



## A comparative study of adoption of 4G and LTE network in Nigeria: A survey of Oshodi/Isolo Metropolis of Lagos State

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### Abstract

A comparative study of the adoption of 4g and LTE network in Nigeria using Oshodi/Isolo metropolis of Lagos state was conducted in 2023 in order to ascertain the availability and adoption of 4G and LTE wireless communication network by consumers. Structured questionnaires and field interview were undertaken for data collection. A systematic random sampling of ten mobile users (10) out of the eleven (11) wards in the local government areas were sampled with questionnaire in order to generate data for the research. The wards were: Oshodi/Bolade, Orile Oshodi, Mafoluku, Shogunle, Shogunle/Alasia, Isolo, Ajao Estate, Ilasamaja, Okota, Ishaga-tedo and Oke-Afa/Ejigbo. A total of 110 questionnaires were administered to mobile users across the wards in the local government under study in order to validate the availability and adoption of 4G and LTE network in their area. The data gathered were sorted, classified and subjected to descriptive statistics. The findings of the study indicated that MTN and AIRTEL (35%) network was widely used by the majority of the respondents. This was followed by GLO network (20%) while 9Mobile was least with (10%) patronage level. Based on the results of the study, the following are hereby recommended: relatively, every of the network provider are desirable for use by subscribers because they were 4g enabled. Equally, they were most effective on call and data services. All the service providers are now operate perfectly on 3G and 4G spectrum.

**Keywords:** Comparative study, survey, adoption, user experience, 4G and LTE network, metropolis

### Introduction

Technological innovations would forever be a recurring activity in life. Since change of any form is constant, so are technological innovations that seek to make life better for humanity. Broadband provides high speed data transmission to Internet; and 4G networks were developed to transform broadband technology with higher data rate and enhance quality of service. 4G refers to the fourth generation of cellular wireless standards (National Communication Commission {NCC}, 2020) [10]. It is a successor to 3G and 2G families of standards. The fourth generation (4G) is a conceptual framework and a discussion point to address future needs of a high-speed wireless network that can transmit multimedia and data to, and interface with wire-line backbone network perfectly. The speeds of 4G can theoretically be promised up to 1Gbps. Some of the applications of 4G are (ITU, 2010, ITU-R, 2012) [2, 4, 5];

1. **Mobile TV:** a provider redirects a TV channel directly to the subscriber's phone where it can be watched.
2. **Video on demand:** a provider sends a movie to the subscriber's phone.
3. **Video conferencing:** subscribers can see as well as talk to each other.
4. **Tele-medicine:** a medical provider monitors or provides advice to the potentially isolated subscriber.
5. **Location-based services:** a provider sends localized weather or traffic conditions to the phone, or the phone allows the subscriber to find nearby businesses or friends.

6. Mobile ultra-broadband (gigabit speed) access and multi-carrier transmission. VII). Mobile WiMAX (Worldwide Interoperability for Microwave Access).

Developed in 2010 with the following attributes:

- Faster and more reliable
- Speed up to 100 Mbps
- Both cellular and broadband multimedia services everywhere
- High performance
- Easy global roaming
- Low cost

The aim of the study therefore is to undertake a comparative study of User Experience and Adoption of 4G/LTE Network in Nigeria using Oshodi/Isolo LGA of Lagos State as the case study.

### Research Methodology

In the bid to evaluate the User Experience and Adoption of 4G and LTE Network in Nigeria, data would be collected using survey research method by administering questionnaires to the subscribers of the wireless networks in the Oshodi/Isolo local govt. areas of Lagos State comprising of 11 wards with 10 respondents from each of the chosen ward.

The participated network subscribers or respondents comprises of several strata of the society ranging from: civil servants, lecturers, politicians, unemployed graduates, traders/artisans, professionals and students.

