Accessibility to Job Locations in Calabar Metropolis, Cross River State, Southern Nigeria

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***Abstract*-The aim of this paper was to examine the level of accessibility to job locations for the urban poor in Nyangasang and Anantigha areas of Calabar Metropolis. Travel diary was used in combination of the questionnaire with a success rate of 89.8 percent (449) for the transport data and socio-economic data from respondents. There were selected using the stratified sampling technique. Kernel density analysis in a GIS environment was employed to estimate the number of jobs located per 1000 m^2. SPSS provided the tool for analysis of statistical data leading to test of formulated study hypothesis. The study confirmed that there was significant relationship between transport mode to job locations and available transport options for residents in the study area, $F(1, 431) = 18.181$, $p < .005$. Different levels of accessibility were undertaken using travel options to predict the number of jobs that can be located per 1000 m^2. Interesting results were obtained to show the different level of influence each transport variable has on accessibility to jobs in the study area. It is clear from the analysis that the current transport scenarios determine the location of jobs in the study area, yet the current public transport realities do not benefit the poor, neither is the current internal urban spatial structure. To improve the benefit of urban transport for the urban poor, more attention needs to be paid on redesign of roads and other complimentary infrastructures to enhance sustainable public transport system that is efficient, available, and affordable.**

Key words: **Accessibility; Urban poor; Job locations; Modal split**

I. INTRODUCTION

Accessibility is a fundamental measure of the benefits of urban life. It measures the end benefit of the integrated transportation and land use system indicating how many destinations (generally jobs but also shops, schools, entertainment, and recreation) can be assessed in a given time using a given mode of transport. Increasing accessibility-bringing people, opportunities and goods within easy reach of each other-has always been the fundamental role of cities. Accessibility plays an important role in policy making, and is a central concept used in a number of scientific disciplines such as transport planning, urban planning, and geography (Geurs & Ritsema, 2003). There are three main perspectives on the measurement of accessibility. They are infrastructure-based measures which describe the level of service in transport infrastructure such as the 'level of congestion' and 'average travel speed on the road network'; activity-based measures which describe the level of access to spatially distributed activities such as 'the number of jobs within 30 minutes travel time from origin locations'; and utility-based measures which focus on the (economic) benefits people derive from access to spatially distributed activities (Geurs et al., 2003; Geurs &van Wee, 2004).

This paper aims to quantify the extent to which trade-offs between accessibility to job locations, socio-economic characteristics and other factors impact on residential location choice decisions in the study area. It is particularly hypothesized that residential choice making has significant relationship with socioeconomic variables such as gender, marital status, household size, education, annual income and kind of job undertaken by household head.

Twolowin come residential locations of Anantigha and Nyangasang in Calabar Metropolis formed this case study approach. The volume of jobs that can be located per 1000 m^2 was predicted under different transport conditions. This paper deals with the fundamental issue of the application of geographic information system techniques in estimating volume of jobs under different transport scenarios. To date, most discrete choice models of household location decisions have focused on the role of housing characteristics in determining a household's location choice (e.g., Quigley, 1976) and other aspects of the housing choice, such as transportation mode (e.g., Boehm, Herzog, & Schfottmann, 1991)and travel costs (e.g., Anas, 1982). Friedman (1981) appears to be the first to estimate a discrete choice model in which the community is the objective of choice. He employed a conditional logit model to examine the role of public services in community choice, but the results show that housing services are the largest determinant of community choice and that local public services have little or no effect on choice of community. Quigley (1976) considers the role of public services in estimating recent renter's location choices in the final stage of a three-part estimation framework. His results with respect to local public services, however, not the focus of the paper, are counterintuitive: school and public expenditures have a small, but negative effect on the probability of a household choosing a community.

Although much has been written on natural evolution and flight-from-blight processes and the empirical significance

of a variety of factors has been demonstrated in isolation, relatively few studies have provided empirical results that identify the relative magnitudes of these various factors and none have done so with an explicit focus on the access tojob locations per geographic space. This paper provides an empirical investigation of the determinants of access to job locations in Calabar. Our results provide quantitative estimates of predicted job locations under different transport options available to residents of the study area. A unique dataset on the travel diary of these residents including travel characteristics, origin, anddestination of household heads who undertook main intra-urban trips in Calabar was used. Approximate volume of job locations was estimated with the hope that such estimates can provide useful guidance tolocal policymakers faced with questions of liveable city development.

II. THE STUDY LOCATION

This study is set up in two residential neighbourhoods of Nyangasang and Anantigha, located in Calabar Municipal and Calabar South Local Government area respectively. These two Local Government Areas constitute Calabar metropolis and is referred to as the study area. Calabar lies between Longitudes $8^0\ 19^1\ 30^{11}$ and $8^0\ 25^1\ 30^{11}$ East of the Greenwich Meridian and Latitudes $4^0\ 57^1\ 55^{11}$ and $5^0\ 40^1\ 30^{11}$ North of the Equator (figure 1). Considering a growth rate of 2.8 per cent and a 2006 baseline population of 328,826 (National Population Commission, 2006), the total population is estimated at above 4700,000 in 2017. The city which is sandwiched in between two rivers, the Calabar River and Kwa River has a lowland terrain with highest and lowest points at about 100m and 2m respectively (Okon, Ogba, Idoko, Eni & Sule, 2015).

Calabar is experiencing sprawl effects in its environs, eastwards to Akpabuyo and northwards to 8 miles and beyond. Although, it is often said that the expansion of Calabar is constrained by the two rivers above, development experts believe that economic characteristics as well as government policy rather offer better explanation for the pattern of development in Calabar. With the establishment of the Calabar International Conference Centre, the Unicem Factory, the Garment Factory, the proposed Cross River State Super Highway and Deep Sea Port, it is expected that the development of Calabar and environs may not be easily predicted.

