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EVALUATION OF EFFICIENCY IN THE OPERATIONS OF PUBLIC AND PRIVATE ROAD TRANSIT SERVICES IN PORT HARCOURT REGION, NIGERIA

Kpalap, Sylvester Bebari Silva (Ph.D.)
Email: kpalapsilva@yahoo.com
Department of Geography and Environmental Studies, Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt, Rivers State
Prof. A. A. Obafemi,
Email: andrew.obafemi@uniport.edu.ng
Geography and Environmental Management, University of Port Harcourt, Rivers State

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Abstract:

Efficiency in operations of public and private road transport services is expected to be a sustainable solution for all major transport problems in Nigeria, but in most cases, they are not providing better travel options due to challenges faced in their operations. Inefficiency in the public and private road transportation system, however, escalated negative transport externalities that have an effect on both users and nonusers; and in some cases, left many travellers stranded when experiencing breakdown due to the poor rescue plan. To ascertain the level of efficiency in public and private road transit operations, data on passengers' preferences for their operations were gathered from assessment of respondents' responses to questions on functionalities (attributes) that determined efficiency in road transit system which include: safety, comfort, competence, availability, reliability, environmental consequences, traffic observance and technological advancement. Analysis of these attributes indicated that efficiency in the services of private road transit firms' stand greater with an average of 52% against 48% for public road transit firms. Thus, it recommended that their facilities be standardized, efficient, safe and comfortable for users, while the various tiers of government operating commercial transport, must embrace ideologies and positive actions that could advance their operations.

Keywords: Efficiency, Performance, Attributes, Transit Service, Port Harcourt Region

I INTRODUCTION

Efficiency in the movement of commuters and their goods play important role in the economic growth of cities and nations. It is mainly demanded to perform the intents of every other segment in the economy. It served as one of the indices for measuring the advancement of a nation. An efficient transportation network magnifies economic activities by improving accessibility and aids the movement of goods together with agricultural commodities in all the nooks and cronies of a nation (Amba in Adeniran, 2017). Movements of passengers, goods and chattels, as well as information, have always been fundamental components of human societies. It is a social service delivered with the aim of improving the well-being of the people. A well-performing transport system increase attraction and provide people with good access to economic and social opportunities, as well as an improved quality of life.

Efficiency in public and private road transport services is expected to be a sustainable solution for all major transport problems in Nigeria, considering it as the primary and only means of transport for a large section of society. Public and private road transport undertakings are striving to offer efficient and convenient travel. But in most cases, they are not providing better travel options due to numerous challenges faced in their operations.

Inefficiency in public and private road transportation systems however increases problems caused by road transport externalities which include: crashes, traffic congestion and emission of carbon dioxide. Unreliability in arrival or departure times is observed to be one of the key factors discouraging the populaces from using public transport (Nolan in Cantwell et al., 2009). Inefficiency in their operations does leave many travellers stranded when experiencing vehicle breakdown at certain times, due to poor rescue plans, thereby subjecting lives of travellers to hazard and risk of missing essential schedules/appointments at their destinations.

The commercial (public) transport services are operating on a sub-standard level. Some of these vehicles are unsecured with smoking engines emitting poisonous gases like carbon monoxide, nitrogen oxide, volatile compounds,

lead, etc., into the environment that poses threat to motorists, commuters and even to the flora as well as fauna (Oyesiku in Ojekunle, 2016). Inefficiency in their operations does leave many travellers stranded when experience vehicle breakdown at certain times, due to poor rescue planned. The issue of frequent stoppages associated with lifting of unticketed passengers while in transit, unnecessary increase in fare, lack of safety measures, ineffective time management system, and poor security net-work, are among the problems that constitute poor performance in the operations of public and private transport companies in Port Harcourt region. To overcome these problems that constitute poor performances (inefficiency) in operations of the two transit systems, call for an evaluation of service qualities/attributes that account for substantial differences in their level of efficiency.

