

Road Improvements and Economic Activities in Samaru, Zaria, Nigeria

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ABSTRACT

As road improvements take place, economic activities respond accordingly to take advantage of better access, which then result in changes in types or prevalence of economic activities along improved road corridors. As this process progresses, some classes of economic activities decline or increase and in some cases new ones emerge. To determine some of these effects, an inventory of economic activities along the corridors of interest was undertaken for the current period (post road improvement period). Interviews were conducted with one hundred purposively identified respondents aimed at eliciting some historical perspective on economic activity variations between the years 1980 and 2020. To back up the oral narrative, additional information from archival sources were employed to establish historical changes in building characteristics and road infrastructure attributes along the corridors under study. The International Standard Industrial Classification (ISIC) codes were then used to categorize economic activities for the different epochs. Findings indicate that among other universal factors such as, access to electricity and improved level of security, improvements on road infrastructure appears to have accelerated the influx of more and new types of economic activities in the study area. Other spinoff effects include building and land use change, uncontrolled gentrification, rent increase and urban management concerns on demographic, social, structural, security and economic issues. A further improvement in road designs that will accommodate the needs of adjoining economic activities and the development of policies that will help manage uncontrolled gentrification, for instance, would largely reduce the undesirable urban management implications stemming from road improvements.

Keywords: Economic activities, gentrification, industrial standard, road infrastructure, urban management.

INTRODUCTION

Societies aim for continuous growth by developing infrastructure that enhance growth and help fulfil human purposes (Agbibe, 2016). The development of basic infrastructure provides the setting for general human activities in the built environment. These provisioning should however, not be restricted to only one or two types (Aschauer, 2000). However, the case today in most developing countries is that of low capacity to develop the full gamut of infrastructure required to embark on full scale renewal programs, as a result of several factors, which include insufficient funds and poor governance structure amongst others. Of the very necessary ones is an efficient transport infrastructure that would aid smooth flow of factors of production, as this is crucial for economic vibrancy (Lakshmanan, 2011). What governments do in most cases is road infrastructure improvement, which in turn influences activities that are carried out in such areas, including economic ones. This approach may rest on the knowledge that among other factors, road infrastructure aids economic

activity development appreciably (Hamza, 2016; Agbibe, 2016; Lakshmanan, 2011).

As these improvements take place, economic activities respond accordingly to take advantage of better access, resulting in changes in types or prevalence of activities around the road corridor within which such improvements have taken place. This is consequential to the decline or rise of some classes of economic activities compared to others. Also, commercial uses tend to outbid other uses as noted by Ding (2013), which makes it difficult for some uses to keep up, mainly by the process of succession, and cause building design and use changes that culminate into uncontrolled gentrification.

Agbibe (2016) posits that substandard and deteriorating road infrastructure remains an obstacle to economic activity sustenance in districts, cities and regions of Nigeria. Therefore, Samaru area of Zaria is not an exception. Even though road infrastructure alone is not sufficient enough to attain the desired economic conditions for any society, it is among the most important transitional mechanisms in the modern economic

development paradigms (Ding, 2013; Lakshmanan, 2011; Banister & Berechman, 2001), especially in developing economies. Transport improvements have been documented to create land-use reorganization along affected corridors (Lakshmanan, 2011; Banister & Berechman, 2001). The opening of inaccessible sites for development by transport infrastructure improvement enables some sites to be brought forward for development. All these sum up to create employment opportunities and social vibrancy (Adefila & Bulus, 2014; Oni, 2006). The fact that an effective transport network makes possible rapid movement of goods and people is self-evident, and is an essential requirement of a modern economy. It is argued that improvements or additions to road networks will stimulate or strengthen economic growth in particular areas.

Second is the scarcely understood nature of economic activity dynamics seemingly premised on road infrastructure improvement, as alluded to by Moyaki (2015) and Gramlich (1994). It remains essentially unclear whether the direction of causation is from transport infrastructure to economic growth or vice-versa or both (World Bank, 1994). This needs to be further examined, so as to understand the relationship

between road infrastructure improvement and economic activity transformations in the local context, which could also provide pointers to likely explanations for similar areas elsewhere. It is against this backdrop that this study seeks to explore the influence of road infrastructure improvement in Samaru district of Zaria by appraising the pre and post road improvement effects on economic activities in the study area, over a period of forty years. The objectives are to (i) determine the attributes of economic activities pre and post road infrastructure improvement in the study area; (ii) examine how road infrastructure improvement may have contributed to increases in economic activities in the study area, and (iii) decipher urban management and planning implications. This is imperative because road infrastructure improvement is probably the most noticeable approach used in stimulating urban renewal and growth in the study area, and similar zones of cities in Nigeria.