South Local Government Areas respectively) are two neighborhoods that share similar socioeconomic and physical characteristics with each other. The motivation for their choice as study location was due largely to the difficult physical characteristics of the neighborhoods, which makes access of residents to employment locations difficult or costly (travel time and transport fares). For example, while Nyangasang has a difficult and undulating topography with high incidence of erosion, Anantigha is low-lying area liable to flooding. Both locations are a distant from the central business district (CBD)

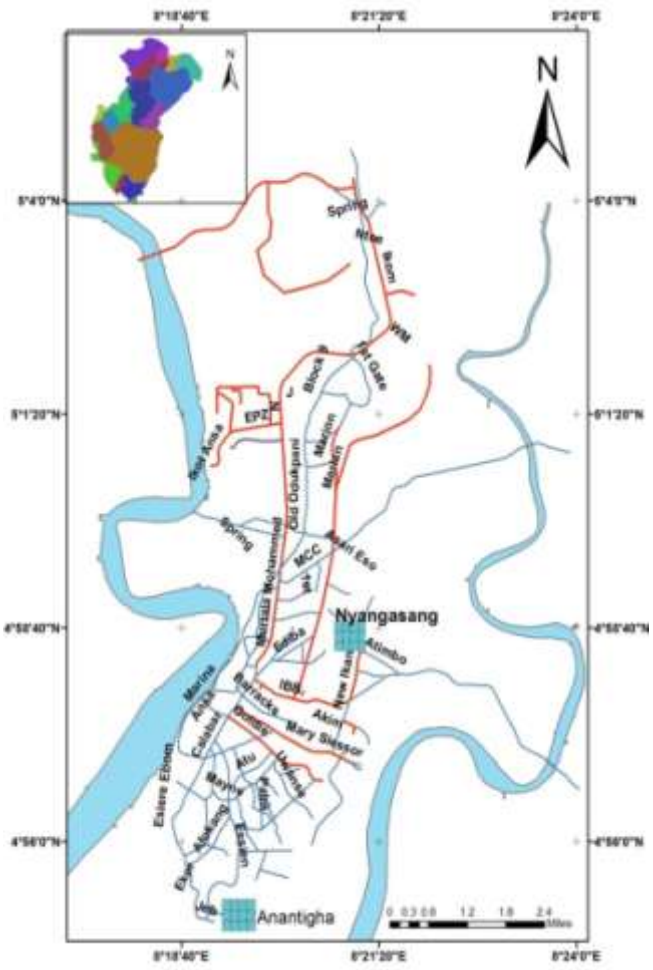

FIG 1: Calabar Metropolis showing Nyangasang and Anangtigha location

These chosen locations (Nyangasang and Anantigha in Calabar Municipal and Calabar This study addressed the fundamental question of the location of jobs in the study area and accessibility to these jobs in Calabar. Results of this study shall among other things provide practical options for increasing accessibility in terms of bringing people and job opportunities within easy reach of each other as an important step in addressing urban poverty and social exclusion.

III. LITERATURE REVIEW

Niemeier (1997) and Handy and Niemeier (1997) adopted a consumer welfare approach to measuring accessibility, by linking individual travel behavior with journey-to-work mode and destination choice. The approach joined a multinomial logit model (the transport model) and a compensating variation model derived from econometrics. The aim was to assign a value to accessibility i.e. the monetary "worth" of accessibility for the journey–to-work trip. van Wee, Hagoort and Annema (2001) noted that the impacts of accessibility change on social inclusion in their work had been underestimated, since the authors did not take into account competition for jobs within the employment market. The

imbalance between jobs and employees in any area was found to be more important than had been thought, once the measures were corrected for competition within employment markets.

In many cases, it has been more convenient to define need by comparing the accessibility of one location with another. Curl (2013) described this comparative accessibility in terms of the 'Public Transport Needs Gap' within Hobart, Tasmania. The project measured the geographical distribution of transport need in the community, and assessed the distribution and quality of the public transport services provided. In common with similar studies elsewhere (Derek Halden Consultancy, DHC 2003), it was found that the gaps varied by trip purpose. The community accessibility approach has been most widely used in rural areas to define minimum accessibility standards to a small selection of local services which are frequently used by people, such as post offices, health centers, shops, and perhaps more complex opportunities such as leisure facilities, parks, and the countryside (Countryside Agency, 2001). Since comparative needs define where interventions are most required within a study area or funding program, they have a key role in accessibility audits (DHC & Transport Study Group, 2007).

Overall, it is not possible to identify every need for every group, since there are potentially many hundreds of combinations of people groups, times of day, trip purposes and travel behavior preferences which could be relevant to the analysis. Practical definitions of accessibility need optimize the choice of population sectors, geographical coverage, spatial detail, and trip purposes, to reflect policy issues which are sensitive locally. This survey and targeted delivery process is at the core of accessibility planning (Social Exclusion Unit, 2003), which is intended to "offer a new way to find and solve local problems, checking whether people experiencing social exclusion can reach the services they need, and identifying action to take if they can't".

A whole range of improved accessibility measures have been proposed in scientific literature. However, more complex indicators also require more analytical skills from users (Hardy & Clifton, 2001) and they placed high demand on available data. Activity-based measures provide an important class of measures as they analyze the accessibility of locations, typically on a macro-level such as traffic analysis zones (TAZ). Typical measures are the cumulative opportunities (or contour) measures that, for example measure the number of jobs within 30 minutes by car from the origin location, and the potential measure (or gravity measure) that discounts these opportunities over time (or distance) using a distance decay function. This is done to count an opportunity closer by as more important that at a distant location. More complex location-based measures explicitly incorporate capacity restrictions of supplied activity characteristics to include competition effects (Geurs & Ritsema van Eck, 2003). This type of measure was used in recent applications such as in Tel Aviv in accessing the distance between potential accessibility by car and public transport (Benenson, Martens, Rofe & Kwartler, 2010; Hong, van den Bosch, Quang & Zuidgeest, 2011), in Boston, Los Angeles and Tokyo to compare potential accessibility to jobs versus different urban form (Kawabata & Shen, 2006), and in Finland to study the relation between potential accessibility by road and railway to population change (Kotavaara, Antikainen & Rusanen, 2011) and in the Wuhan Urban Accessibility Planning Support Systems project of the World Bank (Zuidgeest, Nupur, & Talat, 2012).

