SPATIAL DISTRIBUTION OF INTERCITY PASSENGERS TERMINALS IN LAGOS: IMPLICATIONS FOR TRANSPORT POLICY

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Spatial distribution of intercity passengers terminals in Lagos: Implications for transport policy

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Abstract

The study investigated the relationship between distribution of intercity road passenger terminals and transport needs of all socio-economic groups in the city. An understanding of this relationship is vital to the terminal location policies and programmes that provides for equity, access and economic benefit. The primacy of the city, its economic status and the high level of regional interaction placed high demand on its transport system, particularly the terminals. This has implication on terminal distribution, patronage and economic activities. The specific objectives examined include the factors influencing the spatial distribution of passenger terminals and their impact on people's transport demand and public and private sector response to terminal provisions. The paper adopted a cross sectional survey approach using structured questionnaires administered on the terminal operators in each of the one hundred and fifty nine (159) terminals which are distributed across three activity zones namely CBD, Transition and Residential. Information collected includes terminal characteristics and other factors influencing choice of location. The nearest neighbour analysis was used to determine the pattern of terminal location while analysis of variance technique was used to test the variation in terminal distribution across three activity zones. Data were also collected on the socio economic characteristics of passengers. One thousand three hundred and fifty eight (1358) passengers were randomly selected and interviewed to determine their level of patronage of the terminals and how accessible are the terminals to their residential locations within the city. Findings from the study revealed that terminal distribution is clustered and their operational characteristics vary significantly across the three different activity zones. The knowledge of operational problems, locational advantage of petrol retail outlet and government intervention significantly influences the choice of terminal location. The clustered locational pattern of the terminals is at variance to some existing theories of equidistance spatial distribution of such higher order services implying several passengers had to travel longer distance and time that is inconsistency with objectives of national transport policy. The study concluded that an understanding of the pattern and factors that influence terminal location and patronage is crucial to the transport needs of socio economic groups in the city. The overall transport policy implications to the city development in the country are discussed.

1. Introduction

Transport in its simplest form is to convey people, goods and services from one point to another through different modes among which are land, water, air, rail, pipeline and ropeways (Blunden, 1971;

Oyesiku, 1990). Its efficiency therefore, is a trademark of development as it has played significant role in the development of cities all over the world (Oyesiku, 1990; Adeniji, 2000). Among the various modes of transport, the road is the most popular and widely used all over the world. The previous Nigerian National Development Plans reveal that road alone accounts for more than 85 percent of the total Nigerian transport assets (Federal Ministry of Transport, 1993), about 90 percent of all internal movement of goods and persons and 95 percent of travels and freight in Nigeria. (Onakomaiya, 1999; Oyesiku, 2002).

Road terminal has been described as a major junction of transport activities and an important component of the road mode. It is a transport centre operated by private and government, where people and goods are transferred onto and off vehicles for inter- and intra- city transport purposes. Intercity passenger movement in Nigeria is largely road based and the nature of interaction between cities especially Lagos and other parts of Nigeria is well established in literature (Bolade, 1993; Adalemo, 1999; Oyesiku, 2002; Filani, 2003).

The importance of terminals in the overall transport system especially passenger handling, leading to smooth traffic flow is paramount, it can least be argued that road transport terminals are nodal points in towns and cities along major transportation corridor which is a junction of intercity and intra city network. Without doubt passengers' accessibility to intercity road terminals could significantly affect intercity travel demand, consequently, studies on location of terminals and passenger's access to them becomes crucial.

The study investigated the relationship between distribution of intercity road passenger terminals and transport needs of all socio-economic groups in the city. An understanding of this relationship is vital to the terminal location policies and programmes that provides for equity, access and economic benefit. The primacy of the city, its economic status and the high level of regional interaction placed high demand on its transport system, particularly the terminals. This has implication on terminal distribution, patronage and economic activities. The specific objectives examined include the factors influencing the spatial distribution of passenger terminals and their impact on people's transport demand and public and private sector response to terminal provisions. The overall transport policy implications to the city development in the country are discussed.