MATERIALS AND METHODS

Classification of Economic Activities

The International Standard Industrial Classification (ISIC) classifies economic entities by activities.

Table 1 Broad structure of the ISIC classification of economic activities

| Section | Divisions | Description |
|---------|-----------|----------------------------------------------------------------------------------------------------------------------------|
| A | 01-03 | Agriculture, forestry and fishing |
| B | 05-09 | Mining and quarrying |
| C | 10-33 | Manufacturing |
| D | 35 | Electricity, gas, steam and air conditioning supply |
| E | 36-39 | Water supply; sewerage, waste management and remediation activities |
| F | 41-43 | Construction |
| G | 45-47 | Wholesale and retail trade; repair of motor vehicles and motorcycle |
| H | 49-53 | Transportation and storage |
| I | 55-56 | Accommodation and food service activities |
| J | 58-63 | Information and communication |
| K | 64-66 | Financial and insurance activities |
| L | 68 | Real estate activities |
| M | 69-75 | Professional, scientific and technical activities |
| N | 77-82 | Administrative and support service activities |
| O | 84 | Public administration and defense; compulsory social security |
| P | 85 | Education |
| Q | 86-88 | Human health and social work activities |
| R | 90-93 | Arts, entertainment and recreation |
| S | 94 | Other service activities |
| T | 97-98 | Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use |
| U | 99 | Activities of extraterritorial organizations and bodies |

Source: United Nations International Standard Industry Classification System, Revision IV, 2008.

The ISIC is a United Nations industry classification system maintained by the United Nations Statistics Division. Its' main purpose is to provide a comprehensive framework within which economic data can be collected and reported in a format that is designed for purposes of economic analysis, decision-taking, and policy making (United Nations, 2008). The classification structure represents a standard format to organize detailed information for the monitoring, analysis, and evaluation of performance of an economy or industry over time.

The original version of the International Standard Industrial Classification of Economic Activities (ISIC) was adopted in 1948. Since then, the majority of countries around the world have used ISIC for their national activity classification or have developed national classifications derived from ISIC. The ISIC is subdivided in a hierarchical, four-level structure of mutually exclusive categories, facilitating data collection, presentation and analysis at detailed levels of the economy in an internationally comparable and standardized way. The categories at the highest level are called sections. The first two digits of the code identify the division, the third digit identifies the group, and the fourth digit identifies the class. The categorization allows for easy identification of the type of economic activity that is increasing or reducing numerically, by class or scale in a zone or transport corridor, which makes the ISIC tool suitable in achieving the first objective of this study. Table 1 shows the broad structure of the ISIC classification system.

Techniques for Detecting Spatial and Economic Activity Variation

The need for standardized procedures for detecting spatial and economic activity variation has been recognized as essential, even though there is no agreed or universally accepted methodology (Xinhao & Rainer, 2007). Scholars therefore have strived to come up with robust, reliable and result-indicative methods and practices that enable tracing and assessment of impact of transport infrastructural projects on economic activities that can withstand independent scrutiny.

The evidence, which is advanced in support of claims of economic development benefits, is variable in terms of scope and quantity. While road projects are usually subject to standard assessments of cost and benefit, it is argued that these procedures do not capture or

represent all of the economic development benefits of road projects (Tunde & Adeniyi, 2012). To gain a better understanding of the relationship between road infrastructure improvement and economic activities, certain methods and/or techniques are applied. These include Economic Impact Analysis, Economic Base Model, Input/Output Model, Econometric Model, Time-Trend Analysis of Economic Activity and others. Description of the principles and how these methods can be applied can be found in more detail in several publications (e.g., Brockwell, 2010; Easterly & Rebelo, 2008; Demetriades & Mamuneas, 2000).