This study recognizes, but do not engage in, the rural/urban dichotomy/continuum debate (see, for example, Halfacree, 1993). We acknowledge the urban dimension of accessibility, identified as early as the late 1960s. For example, Hamnett (1996), notes that: ''The work of Pahl (1970), Harvey (1969), and what can be termed the Antipode school of radical geography, led to a spate of work on questions of the distribution of, and access to, urban facilities, particularly as they affected the poor''. Interaction between recent work on urban accessibility (see, for example, Church & Frost, 2000; Hine & Mitchell, 2001) and work on rural accessibility can further enrich the concept and realize more fully its potential contribution to cross-cutting policy-making and delivery.

The parameters of accessibility as ''the rural challenge'' were set out by Moseley (1979). He viewed accessibility as the degree to which someone or something is ''get-at-able'': although he regarded this as a crude definition, it captures the essence of accessibility, and is in keeping with the way the term is treated here. We articulate the definition to be "The ability of people to reach and engage in opportunities and activities ". 'Reach' implies spatial separation, and therefore mobility and transport use, but two things should be recognized: spatial separation is only one form of separation (others, for example, include age, gender, ethnicity, and income), and spatial separation may be overcome by means other than movement. Moseley emphasized this point: ''. . . the rural transport problem . . .'' is ''. . . only part of the wider rural accessibility problem'' (Moseley, 1979). This location of transport within, and as one element of, accessibility is critical in our conceptualization of accessibility: while its discussion involves transport, this is not the only dimension of significance.

Moseley also insisted that the central focus of concern (in rural accessibility policy formulation and evaluation) must be ''opportunities, not behavior'', because ''today pattern of travel is so constrained by the [transport] supply situation as to tell us very little'' (1979). He recognized that this is ''of very great importance to the formulation and evaluation of rural accessibility policies'' (1979). The emphasis on opportunities rather than behavior also points towards a view of accessibility which requires us to consider its normative dimension. In this form the concept has the

ability to address, and potentially to provide a framework for, the correction of market failure-the extent to which the market (made up of regulated, part-regulated and unregulated provision not only of transport, but also of a wide range of activities and services) constrains accessibility to a degree that may be viewed as unacceptable in a societal and political context.

Quantification of accessibility levels by measuring the opportunities available to defined people living in defined locations, and their ability to reach them by transport or other means (at a cost of time, money or other constraint), highlights at least the broad tapestry. Inevitably, however, it involves value judgments about people's accessibility desires, and is imbued with the empiricist's account of accessibility and life chances.

Accessibility became an identifier of the rural experience. For example, Phillips and Williams (1984) recognized the significance of accessibility in making the case for ''a distinctive rural social geography'' (partly to counter the dominance of urban studies, but also to aid in demystifying the countryside). They argued that ''the differences between social groups are the key to interpreting the experiences of those living in rural areas'', and that ''nowhere is this more evident than with respect to accessibility''. Banister (1983) described the ''quiet revolution'' which-in the age of bus deregulation-was increasing the differences between the levels of accessibility experienced by rural households with and without cars.

The opportunity to participate in society means the ability to engage with a reasonable range of activities within society, with reasonable defined in relation to the society in question. Now this definition of social justice, as it stands, is relativistic, in that definitions of what it is to participate in a society clearly differ from society to society. Relativism in this sense is unavoidable in considering accessibility: indeed, it enriches the concept since it encourages recognition of the ways that different values might be spatially and culturally refracted into accessibility needs in different ways in different societies. Here, we take a pragmatic approach and use the context of a typical Western society as the framework for the creation of accessibility needs, while acknowledging fully the importance of avoiding its translation directly into other societies. Participation in society is therefore taken to mean the ability to engage in a range of activities. It must be emphasized that opportunity to engage recognizes the validity of personal and collective choice. Individuals and groups may choose not to engage with a normal range of activities, and they have that right.

IV. MATERIALS AND METHODS

Different data layers in both discrete and continuous forms were used in this study. Geo-locations of housing units of selected research respondents, as well as, job locations formed part of several data layers used in this study. Others included spatial data layer of respondents and housing quality of respondents, travel diary of sampled residents (continuous), and so on. Primary and secondary sources of data were used in this study. Primary data sources included questionnaire, interviews, travel diary and field observations. The questionnaire sought information on the type of house, assets, stable income source, etc.; employment type; while the travel diary was used to obtain information such as location of work; daily commute mode, pattern, and so on. Secondary sources of data included relevant published data that aided the research efforts. They were gazette information in journals, periodicals and seminar papers on accessibility to job locations and so on.

Topographic map of the study area facilitated initial listing of houses for the survey through the stratified sampling method to collect household data. Hand-held GPS was used to aid ground trooth during field exercise. Only residential buildings were sampled for the survey from initial listing and geo-location of transects from the map. Where listed buildings were non-residential, there were immediately substituted with residential buildings upon arrival for data collection. The field research focused on interviewing heads of households in each sampled building.

Respondents were asked to identify their travel behavior for a single day stating which trips were recorded over a 24 hour period in a normal working day. The mode of transport used, cost of transport as well as, recorded travel time and distance for their primary trips was sought for. These respondents are similar with the earlier identified household heads. The location of urban poor was carried out using the hand-held GPS to get coordinates of residents corresponding to their place of residence. Earlier, a purposive selection of neighborhoods with peculiar housing quality, environmental and physical conditions as well as their location in Calabar had been made.To identify employment opportunities and map their locations at an appropriate spatial scale, job locations, job types and their densities were derived from relevant secondary and primary sources in Calabar. Essentially, geolocations of employment areas of residents were obtained using GPS. We further applied kernel density analysis (in a GIS environment) on these aggregates to determine the number of jobs that can be located per 1000 m^2 in the study area. Hypothesis was tested using the multiple regression analysis in SPSS. A combination of these different data layers for this study is presented in figure 2.

V. JOB ACCESSIBILITY MODELS OF URBAN POOR IN ANANTIGHA ANDNYANGASANG

Using data from transport diary as described above, it was possible to model different transport scenarios under which accessibility can be implemented to job locations in the study area. These scenarios include distances to job locations, main trip purpose, and transport cost element to job locations in the study area.