2. Methodology

The paper adopted a cross sectional survey approach using structured questionnaires administered on the terminal operators in each of the one hundred and fifty nine (159) terminals which are distributed across three activity zones namely CBD, Transition and Residential. Information collected includes terminal characteristics and other factors influencing choice of location. The nearest neighbour analysis was used to determine the pattern of terminal location while analysis of variance technique was used to test the variation in terminal distribution across three activity zones.

Data were also collected on the socio economic characteristics of passengers. One thousand three hundred and fifty eight (1358) passengers were randomly selected and interviewed to determine their level of patronage of the terminals and how accessible are the terminals to their residential locations within the city.

3. Review of Related Literature

This section reviews literature related to the subject of study. Hong (2001) argues that the passenger transportation terminals serve both intracity and intercity trips. In one intercity trip, which uses the road passenger transport terminals, there are 3 different interest groups and these are travellers, terminal operators and the government. Each group has its unique principles when choosing transportation terminals, trip routes and corresponding modes. Therefore the actions of each group will to a great extent influence the optimum distribution of passenger transportation terminals in a city.

Oyesiku (1990) in his study of Ogun State showed that in the six urban centres, the travel patterns of residents were related to the socio-economic factors of the urban centres. The study revealed further that the socio-economic development parameters identified are those that could be readily measured and gathered on settlement basis. He suggested that transport facilities can be provided or existing ones redeveloped within the region and the necessary parameters could be easily estimated from available data and the extent of interaction within the region estimated. Nevertheless, he concluded that the road transport facilities in existence have not matched the need of the users and that not all the socio-economic and demographic groups benefited from these facilities. He also suggested that the provision of passenger terminal facilities in the urban centre in line with the variation in the characteristics of the residents need be considered.

Other studies have shown that the conditions of urban transport in most cities in Nigeria have serious economic and political consequences. In it, different aspects of the transportation problem affect towns, cities and different sections of the community. For instance the number of people affected by inadequate facilities for pedestrians and by public transport problems greatly exceeds the number affected only by traffic congestion and parking problems (Adeniji, 1986). In developing countries, urban growth, combined with motorization has placed great pressure on urban economics. Heavy investments in road, parking facilities and public transport infrastructures are needed. However, it has not been possible to meet the rapidly growing demand even in cities where a significant part of total public investment has been directed to the transport sector.

Travellers are the users of urban passenger transportation terminals and intercity trip services. When they choose the trip route, mode and terminal, they try to minimize the individual travel cost of their own. The whole procedure of one intercity trip is that passengers firstly utilize the urban transportation networks to reach one of the terminals within the city, and then enter the intercity transportation networks through the terminals. In total competitive market, it is supposed that the operational cost functions of all the terminals take the same shape, and passengers cannot influence the schedule of terminal operations but can choose terminals to realize their trips. One can see that the first step of intra-city trips from origins to terminals is actually combined with the intercity trips. Again, the cost of choice of a particular passenger transportation terminal is regarded as one part of the whole travel cost, and is determined by the link performance function of the urban networks.

The operators of passenger transportation terminals are those providing service to the travellers and the government. When they consider the location of such terminals, they care more about whether they can realize the optimum organization of vehicle and line schedules, or the maximum commercial benefit of the company. Although they can decrease the transportation cost from terminals to destinations by improving the operational efficiency of the company, they cannot essentially influence the individual cost of each passenger from origin to the terminals. Therefore, the terminals operators cannot essentially influence the terminals choosen by the passengers.

In the study of terminal facilities in Ibadan, Bakare (1985), observed that their location did not follow any particular order, but spontaneous. Also Adesanya (1984) in the study of terminals in Abeokuta, observed that their provision were in response to demand. This is similar to the case of Lagos, and considering the level of Lagos interaction with other parts of Nigeria and the level of travel demand, the provision, location and utilization of terminals should not be left to chance. Oni (1992); Alade (1998); Hong (2001), observed that in most urban centres of the world, road transport terminal requirements have reached problematic proportions. In the study of car parks in Lagos, Oni (1992) observed that the location of public car parking facilities does not exactly relate to areas of demand. In addition, a conflict exists in inter-governmental policy and practice on land-ownership, revenue collection and control of parking spaces. In the same vein, Alade (1998), in his study of motor parks in Ota, Ogun State of Nigeria observed that activities of tout are a cause for concern and that the locations of terminals are unsafe. Hong (2001), in his study of terminals in Seoul South Korea, observed that terminal distribution is mainly confined by geographic conditions and the pattern of urban development with its implication on traffic.