For this study a cursory description of the Time-Trend Analysis of Economic Activity, which was utilized, is given. Brockwell, (2010) mentioned Time-Trend Analysis of Economic Activity as useful in tracing how a given asset, security, or economic variable changes over time. It can also be used to examine how the changes associated with the chosen data point compared to shifts in other variables over the same time period. Studies on time trend analysis may focus on any of the following:

- i. Patterns of change in an indicator over time, e.g., whether usage of a service has increased or decreased over time, and if it has, how quickly or slowly the increase or decrease has occurred.
- ii. Comparing one time period to another time period.
- iii. Comparing one geographical area or population to another.
- iv. Making future projections

To this end, the current study sits within the context of items (i) (ii) and (iii).

Data Collection

Respondents' identified for the community perception survey exercise comprise homeowners who also engaged in economic activities, as well as shop and stall owners, including persons engaged in informal activities. This study focused on corridors that have seen incremental improvements on roads between the years 1980 and 2020. They include Leather Research road, Dan'raka road, Yawo road (Mr. Biggs road), Ahmadu road (Dogon Ice) and Tasha'n Funtua road, as shown in Fig. 1.

Transect surveys were carried out to identify economic activity locations and types so

as to indicate them on a base map pulled from Google Earth. Then ArcGIS was used to digitize and geo-reference images. This paved the way for zoning and identification of road corridors of interest where road infrastructure improvements

had taken place. Subsequently, classification of economic activities based on the International Standard Industrial Classification (ISIC) codes was then undertaken.

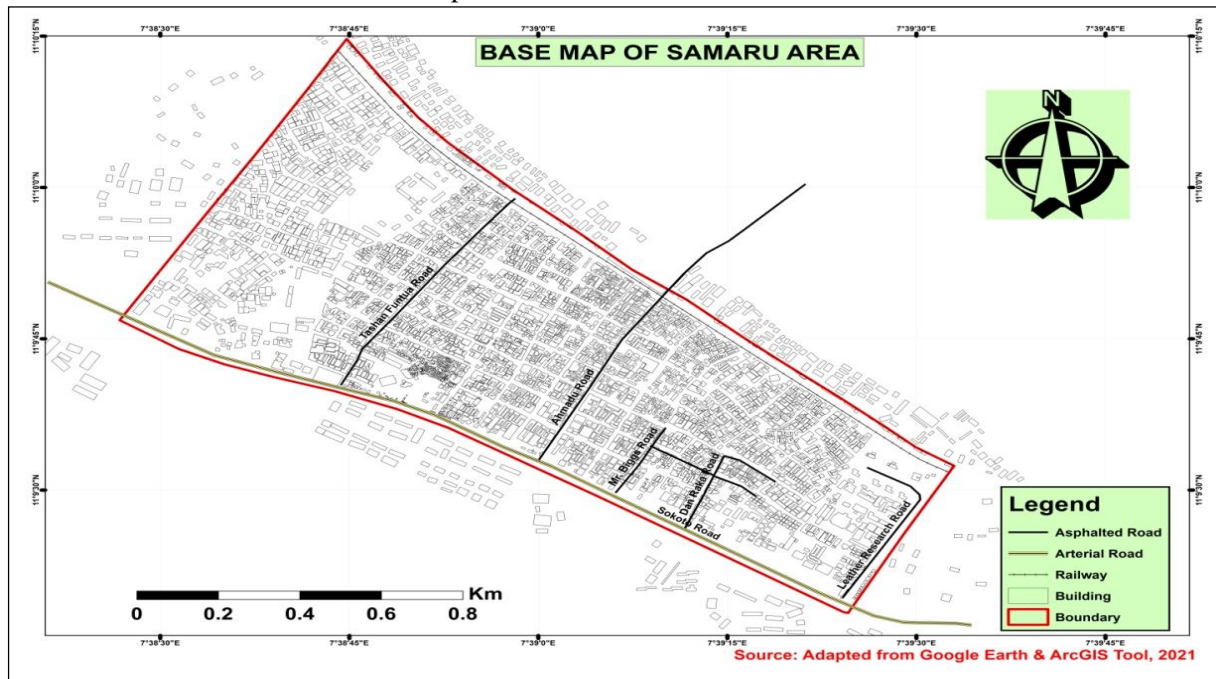


Figure 1 The corridors under study
Source: Adapted from Google Earth using ArcGIS

The study used mixed methods to collect data required to enable a time-series investigation, with the intention of detecting, comparing and appraising changes in economic activities adjoining them. To trace these effects, an inventory of economic activities along the corridors of interest was carried out for the current period to establish types and proportion of existing variants of economic activities in the study area. This was then used to guide interviews of one-hundred purposively identified respondents, supplemented with the use of snowballing approach in identifying key informants, who have lived and/or conducted economic activities along the corridors for appreciable length of time. This aided in regenerating proportions and attributions of economic activities for the preceding epochs, by prompting respondents to deduce from what they remembered from the list derived from inventory.