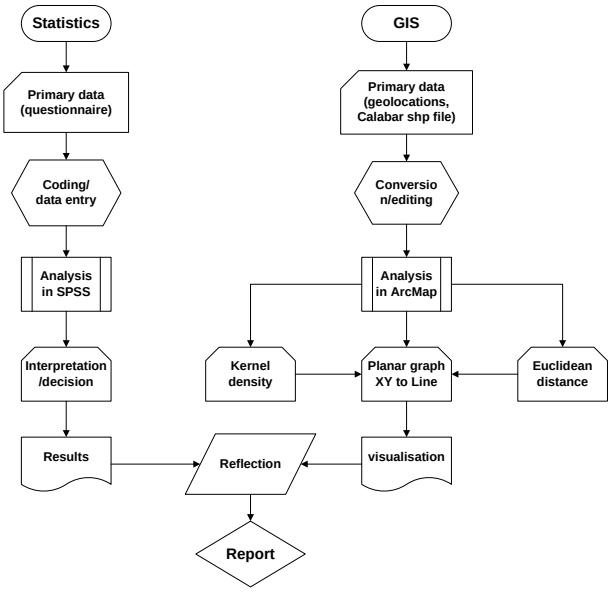

Figure 2: Data layers and procedure of analysis for the study

A. Transport cost element to job locations

The daily cost of transport to work in in the area indicates that 43.8 percent of study respondents spend less than <N200. This constitutes majority who obviously work in the neighborhood where they reside, in most cases, a deliberate attempt to 'escape' the cost of intra-urban transport cost. About 35.2 percent and 21 percent respectively accounts for those respondents paying above N400 and N200-N400 as daily transport cost.

Daily transport cost scenarios to and from work was used to estimate number of jobs located per 1000 m^2. The result shows that more people (41 percent) in Anantigha location of the study area spend more than N400 on daily transport. Others such as 36.9 percent and 22.1 percent spend <N200 and N200-N400 respectively on urban work-related transport (fig 3). These variables were used to model job locations in the study area where about 23 jobs are located per 1000 m^2in the study area (fig4).

Similarly, in Nyangasang location, majority of residents (55 percent) spend less than N200 on daily intra urban transport in the metropolis. About 13.5 percent and 31.5 percent of these respondents indicated spending N200-N400 and above N400 respectively on daily transport. This provide an interesting evidence of the desire of residents to save transport cost if there is there exist a job-housing balance in their neighborhoods. An accessibility model of the impact of daily cost was attempted using kernel density where it was estimated that only about 16 jobs can be located per 1000 m^2 (figure 4). There thus exists a big difference in the impacts of transport cost in the location of job opportunities in the two study locations. This difference may be due to varying topographic conditions (geography) that thus influences road transport network in these two locations.

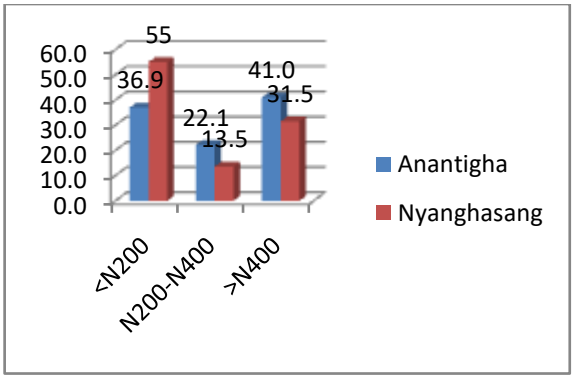

Figure 3: Daily cost of transport to and from job locations in the study area

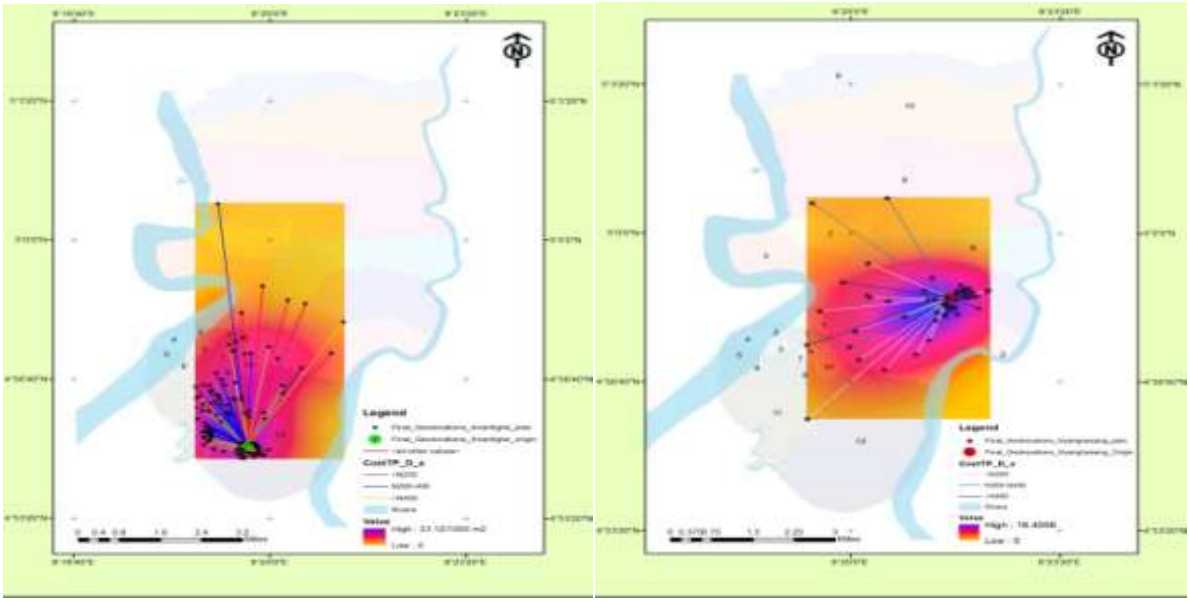

Figure 4: Distribution of job locations based on daily cost of transport to and from work in Anantigha and Nyangahasang

B. Journey time to job locations in Calabar

It is further revealed that majority of work-based trips averaging 16-30mins accounts for 43.9 percent. This corroborates earlier findings that over 40 percent of study respondents expend N200 on daily transport to and from work. Also note that up to 70 percent of these residents are employed in non-civil service government jobs, but as artisans, traders, unemployed, retirees, and other casual employment types. Those that commute in less than 15 minutes and above 31 minutes to their job locations accounts for 40.9 percent and 15.3 percent respectively.

