressive increase in housing demand consequent upon population surge. This is because majority of the students' population usually desires to live as close as possible to the campus.

C. Housing Cost and Land Value

As increase in housing demand continues to raise the cost of housing, the effect is evident in the high cost of building land in the neighbourhood [14]. This condition automatically led to exorbitant house rental values as shown in Table 5. The minimum number, 4(2.2%) for the lowest rent value range, N5,000 - N10,000, and the frequency of 49 (27.2%) for upper rent value in the sum of N31,000 - N40,000 is indicative of the socio-economic stress being undergone by the population of the neighbourhood.

TABLE V: ANNUAL COST OF A ROOM ACCOMMODATION IN THE NEIGHBOURHOOD

Rent value	Frequency	Percentage
N5,000 - N10,000	4	2.2
N11,000 - N20,000	8	4.4
N21,000 - N30,000	32	17.8
N31,000 - N40,000	49	27.2
N41,000 and above	39	21.7
Not available	48	26.7
TOTAL	180	100.0

Source: Authors' field survey.

The high cost of the accommodation rent and their poor maintenance may have stemmed from the management strategies of the buildings in the neighbourhood majorly by Estate Agents who are out to maximise profit at the neglect of users' benefits as shown in Table VI.

TABLE VI: MANAGEMENT STRATEGIES OF THE BUILDINGS IN THE NEIGHBOURHOOD

Strategy	Frequency	Percentage
Landlord	66	36.7
Landlady	3	1.7
Estate Agent	100	55.6
Owner's rep.	5	2.8
Not available	6	3.3
TOTAL	180	100.0

Source: Authors' field survey.

D. Housing Condition

Despite the high rent value of accommodation in the neighbourhood, the deplorable condition of the buildings is unimaginable. Tables VII-IX shows the roof condition, door condition and finishing condition of the buildings respectively. The tables show leaking roof, bad door condition and unpainted surfaces of such expensive accommodations.

TABLE VII: LEAKING ROOFS OF THE BUILDINGS IN THE NEIGHBOURHOOD

Is the roof leaking ?	Frequency	Percentage
Yes	14	7.8
No	165	91.7
Not available	1	0.6
TOTAL	180	100.0

Source: Authors' field survey.

TABLE IX: FINISHING CONDITION OF THE BUILDINGS IN THE NEIGHBOURHOOD

Is the building externally painted ?	Frequency	Percentage
Yes	147	81.7
No	32	17.8
Not available	1	0.6
TOTAL	180	100.0

Source: Authors' field survey.

E. Environmental/ Infrastructural Condition

Lack of pre-planning of the neighbourhood is not only evident upon the poor environmental aesthetics but affects the quality of the access roads to the buildings. Table X shows that majority (62.2%) of the buildings are accessible by poor road that are not tarred and worst still, not graded. Only 11(6.1%) of the sampled buildings are accessible through tarred roads that are in good condition.

Tables XI and XII show the condition of household solid waste management strategies employed in the neighbourhood. Only 1 (0.6%) of the respondents indicated government intervention in this direction while the largest majority, 179 (99.4%), rely on private initiatives. Even though the study reveals some reasonable level of satisfaction by means of convenience factor by the respondents totalling 78(43.3%), the negative impacts of majority of the strategies is destructive to the environment. For instance, burning destroys the ecosystem and leads to the depletion of the ozone layer, solid waste dumping in water ways leads to flooding and open refuse dump sites can be implicated in health hazards of the residents aside from creating poor urban aesthetics. Recycling and actualisation of the slogan of turning "waste to wealth" would have enhanced the sustainability of the environment while supporting the health of the dwellers in addition to numerous economic gains.

TABLE VIII: DOOR CONDITION OF THE BUILDINGS IN THE NEIGHBOURHOOD

Doors in need of repairs?	Frequency	Percentage
Yes	74	41.1
No	104	57.8
Not available	2	1.1
TOTAL	180	100.0

Source: Authors' field survey.

TABLE X: NATURE OF ACCESS ROADS TO THE BUILDINGS

Nature of road	Frequency	Percentage
Tarred and in good condition	11	6.1
Tarred and in bad condition	3	1.7
Not tarred but graded	54	30.0
Not tarred and not graded	112	62.2
TOTAL	180	100.0

Source: Authors' field survey.

TABLE XI: HOUSEHOLD REFUSE DISPOSAL STRATEGIES

Strategy	Frequency	Percentage
Dumping outside the fence	78	43.3
Dumping at government approved dump	1	0.6
Dumping inside water drainage	4	2.2
Commercial refuse collectors	6	3.3
Government refuse collectors	1	0.6
Burning	89	49.4
Disposal for recycling	1	0.6
TOTAL	180	100.0

Source: Authors' field survey.

TABLE XII: CONVENIENCE OF REFUSE DISPOSAL STRATEGIES

Level of Convenience	Frequency	Percentage	Total weight
Not convenient at all (1)	26	14.4	26
Not convenient (2)	76	42.2	152
Convenient (3)	72	40.0	216
Very convenient (4)	6	3.3	24
TOTAL	180	100.0	418

Source: Authors' field survey.

Table XIII shows the source of water supply to the residents of the neighbourhood. It is disheartening to discover that a huge size of the sample, 81(45.0%), rely on manually drawn well for water supply implying that 81 of the buildings

in the sample is deficient of a basic building service in the kitchen, toilets, laundry and dining.

TABLE XIII: SOURCE OF WATER SUPPLY

Source	Frequency	Percentage
Not available	2	1.1
Pipe-borne water	1	0.6
Manually drawn well	81	45.0
Pumped deep well	50	27.8
Borehole	39	4.7
Local water seller	3	1.7
Tanker water seller	4	2.2
TOTAL	180	100.0

Source: Authors' field survey.

V. CONCLUSION AND RECOMMENDATION

Magnetic developments are centripetal city-generating factors in urban design parlance. Such developments attract other forms of land use as sources of complimentary requirements or entirely independent land uses especially in developing nations. Land use prognosis and general speculation in such neighbourhood should focus on the key elements of human services like commercial and residential developments. Often than not, the scale of attracted developments may surpass the primary catalytic developments.

On the whole, the present study reveal that sprawl, low environmental quality, progressively increasing land value, violation of planning regulations, and poor urban aesthetics are the outcomes of lack of pre-planning of the neighbourhoods abutting the university campus under study. Therefore, neighbourhoods abutting institutions of higher learning should be pre-planned since such institutions would always be magnetic and serve as catalysts of growth. This will enhance better urban design practices, morphological functionality of urban enclaves, efficient circulation flows, adequate land use mixes, general environmental quality and city outlooks.

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