The study used historical sequence analysis, from oral narrative, to identify junctures, via triangulation, where variations in economic activities start to manifest. Additionally, information derived from officials of Kaduna State Urban Planning and Development Authority

(KASUPDA) were employed to establish historical changes in building structures and road infrastructure along the corridors under study, by juxtaposing with periods when road infrastructure improvements were carried out between 1980 and 2020. Population along each of the five corridors under study was not known, hence, equal numbers of interviews (20 each) were conducted along them, amounting to 100 in total. Even though the deduction of variants of economic activities for the 1980 – 2000 epoch relied mainly on respondent's recollection, which could introduce bias in terms of each respondent's ability to remember events. The inventory of economic activities carried out for the current period, moderated this shortcoming by providing a broad list of economic activities that served as basis for discussing changes in types and scales of economic activities. Similarly, building and land use variations over the epochs were also deduced.

Respondents were requested to use a four (4) indices Likert scale to rate indicators of social vibrancy as presented in Table 5. Weights were then assigned to the four possible responses based on level of positivity, i.e., *strongly disagree* = 1, *disagree* = 2, *agree* = 3 and *strongly agree* = 4.

The average weighted mean score is 2.50. Hence, weighted average values for indicators above 2.50 are seen as positive and an indication of improved social vibrancy.

RESULTS AND DISCUSSION

Characteristics of Respondents

To gain dependable insight into economic activity

variation, along with building and land use changes in the study area, respondents who have done business, worked or lived in the study area for reasonable length of time were targeted. Thirty eight percent of respondents have lived and engaged in various economic activities in the study area for upwards of 20 years, another 21% for between 15 and 20 years.

Table 2 Criteria for assessing road condition

| CRITERIA | DESCRIPTION |
|-----------------------------------------------------------------------------------|-------------|
| All/most part of road still having good pavements/drainage for all season use | Very good |
| Reasonable length of road still having good pavements/drainage for all season use | Good |
| Some part of road does not have good pavements/drainage for all season use | Fair |
| Most part of road do not have good pavements/drainage for all season use | Poor |

Table 3 Characteristics of roads

| S/N | PROPERTIES | LEATHER RESEARCH | DANRAKA | YAWO | AHMADU | TASHAN FUNTUA |
|---------------------------|------------------------|------------------|-----------|-----------|-----------|---------------|
| PERIOD 1980 – 2000 | | | | | | |
| 1 | Length | 200.944m | 233.845m | 3.13.0m | 576.485m | 688.321m |
| | Road Surface | Not | Not | Not | Not | Not |
| | Material | Asphalted | Asphalted | Asphalted | Asphalted | Asphalted |
| 2 | Shoulder Material | None | None | None | None | None |
| 3 | Condition | Poor | Poor | Poor | Poor | Poor |
| PERIOD 2000 – 2020 | | | | | | |
| 1 | Length | 200.944m | 233.845m | 3.13.0m | 576.485m | 688.321m |
| 2 | Road Surface | Asphalted | Asphalted | Asphalted | Asphalted | Asphalted |
| | Material | Asphalted | Asphalted | Asphalted | Asphalted | Asphalted |
| 3 | Shoulder | 1.1m/ | None | None | 1.5m/ | 1.5m / |
| | Width/Material | Gravel | None | None | Gravel | Gravel |
| 5 | Drainage Width | 0.8m | 0.75 | 1.0m | 1.0m | 1.0m |
| 6 | Period of Construction | 2005 | 2013 | - | 2000 | 2002 |
| 7 | Period of Last Upgrade | 2017 | - | - | - | - |
| 8 | Condition | Good | Good | Fair | Fair | Fair |

The remaining 41% percent have done business or lived in the study area for 5 to 10 years. Of the lot, 22% own the structure within which they live and do business, while 68% are tenants and the remaining 10% are employees. From the respondents' profile it appears that information that could help describe economic activity variation, building and land use changes within the two epochs (1980 – 2000) and (2001 – 2020) under study can be derived from them. Generally, 18% of the respondents' started business after

road infrastructure was improved along the corridor within which they conduct business, and were not able to relate adequately with pre-road improvement queries.