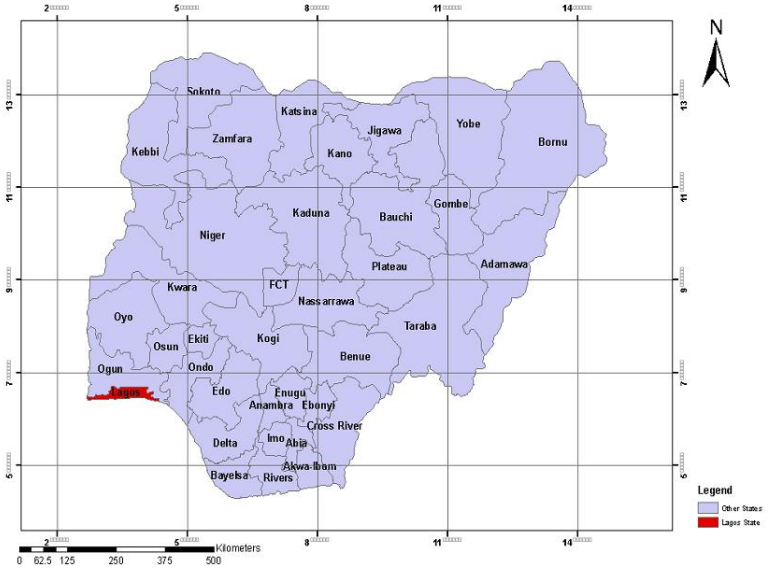
Oyesiku (1990) also suggested that the provision of passenger terminal facilities in the urban centre in line with the variation in the characteristics of the residents need be considered. As already observed, there is paucity of empirical work on spatial distribution in the area of locational analysis of terminals in developing countries, particularly in Africa. This may not be unconnected with limited researches on the subject in the continent, despite unresolved urban transportation problems and the fact that intercity travels in the developed countries are non- road, rather rail road, water and air based.

The Federal government acknowledged the growing need for the formulation of policies in different sectors hence the country witness an upsurge in its formulation between 1985 and 1993 resulting in the 1993 Draft National Transport policy for the country. This is expected to serve as a national guide for transport provision. Nonetheless, the lack of a clear cut provision in this policy on terminal locations has made it a problem to be considered if the cities are to deliver efficient services to its residents. Also, the seeming lack of planning is another critical issue. Conscious ordering of space creates functionally efficient, economic and aesthetically pleasing environment for working, living and recreating. Besides, in content, these plans had no provision for deliberate location of terminals. This seeming lack of planning has been responsible in part for the problem of incidental emergence of terminals.

4. Study Area

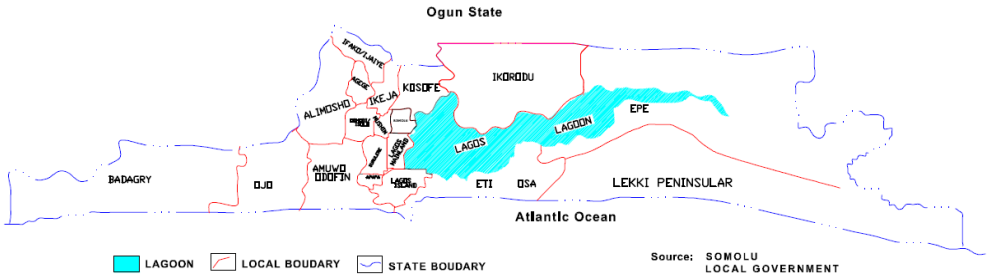
Lagos Metropolis is located in the south western part of Nigeria and occupies 3577 sq km, representing about 0.4 percent of the Nigerian land area. In 2006, Lagos has an estimated population of over 17 million, a population density of 2,519.85 people per square kilometre and projected to become the third largest mega city after Bombay (India) and Tokyo (Japan) by 2015, when its population will be about 24 million. The city harbours over 60 percent of the nation's commerce and accounts for 80 percent value added of manufacturing. It also accounted for over 40 percent of domestic aircraft take off and landing, 78 percent of incoming freights and handled over 99 percent total non-oil exports. The Lagos State budget in 2010 and 2011 was in the ratio of 60:40 and 56:44 respectively for capital and recurrent expenditure and about 14.2 percent of capital expenditure was devoted to transport and urban development.

