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ASSESSESMENT OF GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM) ON TRAVEL DEMAND AND ECONOMIC DEVELOPMENT IN IBADAN METROPOLIS, OYO STATE, NIGERIA

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ABSTRACT

The post-mobile era presents us with countless challenges in every facet of our lives. For instance, in order to make a purchase, we must travel to the market, but thanks to mobile commerce, mobile phones enable us to conduct business from the comfort of our homes. Today's traffic system needs to improve in efficiency to handle the demand for travel that is only going to increase as well as the need to lessen its impact on the environment. The purpose of this study is to investigate how GSM has affected the city of Ibadan's travel demand. Stratified random sample and purposive sampling strategies were employed in the study to deliver 125 well-structured questionnaires to the chosen road users from the chosen vehicle park within the city of Ibadan. The results indicate that the majority of respondents, or 53.6% of the sample, make trips with a purpose. Trip purpose is significant in the study area and contributes to an increase in traffic flow. Due to the many businesses that each study participant operates, it was found that minibuses and taxis were the most readily available modes of transportation for mobility along the study's chosen routes. Additionally, the study's findings indicate that the usage of GSM can occasionally have a substantial impact on the influence of travel demand. The findings demonstrated that, at a significance level of 0.05, each of the three selected indices (cost of travel, purpose of journey, and traffic reduction) had a statistically significant difference between the group means, with R equal to 0.74. The study's findings revealed that, the purpose of a journey plays a significant role in the study area and increases traffic flow using the available transportation options. The cost of services, the cost of the journey, and other factors were taken into account to determine the demand for travel. Similarly, there is a favorable correlation between human conduct and cell phones. In order to ensure efficient and long-lasting communication, it was suggested that the government create a policy requiring all mobile phone service providers to meet certain standards.

KEYWORDS: GSM, Travel Demand, Communication and Economic development

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1. INTRODUCTION

Global business language appears to be information and communication technology (ICT), either replacing accounting or enhancing it. This is due to the fact that the wealthiest men on the planet work in industries like publishing, media, and communications, among others, that have a deciding effect on choices and decisions made with the use of knowledge. Mobile phones have become an indispensable tool in both developed and underdeveloped nations nowadays. There is a constant demand for a cell phone. Our mobile phone is a need from sunrise to sunset. In Nigeria, mobile phone culture is very recent; in fact, mobile phone use dates back to the early 2000s. In a very short period of time, mobile phones become quite popular in Nigeria. Currently, mobile phone usage is about 85% of the Nigerian population. Everyone has access to a mobile phone, even day laborers and upper class citizens. A mobile phone is a necessary item in every way. Mobile phones have a mixed effect on human behavior; some claim beneficial effects, while others are harmful. Young people worldwide are most impacted by mobile phones (Torre, Goslin & White, 2020). Many mobile phone users in Europe and other regions of the world utilize the GSM (Global System for Mobile communication) digital mobile network. Of the three digital wireless phone technologies, GSM is the most extensively used and employs a variant of time division multiple access (TDMA) (Agarwal, Ray, Pradhan & Kumari, 2022). When we live in the post-mobile era, we have to deal with countless challenges in every area of our lives. For instance, we have to go to the market in order to buy something, but thanks to mobile commerce, mobile phones enable us to shop from the comfort of our homes.

In Nigeria, there are a lot of people who are nonverbal. Their cell phones are a gift because they introduced text messaging services. Speechless folks can interact with others thanks to this blessing. Thousands of people travel every day all across the world, including a sizable number of domestic and international travelers in Nigeria. It will be quite hard to stay in touch with their friends and family if they communicate using regular post office mail. However, a cell phone makes the impossibly feasible. Communication is possible amongst people everywhere in the world.

A mobile phone can be used for emergency services as well. We can obtain emergency services, such as fire, ambulance, or another emergency that we require, by utilizing a cell phone. In our digital age, cell phones are an essential component of our daily lives. In Oyo State, practically everyone owns a phone, and it's common to observe people using their phones to text, make brief phone calls, browse the internet, or perform any other necessary action by tapping or clicking. Today's traffic system needs to become more efficient in order to handle the demand for travel that is growing as well as the requirement to lessen its impact on the environment (De Blas, Mediavilla, Capellán-Pérez & Duce, 2020). A thorough understanding of human mobility is required in order to make well-informed decisions while making improvements to the traffic system. This necessitates detailed data on travel trends and actual demand for travel, which is currently hard to come by. Data from cellular networks is thought to be a promising source of information that can be utilized to improve traffic planning and management. Being a vast data source, it can provide fresh perspectives on mobility across all types