As for income, 52% of respondents earn less than ₦30, 000 per month. Another 29% earn between ₦30, 000 and ₦50, 000 monthly. A further 13% earn between ₦50, 001 and ₦100, 000. Only 6% of respondents earn more than ₦100, 000 monthly. The majority earn less than ₦30, 000 and are able to engage in economic

activities in the study area mostly because they occupy family owned spaces and do not need to pay rent.

Attributes of Roads in the Study Area

During this study, an assessment of the selected roads and their corridors was done to appraise their condition and collect basic information about their status. The criteria used for the assessment of road features and their condition are as presented in Tables 2 and 3. The corridors were selected because they are those that have seen incremental improvement over the years. They include Leather Research road, Dan'raka road, Yawo road (Mr. Biggs), Ahmadu road (Dogon Ice) and Tasha'n Funtua road. The Kaduna State Urban Planning Development Agency (KASUPDA) provided information about the periods of constructions and rehabilitation.

Analysis of Trend in Economic Activity Variation (1980–2020)

According to KASUPDA, three of the five corridors under study, that is Leather research, Danraka, and Tashan Funtua roads were constructed in 2017, 2013, and 2002 respectively. On the other hand, Ahmadu (Dogon Ice) and Yawo roads (Mr. Biggs) roads only saw partial resurfacing before the year 2000. From comparing the inventory of economic activities carried out for the later epoch, that is 2001–2020, with those deduced from interview of respondents for the preceding period, it was found that seven (7) new economic activities surfaced, as seen in the introduction of activities in the ISIC S 94 (service), M 69-75 (Professional, scientific and technical), G 45-47 (wholesale and retail trade, repair of motor vehicles and motorcycle), K 64-66 (financial and insurance) and P 85 (education) classes. By type sales of foodstuff and provision, sales of gas and fuel, point of sale businesses (POS), hairdressing, restaurants and sales of baked food were the highest gainers; the increase was attributed to the rising need for the products/services owing to perceived population increase, linked to better access post road improvement, as reported by respondents.

There was a predominance of G45-47 class of activities covering wholesale and retail

trade in foodstuff/provisions, household appliances, textile and footwear, pharmaceutical products and vehicle repair activities with a combine 35.97% of the total variants of economic activities in the 1980 – 2000 epoch. This appears to have maintained dominance by turning in a combine 35.02% in the 2001–2020 era as well. This dominance may be attributable to the fact that the class covers essential daily needs. Of the entire twenty-three (23) variants of economic activities deduced for the 1980–2000 epoch, ISIC M69-75 comprising, tailoring/fashion design, hair dressing and repair of electronics contributed a total of 22.11% to the whole, with tailoring/fashion design alone contributing 11.60% to this class.

This outlook also clearly depicts a hierarchical level of importance in demand for various goods and services in favour of daily needs, followed closely by personal services. Other activities contributed between 0.80 (viewing centres) and 12.09% (restaurants/eateries) respectively. Even though the restaurants and eateries (ISIC I 55-56) class turned out the highest percent value for an individual class, the G45-47 class activities are still more in overall terms, as shown in Table 4.

As shown in Table 1, inventory of economic activities for the period covering the years 2001–2020 revealed the presence of thirty (30) varying economic activities, of which 23 were in existence in various numbers and scale in the preceding epoch as inferred from responses from respondents.

It is interesting to note that apart from the addition of seven (7) entirely new economic activity types in the 2001 – 2020 epoch, all existing twenty-three (23) economic activities also increased in number, scale and spatial spread. It can be gleaned thus that even though some new activities found their way into the list, the older activities were also resilient in keeping their location and space even after road improvement introduced other dynamics in terms of competition for space and ability to match rent. It can be construed that the attributes of economic activities pre and post road infrastructure improvement in the study area in terms of types and scale did not change drastically for both epochs.