Figure 1: Map of Nigeria



Lagos plays a pivotal role in national and regional interaction. About 70 percent of intercity movement originates from Lagos, and close to 65 percent of intercity trips has Lagos as destination. The city has about 9,560 Km roads which is equivalent to 0.88 kilometres per 1000 persons and

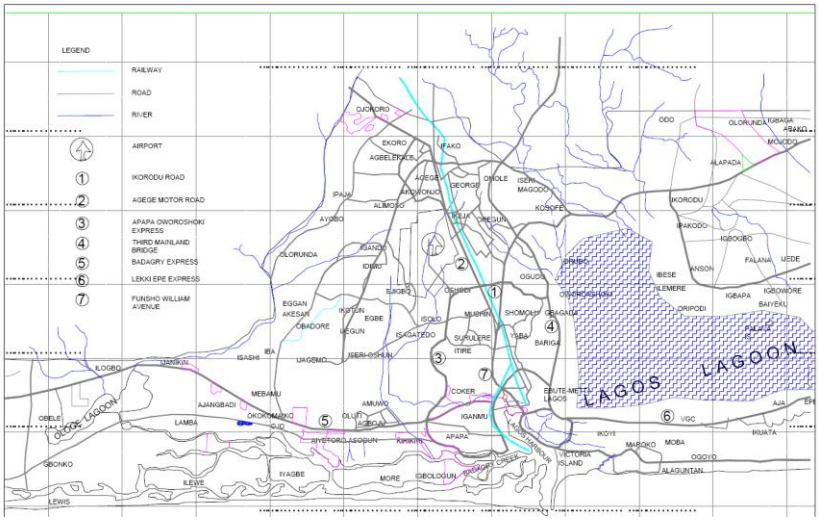
Figure 2: Map of Lagos State, Nigeria



over 160 intercity road transport terminals with limited rail and inland water transport service. Nigeria has about 1,500,000 vehicles at the rate of 1 motor vehicle per 1000 people and ranked 131st in the world with a vehicle density of 2.69 per square km. Lagos share of this is over 50 percent with over 141,265 vehicles registered in 2006. To make Lagos a globally competitive city, the Bus Rapid Transit and Lagos Bus Service scheme were introduced in 2008 with a 10,000 passenger's capacity per hour per direction.

The first attempt at urban planning in Lagos was the 1928 ordinance establishing the Lagos Executive Development Board, which undertook slum clearance and development schemes. This was followed by the establishment of Ikeja Area Planning Authority with similar mandate. A twenty year master and regional plan that guided the growth and development of Lagos was prepared in 1980. Since then model city plans on district basis has been embraced for realistic guide and development. Recent efforts are towards upgrading the slum areas anchored by the Lagos State Urban Renewal Authority and the World Bank assisted Lagos Metropolitan Development and Governance Project. Efforts are on-going to improve the urban planning for sustainable development.