The questionnaire was structured into two major sections; the bio-data of the respondents and the personal assessment of the quality of service (QoS) of the 4G and LTE Network in Nigeria which include items such as service providers, subscribers, type of subscription used, how fast is the downloading, level of download, connectivity level, broadband type, tariff plan type used, how easy is access broadband network.

**Study Area**

Oshodi-

Isolo is a Local Government Area (LGA) within Lagos State . The LGA is part of the Ikeja Division of Lagos State, Nigeria. At the 2006 Census it had a population of 621,509 people, and an area of 45 square kilometers. The Local Government was constituted by eleven wards as below listed: Oshodi/Bolade, Orile Oshodi, Mafoluku, Shogunle, Shogunle/Alasia, Isolo, Ajao Estate, Ilasamaja, Okota, Ishagatedo and Oke-Afa/Ejigbo. (National Bureau of Statistics {NBS}, (2022) [1].

**Research Design**

Survey research method would be used for this study. Survey research method is the most suitable technique presently available for socio-economic research involving questionnaire. She further added that survey research is characterized by the selection at random samples from a large and small population to obtain empirical knowledge of contemporary nature. This knowledge allows generalization to be made about characteristics, opinions, beliefs attitudes of the entire population being studied (Creswell, 2009) [1]. This makes the design appropriate or suitable for this study.

**Research Instruments**

Primary data would be gathered through: Direct field survey using structured questionnaire and field visit. Documentary

sources from journals, conference proceedings and textbooks would also be employed for the research.

**Data Analysis**

The data gathered would be sorted, classified and subjected to descriptive statistics in order to undertake a comparative study of User Experience and Adoption of 4G/LTE Network in Nigeria using Oshodi/Isolo metropolis of Lagos as case study.

**Results and Discussion**

**Results**

The questionnaire was shared with 100 randomly selected people to gather information about their demographic characteristics, mobile network provider preferences, and internet usage habits. Here are the key findings:

**Demographic Characteristics**

Table I showed that the respondents' ages varied from 18 to 65 years, with an average age of approximately 32 years. The sample consisted of both males (55%) and females (45%). They represented a diverse range of occupations, educational levels, and monthly income levels. The preponderance of the occupation preference is as follows: Schooling (45%), Professionals (30%), business owners (15%), Public servants (5%) and others (5%). The educational diversity showed the following: Uni graduates (30%), Post graduate (25%) while secondary school graduate represents 15%. The marital status of the respondents indicated the following trends: single (45%), married (30%), divorced (15%) and widowed (5%). The respondents had an average of 1 to 4 dependents. The mobile network providers and percentages of users were: Airtel (35%), MTN (33%), GLO (20%) and 9Mobile (10%). The survey coverage showed the Oshodi axis having 55% of the respondents while Isolo axis represented 45%.

**Table 1:** Demographic Characteristics

Age (years)	Gender	Occupation	Educational Level	Monthly Income	Marital Status	Number of Dependents	Survey coverage	Mobile Network Provider
18-25 45%	Male 55%	Schooling 45%	Secondary School: 15%	<50,000: 25%	Single: 45%	None: 20%	Oshodi: 55%	MTN 35%
26-35 30%	Female 45%	Professional 30%	University Graduate: 30%	50,000 – 100,000: 30%	Married: 30%	1-2: 30%	Isolo: 45%	GLO 20%
36-45 15%		Business owners 15%	Postgraduate: 25%	>100,000: 45?	Divorced: 15%	3-4: 25%		AIRTEL 35%
46-55 5%		Public servants 5%			Widowed: 5%	5+: 20%		9Mobile 10%
56-65 5%		Others 5%						