Table 4 Proportion of economic activity by type (1980-2000) & (2000-2020)

| S/N | ECONOMIC ACTIVITIES | ISIC CLASS | 1980-2000 | | 2000-2020 | | REMARK |
|---------------|-------------------------------------------------------------------------------------|------------|------------------------------------|-------|---------------------------|------|--------------|
| | | | Deduced Proportion from Interviews | | Proportion from inventory | | |
| | | | No. | % | No. | % | |
| 1 | Livestock trading | A 01-03 | 15 | 4.07 | 32 | 2.35 | Increased |
| 2 | Carpentry/ furniture making | C 10-33 | 21 | 5.64 | 55 | 4.05 | Increased |
| 3 | Grain milling | S 94 | 5 | 1.34 | 72 | 5.30 | Increased |
| 4 | Weaving of Aso Oke | C 10-33 | - | - | 5 | 0.37 | New Activity |
| 5 | Shoe making | C 10-33 | 10 | 2.68 | 77 | 5.67 | Increased |
| 6 | Printing & graphic design | M 69-75 | - | - | 70 | 5.15 | New Activity |
| 7 | Sales of gas and gas fittings | G 45-47 | - | - | 28 | 2.06 | New Activity |
| 8 | Sales of animal food/raw materials | G 45-47 | 12 | 3.22 | 29 | 2.13 | Increased |
| 9 | Sales of provisions& foodstuff | G 45-47 | 40 | 10.75 | 73 | 5.37 | Increased |
| 10 | Sales of electrical household appliance. | G 45-47 | 3 | 0.80 | 55 | 4.05 | Increased |
| 11 | Sales of clothes and textiles, footwear, and leather articles | G 45-47 | 27 | 7.25 | 53 | 3.90 | Increased |
| 12 | Sales of carpets rugs and curtain | G 45-47 | - | - | 23 | 1.69 | New Activity |
| 13 | Sales of toys and games | G 45-47 | 18 | 4.83 | 58 | 4.27 | Increased |
| 14 | Sales of pharmaceutical and medical products | G 45-47 | 10 | 2.68 | 41 | 3.01 | Increased |
| 15 | Sales of secondhand goods | G 45-47 | 5 | 1.34 | 67 | 4.93 | Increased |
| 16 | Other retail sales not in stores, stalls or markets (hawking and truck pushing) | G 45-47 | 19 | 5.10 | 77 | 5.67 | Increased |
| 17 | Student hostels | I 55-56 | 33 | 8.87 | 71 | 5.27 | Increased |
| 18 | Restaurant/eateries | I 55-56 | 45 | 12.09 | 61 | 4.49 | Increased |
| 19 | Commercial banks and other financial services | K 64-66 | 1 | 0.26 | 3 | 0.22 | Increased |
| 20 | P.O.S (Point of sales services) | K 64-66 | - | - | 34 | 2.50 | New Activity |
| 21 | Photocopying, document preparation and other specialized office support activities. | M 69-75 | 11 | 2.95 | 54 | 3.97 | Increased |
| 22 | Study center | S 94 | - | - | 9 | 0.66 | New Activity |
| 23 | Primary/Secondary schools | P 85 | - | - | 26 | 1.91 | New Activity |
| 24 | Health care centers | Q 86-88 | 5 | 1.34 | 9 | 0.66 | Increased |
| 25 | Tailoring/fashion design | M 69-75 | 43 | 11.60 | 67 | 4.93 | Increased |
| 26 | Hair dressing | M 69-75 | 17 | 4.56 | 71 | 5.27 | Increased |
| 27 | Repair of phones and computer | M 69-75 | 7 | 1.88 | 31 | 2.28 | Increased |
| 28 | Repair of household electronics | M 69-75 | 15 | 4.07 | 33 | 2.43 | Increased |
| 29 | Washing and dry cleaning of clothes | S 94 | 7 | 1.88 | 63 | 4.63 | Increased |
| 30 | Viewing centres | S 94 | 3 | 0.80 | 11 | 0.81 | Increased |
| Deduced Total | | | 372 | 100 | 1,358 | 100 | |

Source: Field Survey 2020

However, road infrastructure improvement could be said to have contributed to an increase in number and scale of economic activities within

identified ISIC classes, including the new activities, as they all appear to be growing exponentially in absolute numbers in the study

area since road improvements were undertaken and for these reasons, there are accompanying urban management and planning implications that could be deciphered, both from field observation and experiences of respondents.