Figure 3: Map of Lagos Metropolis, Nigeria



5. Findings and Discussions

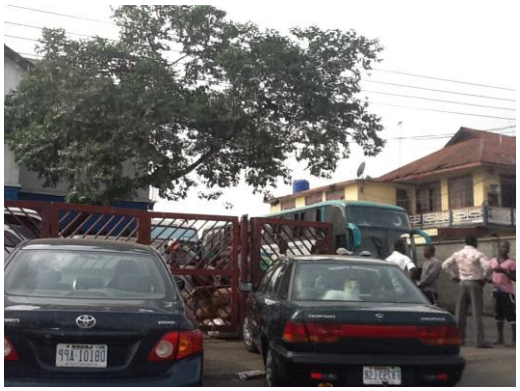
Factors Influencing the Growth of Terminals

Several factors are responsible for the growth of road passenger terminal in Lagos Metropolis. However, two key factors were identified from the study; the first is population explosion due to its role as a former capital territory, and the preferential treatment it enjoyed in the area of provision of infrastructures and urban facilities. The second factor is the prominence of road transport over other modes of transport.

Spatial Distribution of Terminals in Lagos

Plate 1: Intercity Terminal

Plate 2: Intercity Terminal



The study reveals that at the initial stage the terminals were dispersed but later on they became clustered. One striking feature is that there is a concentration of terminals along major transport corridors, and around the centers of business activities, transition zones and to a lesser extent residential activity zones. Land availability, accessibility and mix use nature of the transition zone may be responsible for the high level of concentration in this zone. For instance, about 57 percent terminals are found within the transition zones, closely related to this are the commercial areas that attract about 28 percent terminals. At the extreme are the residential areas that attract as many as 16 percent terminals. Irrespective of the use, it can be observed that terminals locate close to the major highways. This suggests that accessibility is of major interest to the terminal operators. This is understandable since this facilitates greater contact between transporters and potential passengers.

Analysis of the Terminals Location Pattern

The nearest neighbour analysis was used to determine the pattern of terminal location. There are so many options open in making a decision to locate a facility for use. In doing this, certain factors have to be considered. There are 159 terminal locations covered by this investigation. The pattern of intercity passenger terminal in Lagos is tested using the Analysis of Variance. The data collected for this analysis was in analogue format, the data was digitised using the digitising tablet. The analysis was run by the computer using Arc view 3.2 package and the result indicates that the Rn that is the R value is 0.
When Rn $\leq$1.0, the points are clustered
When 1 < R n $\leq$ 2, the points are randomly distributed
When 2.00 <R n$\leq$ 2.15, the points are Regular.

Thus our Rn value of 0 shows that the distribution of the facilities is clustered. This means that the location pattern is clustered.

A hypothesis was formulated with respect to the spatial distribution of terminals and state as follows:
H_1: The distribution pattern of intercity passenger terminals in Lagos is random.
Table 1: Test of Significance

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Where is the terminal located?	43.423	155	.000	3.08	2.94	3.22

Source: Author's Analysis, 2012

In table 1, T test was employed to determine how significant the result is and from the one- sample test carried out, it is seen that the t value is 43.423, which is very high. This shows that the result is significant at 95 percent confidence level. The table value is 1.64 and this is less than the calculated value. Hence the hypothesis that says that "The distribution pattern of intercity passenger terminals in Lagos is random" should be rejected and the alternate be upheld. That is the distribution of intercity road transport terminals in is not random but clustered.

Terminal Characteristics

The study reveals that over 27 percent of the terminals are located in business districts. Similarly, about 57 percent of the terminals are located in the zone of transition while 16 percent are located in residential zones. This suggests that the zone of transition accommodates majority of terminals in Lagos. Land availability, accessibility and mixed use nature of the transition zone may be responsible for this pattern. Also, terminals that are more than 10 years old are about 14 percent, while about 40 percent of the terminals are between 5 and 10 years. At the extreme are those terminals below 5 years old and this account for over 46 percent of the total terminals. This suggests that majority of the terminals are relatively new. Analysis of the size of terminals reveals that 77percent of the terminals are less than 0.5 hectare. Those that are between 0.5 and 1.0 hectare are about 21 percent and those that are more than 1.0 hectares constitute less than 2 percent of all the terminals. This is due to land space constraint as experienced in urban areas especially in the CBD.