Independent models of the different study locations in figure 5 show that in Anantigha 50.2 percent of residents commute for 16-30mins to their job locations, 32.9 commute in less than 15 minutes while about 16.9 percent do so in more than 30 minutes. This findings still corroborates findings of general travel conditions in the study locations and

their impact on job locations. When used to model location of jobs, it was found that the impact of journey time accounts for 20 jobs per 1000m^2 in Anantigha area of the metropolis (figure 6).

In Nyangasang area, majority of residents (56 percent) commute to their job locations in less than 15 minutes, 33 percent in 16-30 minutes and only about 11 percent commute to job locations in more than 30 minutes (figure 5). This also accounts for low expense on intra urban travel in Nyangasang area. An access to job location model in figure 6 further revealed that only about 14 jobs per 1000 m^2 can be located based on this criterion. This thus suggest the level of impact transport cost have on job locations when jobs are located at close proximity to residential neighborhoods or the quality of jobs that these residents engage in for livelihood.

C. Modal split to job locations in Calabar

Findings from the study indicate that the dominant transport mode to work in the study area is public taxi/bus (42.3 percent). However, private car mode of transport to work account for about 33.9 per cent of all work-related trips while keke napep (tricycle) accounts for 10.3 per cent. Interestingly, about 12.2 per cent of residents walk to work while an obvious 0.9 per cent is for bicycle work travel in Calabar. Model of modal split scenario to work in the study area is provided in figure 7. This result revealed that in Anantigha location of the study area, there is a modal split of 38.2 percent, 44.2 percent, 6.4 percent and 11.2 percent respectively for private car, public taxi/bus, keke and walking (figure 7). Therefore, based on modal split, an average of 25 jobs was observed to be located per 1000 m2 (figure 8).

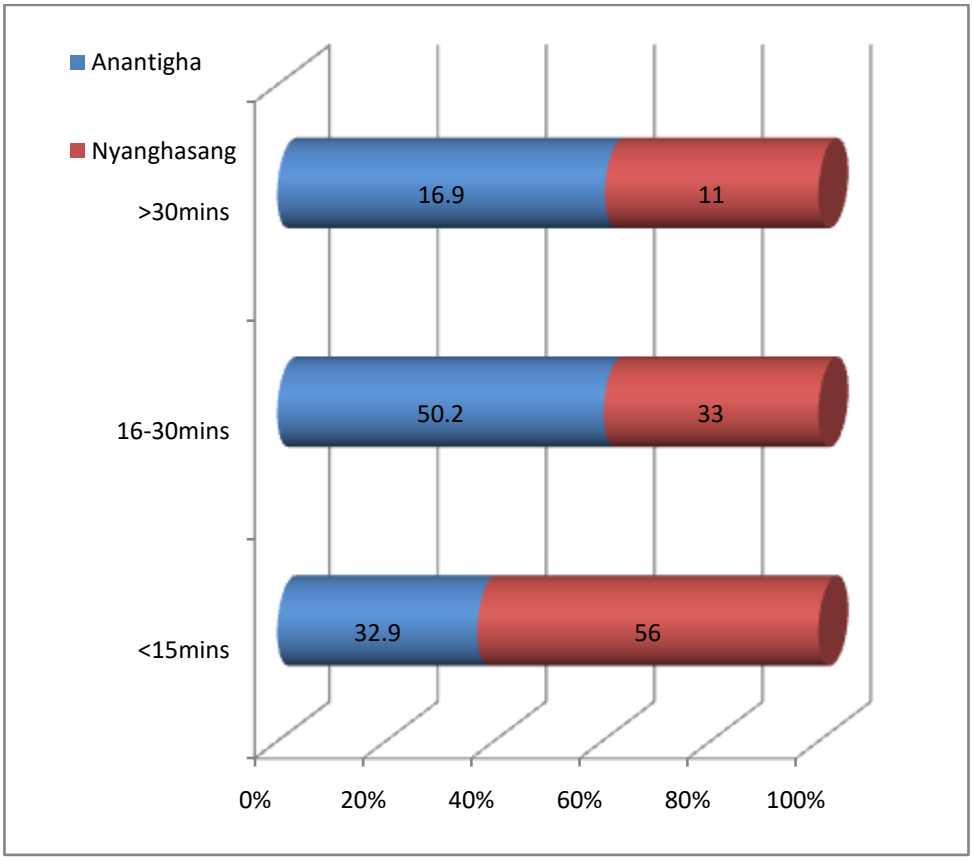

Figure 5: Daily intra-urban commute time to and from job locations in the study area.