Consequences of Road Improvement and Economic Activity Variations

In broad terms, the implications of the influence of road corridor improvements on economic activities are manifest in many forms. From the sheer numerical increase in economic activities seen between the two periods under study, that is from 372 units deduced for 1980-2000 epoch to 1,358 units in the latter, it can be inferred that more space was occupied by economic activities. The type, location and use of such spaces have other effects that could be positive and/or negative with implications on planning and urban management.

Regarding use of space, 87% of the respondents carry out one activity type in their space while 13% of the respondents carry out more than one activity type. The rising need for space along the improved corridors has resulted into building and land use conversions. Mixed-use buildings are increasing in number along the identified corridors, according to a source at the Kaduna State Urban Planning and Development Authority (KASUPDA). The pervasive conversion of wholly residential structures into mix-use buildings, owing to increasing demand for commercial space is evident. Even though theoretically, this is to be encouraged, however, incompatibility of land uses mixed in buildings and on land, as a result of the unguided nature of conversions creates safety concerns. For instance, sale of liquefied gas, among other uses like restaurants, hair dressing, welding, etc., within the same premise or in close proximity should be discouraged, because this type of arrangement would increase susceptibility to accidents among other issues, hence, public awareness towards sensitizing the populace against such acts is desirable.

Another noticeable effect is the increasing bulk of buildings fronting the roads. Additionally, building conversions result into uncontrolled gentrification manifested in inconsistencies in density and bulk of buildings. This has a number of implications, for example, the overrunning of erstwhile open and parking spaces by increases in on-street parking, and reduction in green areas and open spaces. It also impacts air flow, as bulky

structures tend to block the smaller more interior ones, thereby negatively impacting ventilation and day lighting advantages, which invariably leads to increases in energy use. The planning implications of these include development permit violations and loss of revenue to government because according to KASUPDA most of these conversions are illegally carried out. The development control arm of KASUPDA needs to increase surveillance and discourage illegal building size and land use violations in the area.

The fact that activities are mainly carried out in spaces fronting properties, for the belief that economic activities thrive due to their proximity to roads, result in encroachment unto road shoulders and building setbacks. The siting of informal/non-permanent structures on vacant spaces between buildings to take advantage of better access also contributes to traffic congestion, exacerbated by on-street parking, which in turn reduces road capacity in the study area. The occupation of vacant spaces with informal structures, mean that road carriageways are reduced, with constriction of space for both vehicular and pedestrian traffic. This increases the chances of collisions and conflicts between motorized and non-motorized traffic and jeopardizes public safety. Congestion along the road corridors under study at specific times of the day lead to reduced mobility and impacts pedestrian safety too, as a result of increased vehicular and pedestrian interaction. Pedestrians are mainly on the receiving end, because they are forced onto the roadway thereby exposing them to the risk of accidents. Roads along busy residential zones like the ones under study need to be accorded special attention in terms of design and construction. Where basic road user safety appurtenances are lacking, they should be retrofitted to improve safety of pedestrians, lighting, and effect traffic calming. There is need for planning authorities to enforce laws regarding road setbacks and parking regulations. Improvement in the design of roads to envisage on-street and off-street economic, social and mobility activities, should help reduce conflicts of interest along the corridors.

Basically, increased informal economic activities on open spaces put pressure on existing infrastructure, because they usually are not envisaged. This would have implications on energy supply, traffic, security, pollution, and waste generation and management. Since it is established that improvement of roads influence

other change drivers, such as the continuous influx of population resulting from better access, which in turn supports increase in economic activities and creation of new business ventures to cater to the needs of the expanding demand, prompting even more physical development. These are also part of the factors that impact supply of urban services, like electricity and level of security. Hence, the tolerance of informal activities must be followed with improved urban service delivery; else, some guidance is required in managing the implications of uncontrolled replication of informal activities within neighbourhoods. Pollution emanating from emission of carbon particles from automobiles as well as dust and fumes from food processing and other economic activities also have great implications on health and hygiene.