Passengers Patronage and Analysis of Access to Terminals

Terminal location analysis in Table 2 reveals that 43.1 percent of the respondents patronize terminals located within the business districts and about 50 percent patronise those in zone of transition. The rest 7.94 percent respondents patronize terminals located in residential areas. The destination of respondents is spread over the six national geopolitical zones.

Trip distance to terminals indicates that about 40 percent of respondents travel less than 5km to the terminals. Those who travel less than 10km are 37.4 percent of the respondents while those respondents who travel more than 15km are just 11.4 percent. The respondents that travel more than 20km to get to the terminals are about 12 percent. This shows generally that majority of about 76 percent respondents are near to the terminals they use. This suggests that respondents are less likely to patronize terminals that are located beyond 10km to their trip origin.

In addition, majority 92 percent spend less than =N=200.00 to travel to the terminals. Those respondents that spend above =N=200.00 are about 8 percent. This shows that amount spent by the majority is affordable because over 72 percent of the respondents fall within both middle and high-income group.

Also, majority 94 percent of respondents stated that accessibility, convenience and proximity are their reasons for patronage. Those respondents with no known reason are about 6 percent. Accessibility and proximity in the areas of distance travelled, cost of intra city travel and time taken to the terminals appeared as the major reason for patronage of a particular terminal as indicated by more than half 53.2 percent of the respondents. In addition, convenience perhaps in services provided, infrastructure and destination location also influences the patronage.

Table 2: Passengers Patronage and Access to Terminal

Variables		Frequency	Percent
Terminal Location of Respondents	Business District	583	43.1
	Zone of Transition	673	49.7
	Residential	98	7.2
	Total	1354	100.0
Trip Distance of Respondents to Terminals	Less than 5km	528	38.9
	5 – 10km	508	37.4
	11 -15km	155	11.4
	Above 20km	167	12.3
	Total	1358	100.0
Trip Cost of Respondents to Terminals	Less than 100 Naira	918	67.6
	100 - 200 Naira	331	24.5
	201 - 500 Naira	86	6.3
	Above 500 Naira	22	1.6
	Total	1357	100.0
Reason for Patronage of terminals	Accessibility	723	53.2
	Proximity	253	18.6
	Convenience	306	22.5
	None known	76	5.7
	Total	1358	100.0

Source: Author's Field Survey, 2012

Findings from the study revealed that terminal distribution is clustered and their operational characteristics vary significantly across the three different activity zones. The knowledge of operational problems, locational advantage of petrol retail outlet and government intervention significantly influences the choice of terminal location. The clustered locational pattern of the terminals is at variance to some existing theories of equidistance spatial distribution of such higher order services implying several passengers had to travel longer distance and time that is inconsistency with objectives of national transport policy.

6. Conclusions

The demands of terminal operators and passengers have become more varied especially in areas of the daytime, night time operations and freight handling. Consequently, the time is ripe for a systematic forward planning to accommodate the changing taste and preference of passengers and emerging transport technology. The study concluded that an understanding of the pattern and factors that influence terminal location and patronage is crucial to the transport needs of socio economic groups in the city. Hence, there is need to initiate studies policies and programmes that will help monitor and improve intercity road transport passenger terminals in Nigeria.

7. Recommendations

As a result of the clustering and concentration of terminals in business districts and transition zones, some passengers do travel long distance spend more time and pay more to get to these terminals location. In view of this, there is need to encourage the provision of more terminals location in areas where they are not available and at the urban fringe in order to take care of the marginalised and future population increase. As a strategy to encourage terminals service providers to locate in areas of need, the issue of good road and availability of passengers should be properly addressed. As revealed in this study, the clustered location pattern of terminals follows similar pattern of petroleum retail outlets, being complimentary activities. Although which of these locates first have not been established in literature, it is recommended that in granting statutory physical development approval to petroleum

retail outlets, there is need to exercise some caution for better city management. The study has revealed that operation problems are determinants of terminal location in Lagos. Hence the attendant problems such as traffic jam, environmental degradation and other vices should be addressed by the appropriate organs of government.

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