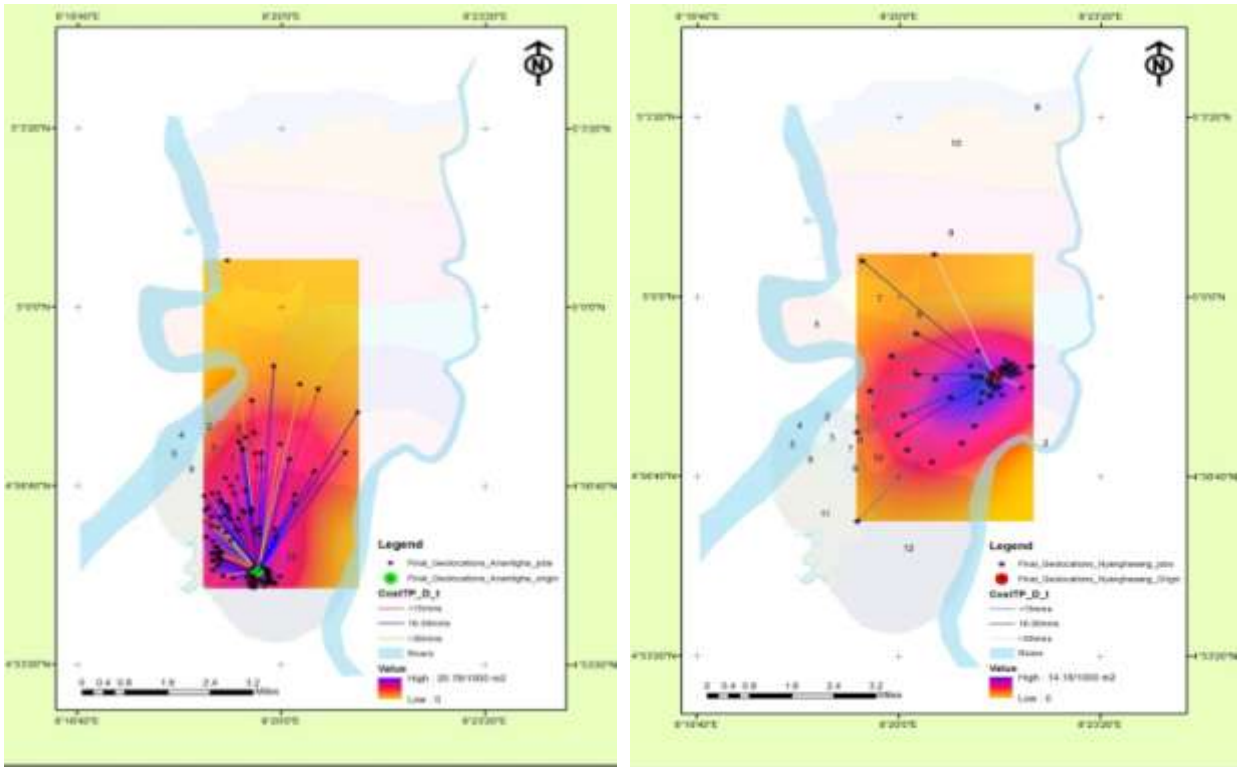

Figure 6: Distribution of job locations based on daily commute time to and from work in Anantigha and Nyangahasang

In terms of Nyangasang, modal split distribution of private car (30 percent), public taxi/bus (40.5 percent), keke (15 percent), walking (12.5 percent) and bicycle (2 percent) was revealed in figure 3. These modal split therefore was used to undertake an estimation of the location of 20 jobs per 1000 m^2 in Nyangasang (figure 8). The significance of these findings stems from the fact that approximate number of job is predicted based on modal split.