of transportation. Compared to trip surveys, it is also simpler to stay current. In cities, three daily peak periods are identified (morning, afternoon, and evening); travel demand displays weekly and seasonal patterns. Tao Tao, Corcoran, Rowe, and Hickman (2018) state that there are identifiable travel patterns in the movement of people who commute on a daily, weekly, or seasonal basis within and between cities. In Nigeria, the most popular days of the week for travel demand are Mondays and Fridays. This is because many individuals travel on the weekends to attend social events and to see their relatives. This increased travel process, makes people more vulnerable to accidents and makes them targets for armed robbers which has adverse effect on the economic development. If the sole purpose of the trip is information dissemination, then this kind of travel should be avoided as it is also linked to physical stress and examining how GSM affected the economic development during travel demand within Ibadan metropolis is the goal of this study. In order to do this, the study analyzes the elements influencing GSM operation during trip demand in Ibadan and determines how GSM influences travel demand in the city.

2. LITERATURE REVIEW

The way that people move and how they communicate are intricately related (Osoja, Opeyemi, Olasokan, and Toki, 2022). and they can take on many shapes. To shed light on the conceptual relationship between travel and communications, communication was divided into three main modes (Zaharna, 2022). Furthermore, a connection has been shown between information and communication technologies and how individuals travel. When addressing call activities performed by mobile phone users, it is important to keep in mind that the distribution of call activities is heavily influenced by both weekly and daily social rhythms. Additionally, there are a number of additional aspects that should be considered as they may also impact mobile phone use. Mooses, Silm, and Ahas (2016) and Schroeder (2010) state that the first factor influencing the usage of mobile phones is the national context and cultural background, which includes laws, morality, ethics, and legislation related to phone use, as well as the domestication of mobile phones, network accessibility, and service costs. Regardless of socioeconomic status, mobile devices are well introduced in the context of this study and are expressly favored to landline phones (Malm and Toyama, 2021). A key idea in transportation research is accessibility. Similar to the idea of "competitiveness," there is debate about how to define "accessibility," as there are various definitions. "Accessibility is a slippery notion...one of those common terms that everyone uses until faced with the problem of defining and measuring it," write Geurs & Van Wee (2013). Some ideas about the concept of "accessibility" and its measurement in connection to competitiveness are presented in this section.

There are other ways to assess accessibility, such as focusing on a certain demographic, medium, place, or activity. Certain aspects and viewpoints are often ignored or undervalued in conventional planning. A more thorough examination of accessibility in planning broadens the range of possible fixes for transportation issues. These include the following: land use characteristics, transportation network connection, affordability, mobility substitutes, mobility demand, mobility, mobility options, user information, integration of the transport system, roadway design and management, prioritizing, and

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inaccessibility. According to Brussel, Zuidgeest, Pfeffer, and Van Maarseveen (2019), accessibility cannot be captured by a single indicator. All of these are compatible with our theoretical transportation system model. How accessibility is measured for a given study depends on its objectives. Acheampong & Siiba (2020) used survey research using pertinent variables of socioeconomic and travel demands to assess the sustainability of Kumasi, Ghana's urban transport system. The study's foundation is the finding that sustainable transportation has social, environmental, and economic components. It was inspired by the relationship between transportation and sustainable development.

Using a self-report questionnaire to administer the item pool to a developmental sample, James (2012) explored problematic mobile phone use: evaluating the behavior, its motivational process, and negative effects. He discovered a difference between actual conduct, its outcome, and reasons. Marzuoli, Boidot, Feron, and Srivastava (2019) used a survey research method to investigate the impact of mobile phone calls on the travel patterns of airline transport passengers at Murtala Mohammed Airport Two (MMA2) in Lagos, Nigeria. They discovered a significant positive correlation between the frequency of travel and mobile phone calls in the study area.

3. METHODOLOGY

The Oyo State city of Ibadan served as the study's area. The study employed a purposive sample technique to pick 125 road users from three automobile parks inside Ibadan Metropolis. The study employed both descriptive and regression analysis to examine primary data obtained from well-structured questionnaires. While regression analysis was utilized to look at how mobile phone usage affects travel demand and economic characteristics in Ibadan, as seen by the model below, descriptive tools such as frequency tables and pie charts were employed:

The model is specified as:

$Y=a+b_1X_1 +b_2X_2 + b_3X_3+ \ldots\ldots\ldots + b_nX_n + U_i \ldots\ldots\ldots\ldots\ldots(1)$

Where

a= Constant

U_i=Error term or disturbance term

Y= Dependent variable (Employment opportunity)

X_1= Travel cost

X_2= Trip type

X_3= Traffic reduction

X_4= Service cost

X_5= Network availability

4. RESULTS AND DISCUSSION

Road users in the study area produce trips to meet travel demand for a number of reasons. In doing these, the first challenge they faced is the poor GSM network while attempting to communicate for various purposes, including business. The results of the study indicate that the majority of respondents, or 53.6% of the sample, make trips because of their intended destinations. Similarly, 19.2% of

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respondents say they travel because it's more expensive to make a journey than to use a GSM phone to make calls. Faulty networks from all network providers also have an impact on the creation of trips, as reported by 15.2% of research participants. Ultimately, 12% of the sample group travels without a cell phone. This indicates that the research area's travel purpose is significant, which in turn contributes to an increase in traffic flow.