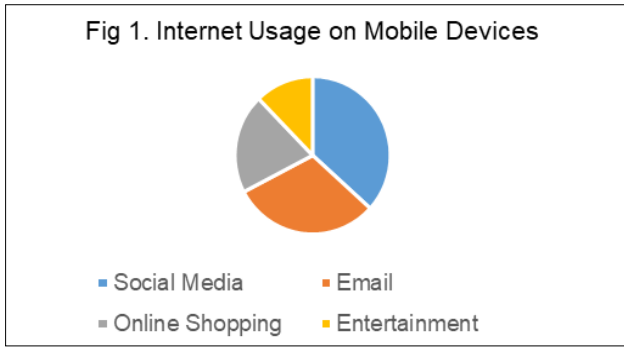
**Internet Usage on Mobile Devices**

Table 2 and fig. I showed the internet usage on mobile devices. The primary purposes for using the internet on their

mobile devices were: social media (30%), e-mail (25%), entertainment (10%), Work-Related Tasks (10%), online shopping (15%) and other purposes (10%).

**Table 2:** and fig. I showed the internet usage on mobile devices

Internet Activities	Percentage
Social Media	30%
Email	25%
Online Shopping	15%
Entertainment	10%
Work-Related Tasks	10%
Other Purposes	10%
Total	100%

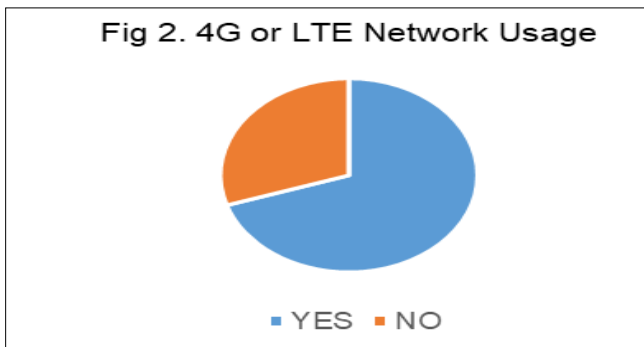


**4G or LTE Network Usage**

Table 3 and fig 2 showed the 4G or LTE Network Usage. 70% of the respondents had used a 4G or LTE network while 30% of the respondents had not.

**Table 3:** and fig 2 showed the 4G or LTE Network Usage

4G or LTE Network Usage	Percentage
YES	70%
NO	30%
TOTAL	100%

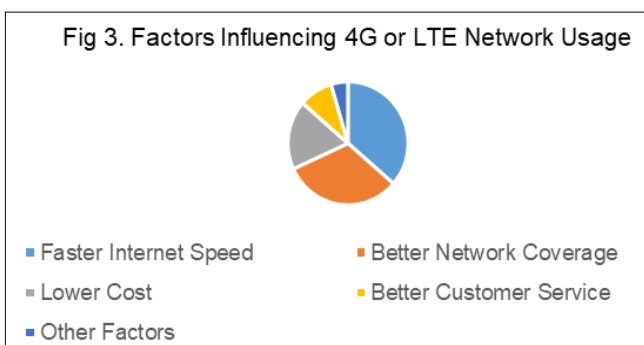


**Factors Influencing 4G or LTE Network Usage**

Table 4 and fig 3 shows the factors influencing 4G or LTE Network Usage. The main factors that influenced the decision to use a 4G or LTE network were: faster internet speed (40%), better network coverage (40%), lower cost (10%), better customer service (05%) and other factors (05%).

**Table 4:** and fig 3 shows the factors influencing 4G or LTE Network Usage

Factors	Percentage
Faster Internet Speed	40%
Better Network Coverage	40%
Lower Cost	10%
Better Customer Service	05%
Other Factors	05%
Total	100%

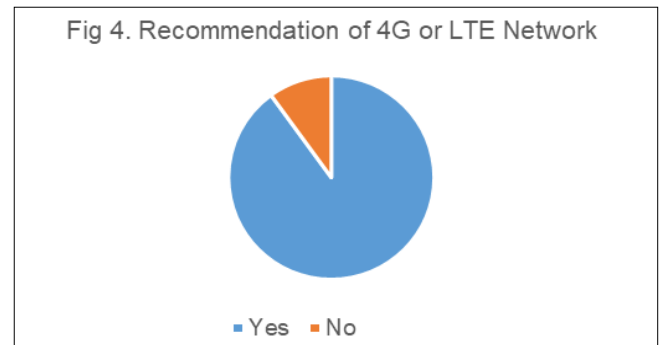


**Recommendation of 4G or LTE Network**

Table 5 and fig 4 shows the Recommendation of 4G or LTE Network. An overwhelming majority (around 90%) of the respondents would recommend a 4G or LTE network to others.