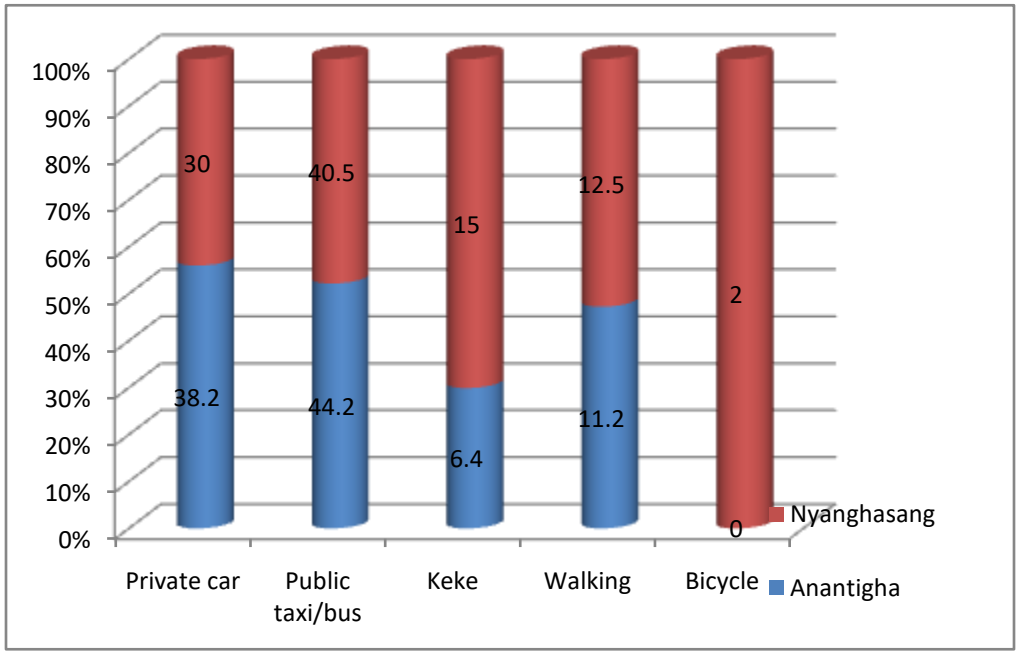

Figure 7: Modal split to job locations in both Anantigha and Nyangahasang

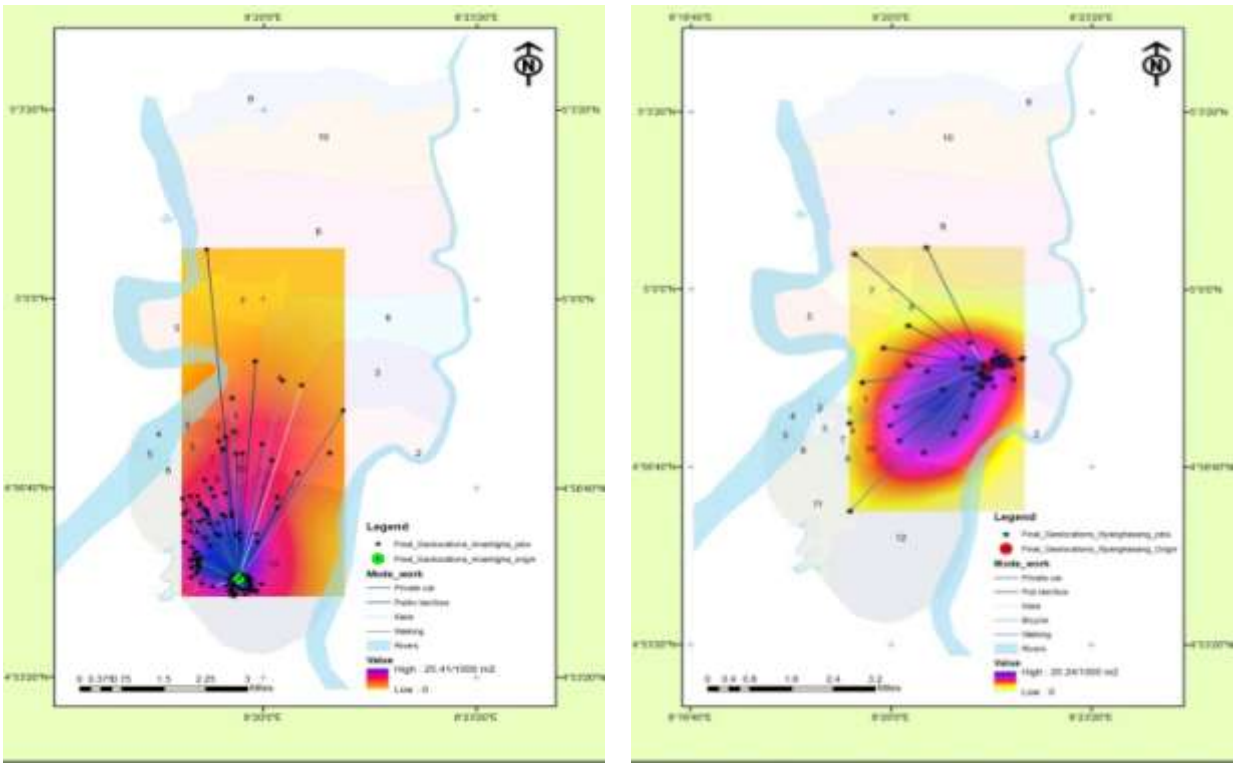

Figure 8: Employment locations based on modal split to work in Anantigha and Nyangahasang

D. Main trip purpose and impacts on job locations

The primary purpose of main trips such as work, school, shopping and so on were investigated to assess their impact on job locations in the study area. In the travel diary, it was asked respondents what their main purpose of trip was, having options for secondary purpose trips and so on. The focus of this section was to see the pattern of primary trips in the study area. This is useful for planning of land uses such as employment locations, transportation and so on. Results of findings in figure 9 revealed a somewhat similar pattern of primary trips in both study locations. Most primary trips are work related trips. For example, in Anantigha and Nyangahasang, primary work-trips accounts for 61 percent and 65.3 percent respectively. Furthermore, shopping, family, school and other primary trips ranges approximately from 13 percent to 6 percent, or a mean value of 9 percent for all of these categories.

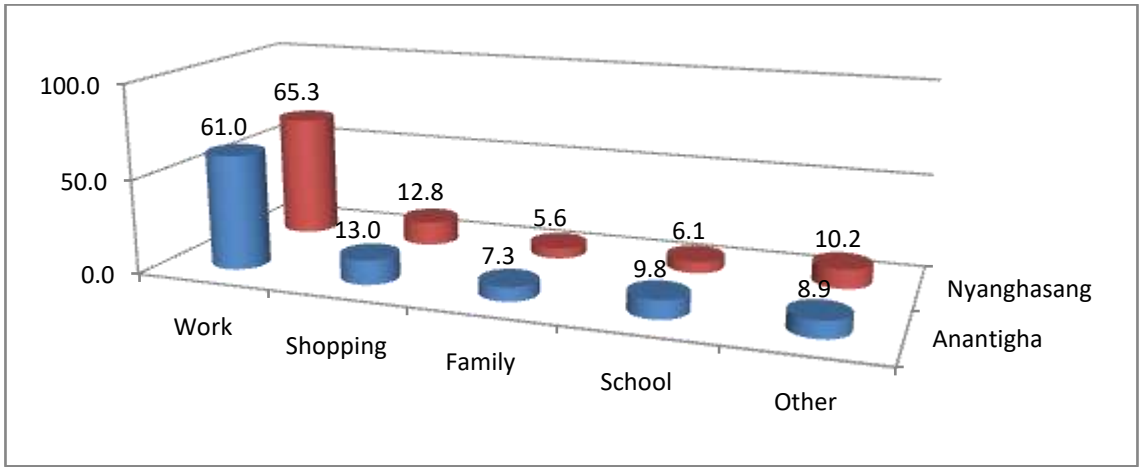

Figure 9: Daily primary trips in Anantigha and Nyangasang

This somewhat similar pattern of primary trips corroborates further model of job locations based on main trips undertaken by respondents in the study area. For instance, in Anantigha area, it was estimated that there are 23 jobs per 1000 m^2 in the study location using these parameters (figure 10).Similarly, about 25 jobs per 1000 m^2 can be located in Nyangasang. This means that these parameters remain better predictors of job locations considering that more jobs are located per 1000 m^2 (figure 10). This may not be farfetched as six or more primary trips out of every 10 undertaken in the study area are work-related.

E. Test of hypothesis

In this hypothesis, quality of travel options was used in a standard linear regression analysis to predict transport mode to job locations by residents in the study area. The correlations of the variables are shown in Table 1 from where it can be seen that all correlations are statistically significant. Modal classification for this analysis includes private car, public taxi/bus, tricycle (keke), bicycle, and walking from which respondents indicated which one that applies to them. Furthermore, modal quality is defined in terms of cost of fares, flexibility of the mode, availability, comfort and safety feeling from using mode.

The prediction model was statistically significant, $F(1, 431) = 18.181$, $p < .005$, and accounted for approximately 20 percent of the variance transport mode to job locations ($R^2 = .210$, Adjusted $R^2 = .204$). Transport mode to job locations was primarily predicted by high levels of travel options. This suggests that there is a significant positive relationship between transport mode to job locations and available transport options for residents in the study area. The null hypothesis that there is no significant relationship between transport mode to job locations and available transport options for residents in the study area is rejected.