Table 1.1: Respondents reason of traveling

	Frequency	Percent	Valid Percent	Cumulative Percent
Bad network	19	15.0	15.2	15.2
trip purpose	67	52.8	53.6	68.8
cost of trip	24	18.9	19.2	88.0
absent of mobile phone	15	11.8	12.0	100.0
Total	125	98.4	100.0	

Source: Fieldwork Survey, 2024.

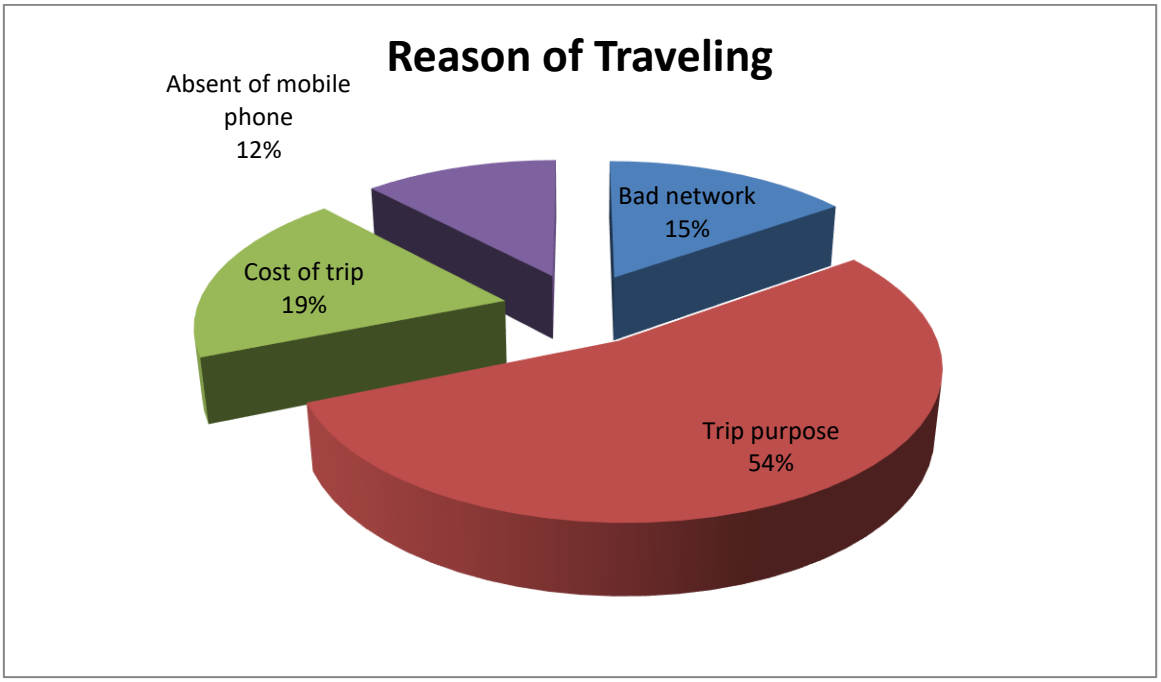

Fig 1.1: Chart representing Reason of Traveling

Source: Fieldwork Survey, 2024.

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1.2: Available Means of Transport

The study region offers a variety of transportation options, as the table below illustrates. These modes of transportation serve distinct purposes and can be selected for various situations. The survey's findings showed that, among the respondents in the study area, minibuses and taxis were the most readily available modes of transportation for mobility along the study's chosen routes, accounting for roughly 33.6% of the total. However, because of the area's density, only 20% of respondents used tricycles for transportation. In addition, due of the environment's density, the study's motorbike usage rate was the lowest of all the possible modes of transportation at 12.8%. This demonstrates that since business excursions account for the majority of travels made in the study area, mobile phone calls cannot fully replace them.

Table 1.2: Respondents' Means of transport

	Frequency	Percent	Valid Percent	Cumulative Percent
Motorcycle	16	12.6	12.8	12.8
tricycle	25	19.7	20.0	32.8
mini-bus	42	33.1	33.6	66.4
Taxi	42	33.1	33.6	100.0
Total	125	98.4	100.0	

Source: Fieldwork Survey, 2024.