As expected, rent and land values increased. According to respondents, pre-road improvement, a plot of land sold for between ₦1 and ₦3 million, while shops and apartments attracted rent of between ₦20 and ₦40, 000 per annum. Post-road improvement figures however went up to between ₦3 and ₦7 million for a plot of land, while rent rose to between ₦50 to ₦200, 000 per annum for stalls and apartments. As for value of buildings, houses that sold for between

₦3 to ₦5 Million, now easily attract ₦5 to ₦7 Million and above. About 49% of the respondents believed that road improvement positively influenced land value and price of houses, which was attributed to the attraction of new higher income groups of people that in turn increases the needs for space, goods and services. However, 21% of the respondents believed that rent value is mostly determined by condition of structure/building, rather than road improvement per se. The benefits of the economic improvements in the study area are not shared equitably between new and old residents, because the ownership of economic activity spaces is skewed towards long term inhabitants.

In terms of social vibrancy, Table 5 depicts the perception of 59% of 100 respondents, who have lived and conducted business along one of the corridors, and can relate to post improvement changes in economic activities. On the perceived effect of road improvement on social vibrancy, it can be seen that all indicators of social vibrancy returned a weighted mean score of more than 3.00, which is above the 2.50 cut-off for relevance. This means that respondents agree that road improvement enhanced social vibrancy in the study area.

Table 5 Effect of road improvement on social vibrancy

| SN | VARIABLES | Strongly agree | Agree | Disagree | Strongly disagree | Frequency | Weighted mean | Level of agreement |
|----|-------------------------------|----------------|-------|----------|-------------------|-----------|---------------|--------------------|
| | | 4 | 3 | 2 | 1 | | | |
| 1 | Improved social interaction | 43 | 12 | 4 | 0 | 59 | 3.661 | Agree |
| 2 | Improved business patronage | 22 | 32 | 5 | 0 | 59 | 3.288 | Agree |
| 3 | Improved service hours | 33 | 22 | 4 | 0 | 59 | 3.491 | Agree |
| 4 | Increased pedestrian movement | 24 | 34 | 1 | 0 | 59 | 3.389 | Agree |
| 5 | Increased vehicular movement | 22 | 36 | 1 | 0 | 59 | 3.559 | Agree |
| 6 | Improved level of security | 38 | 11 | 7 | 3 | 59 | 3.423 | Agree |

The main indicators with the highest mention to support this claim are improved social interaction because of higher flows of traffic and improved service hours of businesses, underscored by improved level of security attributed to the presence of people in greater numbers and for longer hours in the day. About 49% of respondents indicated that the rate of crime along the corridors is now reduced compared to the past when thugs vandalized shops, houses or mug

passersby at night. Fights among youths, especially between students and locals, have also declined according to respondents. The fact that the number of economic activities is increasing made it more affordable for merchants and residents to engage vigilantes.

Another factor, as expected, that contributed to improved social interaction and security according to respondents is improved accessibility. Generally, 99% of respondents

attested to this fact. Lastly, continuous influx of population and business ventures appear to be influencing a change in the character of the area. This has brought about demographic, social, structural, and economic changes with impact on income structure, ultimately leading to building modernization, rehabilitation and beautification, provision of social amenities as well as job opportunities to both skilled and unskilled persons in the study area. Even though Gramlich (1994) noted, that it remains unclear whether the direction of causation is from transport infrastructure to economic growth or vice-versa or both. There appear to be appreciable link between road infrastructure improvement, economic activity transformations and social vibrancy in the context of the study area.

CONCLUSION

The improvement of road infrastructure is an integral part of the economic development process. Generally, roads are dominant transport assets and a valuable infrastructure used on a daily basis by millions of travellers to reach desired destinations. So, road infrastructure is a significant public asset, which should be continuously managed and improved. The study appraised the effects of road infrastructure improvement on attributes of economic activities in Samaru area of Zaria, Kaduna state, Nigeria, with a view to identifying implications for urban planning and management. It was noticed that among other drivers of economic development such as, population increase, adequate urban services, and security; improved road infrastructure significantly influenced the growth of economic activities in the study area. The presence of these roads attracts economic activities to locate along them, thereby initiating demographic, social, structural, and economic changes on a positive note. However, other implications such as, encroachment, congestion, pollution, uncontrolled gentrification among other effects, were also evident. By improving road designs to accommodate on-street and off-street economic activities and by developing policies that will help manage menace of illegal developments, most of these planning implications can be remedied to a large extent.

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