The raw and standardized regression coefficients of the predictors together with their correlations with dwelling status, their squared semi partial correlations and their structure coefficients, are shown in Table 2. Modal split for work-related trips received the strongest weight (0.066) in the model followed by quality of the travel options (0.042). With the sizeable correlations between the predictors, the unique variance explained by each of the variables indexed by the squared semi partial correlations was quite low. Inspection of the structure coefficients suggests that, with the possible exception of modal split to work whose correlation is still relatively substantial; the other significant predictors were strong indicators of the underlying (latent) variable described by the model, which can be interpreted as general ability to pay for available transport service.

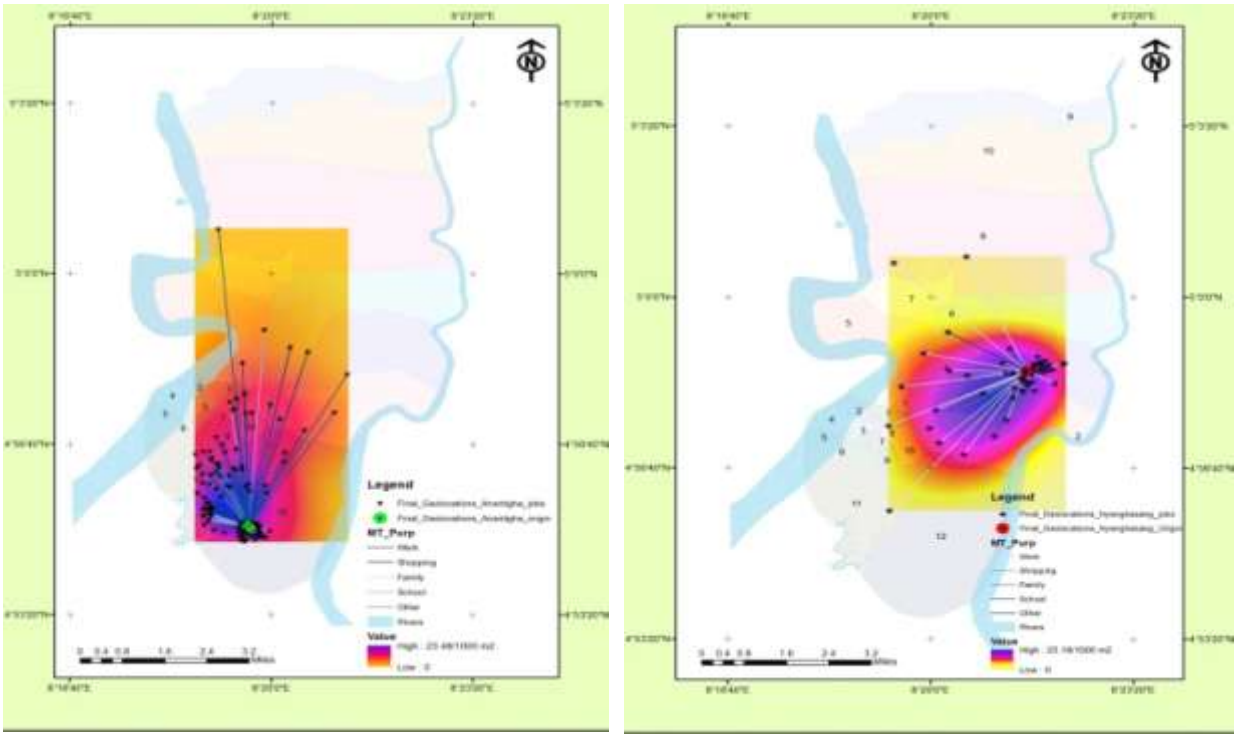

Figure 10: Distribution of job locations based on daily primary trip purposes in Anantigha and Nyangasang

Table 1: Correlations of the variables in the analysis (N = 415)

Variables	residential mobility change	mode to work	travel options	Quality of options
residential mobility			.352	-.235
mode to work	1.000	.378	.528	-.053
travel options		1.000	1.000	-.188
Quality of options				1.000

Table 2: Standard regression results

Variables	b	SE-b	Beta	Pearson r	sr^2	Structure Coefficient
Constant	1.387	.076				
mode to work* travel options*	.114	.021	.279	.378	0.066	.825
	.088	.027	.170	.352	0.025	.769
Quality of options*	-.072	.017	-.189	-.235	0.042	-.513

Note. The dependent variable was dwelling status, $R^2 = .074$, Adjusted $R^2 = .068$
sr2 is the squared semi-partial correlation.
* $p < .05$.

VI. CONCLUSION/RECOMMENDATIONS

The importance of using accessibility tools in urban planning practice has recently been rising in many countries. This paper has reviewed the way in which accessibility tools can be used to access job locations in urban centres. Our findings show that there is variation between accessibility to job locations for the different urban poor groups when considered that different jobs exist per 1000 m^2 across different income and housing conditions. Different public/private transport conditions were considered for modelling accessibility to job locations. These included average distances to job locations, transport cost element to job locations, journey time, distances covered to job locations and so on. The findings revealed that there is variation in the level of influence each the identified public transport variable has on access to job locations. For example, an average of 25 jobs and 20 jobs per 1000 m^2 was observed to be located per 1000 m^2 when distance criteria were used in the model in Anatigha and Nyangasang respectively. It is concluded that accessibility to job locations is poor thereby leading to social exclusion of Nyangasang and Anantigha residents in Calabar. The low income and their engagement in low paying informal jobs further impoverish them. The findings show that that there is variation between accessibility to jobs for the different urban poor groups in the study area.

It is clear from the analysis that the current different transport scenarios determine the location of jobs in the study area, yet the current public transport realities do not benefit the poor, neither is the current internal urban spatial structure. To improve the benefit of urban transport for the urban poor, more attention needs to be paid on design of roads and other complimentary infrastructures to enhance sustainable public transport system that is efficient, available, and affordable. This is in a view to providing sustainable accessibility to locations of well-paying jobs in the metropolis given that cost of transport influenced the location of many jobs for the study residents. It is important to contemplate a special public transport system to locations of low cost housing or sprawls in a bid to addressing transport concerns to job locations for the low income earners.

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