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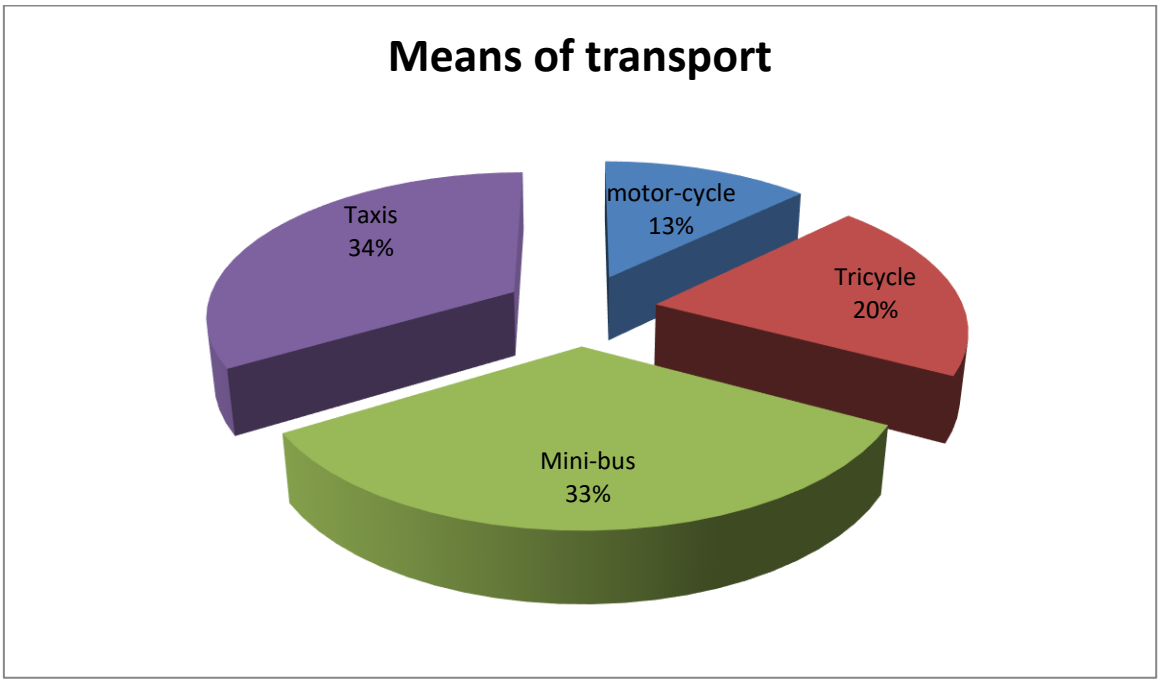

Fig 1.2: Chart representing Means of Transport

Source: Fieldwork Survey, 2024.

The relationship between mobile phone usage on travel demand and economic development in Ibadan was obtained using Analysis of Variance (ANOVA) to ascertain whether there was any statistically significant variance between mobile phone use on travel demand and economic development. The findings demonstrated that, at a significance level of 0.05, each of these chosen indices (cost of travel, purpose of journey, and traffic reduction) had a statistically significant difference between the group means. The results of the multiple regression models indicated that there is a positive correlation between mobile phone use and travel demand (R = 0.747). However, the model was only able to explain 54.8% of the variation in travel demand between mobile phone use and human behavior (F value = 51.03, significant at $p<0.05$). As a result, the alternative theory that there is a connection between human behavior and mobile phone use in terms of trip demand was adopted.

The objective of the trip had a beta value of 1.127, a t-value of 7.249, and a p-value of 0.00; the coefficient of travel expense had a beta value of 1.087, a t-value of 5.514, and a critical p-value of 0.000. The traffic decrease had a beta value of 0.580, a t-value of 3.213, and a p-value of 0.002. This suggested that human behavior and the demand for travel into and out of the city of Ibadan are significantly influenced by all three of the variables.

Table 1.3: Model Summary of Relationship between Mobile Phone Use on Human Behavior and Travel Demand in Ibadan.

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Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.747[a]	.559	.548	.88483

Table 1.4: ANOVA of Relationship between Mobile Phone Use on Human Behavior and Travel Demand in Ibadan.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	119.858	3	39.953	51.030	.000[b]
	Residual	94.734	121	.783		
	Total	214.592	124			

Table 1.5: Coefficients of Relationship between Mobile Phone Use on Human Behavior and Travel Demand in Ibadan.

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.365	.208		1.757	.081
	Purpose of travel	-1.574	.217	-1.127	-7.249	.000
	Cost of travel	1.085	.197	1.087	5.514	.000
	Reduction in traffic congestion	.570	.177	.580	3.213	.002

Source: Fieldwork Survey, 2023.

5. CONCLUSION

The research hitherto has revealed the significant role mobile phone (GSM) usage plays in the economic development and travel demand within Ibadan metropolis. The analysis of multiple regression shows that there was a strong relationship between mobile phone on travel demand and economic development. It was recommended that in order to meet travel demands and mobility needs of a society particularly in urban areas, road users are to make phone calls than trip frequency which in return reduces the amount of traffic flow as well as travel cost along the road network.

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