**Table 5:** and fig 4 shows the Recommendation of 4G or LTE Network

Would you recommend a 4G or LTE network to others?	Percentage
Yes	90%
No	10%
Total	100%



**Discussion**

The results of this questionnaire highlight the increasing importance of mobile internet connectivity in Nigeria. With a large portion of the population using mobile devices for various purposes, such as social media, email, entertainment, and work-related tasks, it is evident that mobile internet has become an integral part of daily life for many Nigerians.

The high satisfaction levels with the current mobile network providers indicate that the competition in the telecommunications industry has resulted in improved services. However, it is essential for providers to continue investing in network infrastructure and customer service to maintain and enhance customer satisfaction (ITU, 2010; ITU-R, 2012; Mojtahed, and Xirasagar, 2013) [2, 4, 5, 8].

The popularity of 4G and LTE networks among the respondents signifies the growing demand for faster and more reliable internet connections (3GPP LTE Encyclopedia, 2010) [3]. The positive experiences of those who have used these networks can influence others to switch or upgrade to these technologies, contributing to the overall advancement of internet connectivity in the country. The factors influencing 4G or LTE network usage, such as faster internet speed and better network coverage, align with global trends in mobile internet preferences (Motorola, 2010, LteWorld, 2012) [7, 10]. Cost also plays a significant role, indicating that affordability remains a crucial consideration for many consumers.

Overall, this study provides valuable insights into the preferences and habits of Nigerian mobile internet users. The information gathered can be used by mobile network providers and policymakers to make informed decisions and address the evolving needs of the population concerning internet connectivity. By understanding the factors that drive satisfaction and usage, mobile operators can continue to enhance their services and contribute to the country's digital development.

## Conclusion and Recommendations

### Conclusion

The study provides valuable insights into the preferences and habits of Nigerian mobile internet users. It highlights the importance of network coverage, speed, and reliability, as well as cost and device compatibility in driving users' adoption.

Based on the results of the study, it can be concluded that:

1. Relatively every of the network provider are 4g and LTE enabled and are desirable for use by subscribers.
2. MTN and AIRTE is most effective on call services and data services as compared with GLO and other service providers.
3. Poor internet connectivity are challenges faced by most of the respondent at some instances.

### Recommendations

The study recommends the following:

1. That mobile network providers should invest in network infrastructure to improve network coverage, speed, reliability and quality to enhance user satisfaction and adoption. By addressing these issues, mobile network providers can attract more users and increase their market share.
2. The study also recommends that mobile network providers should work with the government to address the challenges of network infrastructure and regulation to promote the growth of the telecommunications industry in Nigeria. This can lead to increased competition and better services for consumers.
3. The study can also be used as a reference for future research on the topic.
4. The recommendations can be used by mobile network providers and policymakers to make informed decisions and address the evolving needs of the population concerning internet connectivity. By understanding the factors that drive satisfaction and usage, mobile operators can continue to enhance their services and contribute to the country's digital development.
5. The recommendations can also be used to develop new products and services that meet the needs of Nigerian mobile internet users.
6. The findings are particularly relevant in the context of the COVID-19 pandemic, which has highlighted the importance of internet connectivity for work, education, and social interaction. The pandemic has accelerated the shift towards digital technologies, and internet connectivity has become more critical than ever before.
7. The recommendations can help to ensure that Nigerian mobile internet users have access to reliable and affordable internet connectivity, which is essential for economic growth and social development.

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