Certain technical performance calculations could be predominantly useful in the analysis of global network performance, modal comparison, analysis, and evaluation by linking both physical attributes (length, distance, configuration, etc.) as well time-based attributes (punctuality, reliability, etc.) of networks. Several other indicators are presently used in measuring technical performance of freight and passenger transport which include: Passenger or freight density, Mean distance travelled, Mean per capita ton output, Mean utilization coefficient, while Transport time, Reliability, Punctuality and Load factor are grouped as cross-temporal analysis indicators (Rodrigue and Comtois, 2020). Hansson *et al.* (2019), grouped service quality attributes into eight areas. Such include Availability which is the degree of service provided in terms of geography, transport types, functioning hours, and regularity; accessibility as the right to use to the public transport system including interface with other transport systems; information as to how to support the planning and execution of trips, under normal situations and under irregular conditions such as delays; time as the length of trip period, which likewise includes adherence to agendas in the form of punctuality or orderliness; customer care as client attention, staff behaviours and attitudes; comfort by way of service features that make journeys relaxing, enjoyable, or productive; safety by means of the sense of personal protection from crime and accidents; and environment consequences as the ecological impact from the provision of public transport service.

Mayo and Taboada (2019), in their study, recognize factors like connectivity or reach, accessibility to a specific mode of transportation, information, time satisfaction, user attendance, comfort, security in addition to safety, as well as environmental impact to be significant in the commuter choice of transport mode. They likewise recognize the socio-demographic, built environment, latent attitudes, and trip characters to be an influential factor in choice mode of transport in lieu of long-distance, intercity travel. Reliability, privacy, comfort, availability, safety, and attitudes as key factors in the transportation preference of commuters in the Chicago area of the United States of America.

Knupfer et al. (2018) defined efficiency in transport as to how fast and consistently a trip could be completed by either public or private transit system. It becomes necessary to ensure that transport is efficient so that commuters will have confidence that they have a quick, reliable journey as functions of public transport in metropolises and municipal tends to increase.

İmrea and Celebia (2017), postulated that public transport setups and organization play an important role in ever-changing demand from private car ownership to more efficient modes of transportation and lessening congestion in transportation networks. With more and better public transport, metropolises can cut traffic congestion, foster social inclusion and lessen pollution.

Wojuade and Badiora (2017), identified lateness, dirty and unattractive stations, lack of safety and security, long waiting time, poor travel information, poor personnel behaviours and inadequate facilities for disabled persons as poor service qualities that cause the inability of public transport to attract new riders especially private car users. Understanding commuters' behavioural expectations after undertaking transit services is a vital task for public transit operators, to enable them to define the effective strategies of meeting passengers' needs, and thus maintained existing commuters as well entice new ones from other modes (Lai and Chen in Oña et al., 2016).

In evaluating urban public transport of twenty-one largest cities in Brazil, efficiency was defined as:

> A necessary condition that reflects the company's operating margins and effectiveness is the company's ability to reach its objectives regarding the service level. The efficiency and effectiveness of public transport are essential to people's daily lives and to guide public policy (Carvalho et al., 2015)

Mouwen (2015), in drivers of customer contentment with public transport services, opined that "customers' valuations of service rest on the balance between sacrifices and benefits in both monetary and non-monetary terms. Sacrifices and benefits are moderated by customers' perceptions and characteristics. The needs of individual customers (commuters) are a significant determinant factor of the level of satisfaction the commuters' experience and of repurchase intentions. Though these needs vary among individual customers, and they remained heterogeneous".

Sampaio et al. (2009) in the analysis of twelve transport systems from several countries in Europe and seven from Brazil stated that quality and efficiency in public transit systems could be analyzed based on factors related to the quality of the service required for good performance, which includes: system accessibility, travel time, trustworthiness, frequency, maximum load, vehicle characteristics, adequate information and support facilities. Rodrigue and Comtois (2020) in assessing the technical performance of different transport modes, equally hypothesized length, distance, a configuration in addition to punctuality, reliability as physical and time-based attributes used as indicators for measuring technical performance of freight and passenger transport. Sultana (2013) inefficiency analysis of public transit systems in Bangladesh, likewise posited that efficiency analysis is mainly dependent on labour, operating cost, and fleet size, in addition to vehicle kilometres as inputs and outputs in efficiency analysis of public transit systems. Wolff and Caldas (2018) in a model for evaluation of Brazilian road transport, equally developed an evaluation model of road transport infrastructure, to aid decision making in situations of choice amongst different alternatives of road transit schemes. The

model evaluated the positive relationship between the costs involved in infrastructure and the benefits generated in comparing road transport schemes.

The aforementioned scholars assessed efficiency with various attributes (qualities) enumerated above, but this study focuses on public and private road transit firms' efficiency with a view to examining the adoption of technological innovations like the use of tachograph and information and communication technologies (ICT) by the different road transit firms.

2.0 MATERIAL AND METHODS

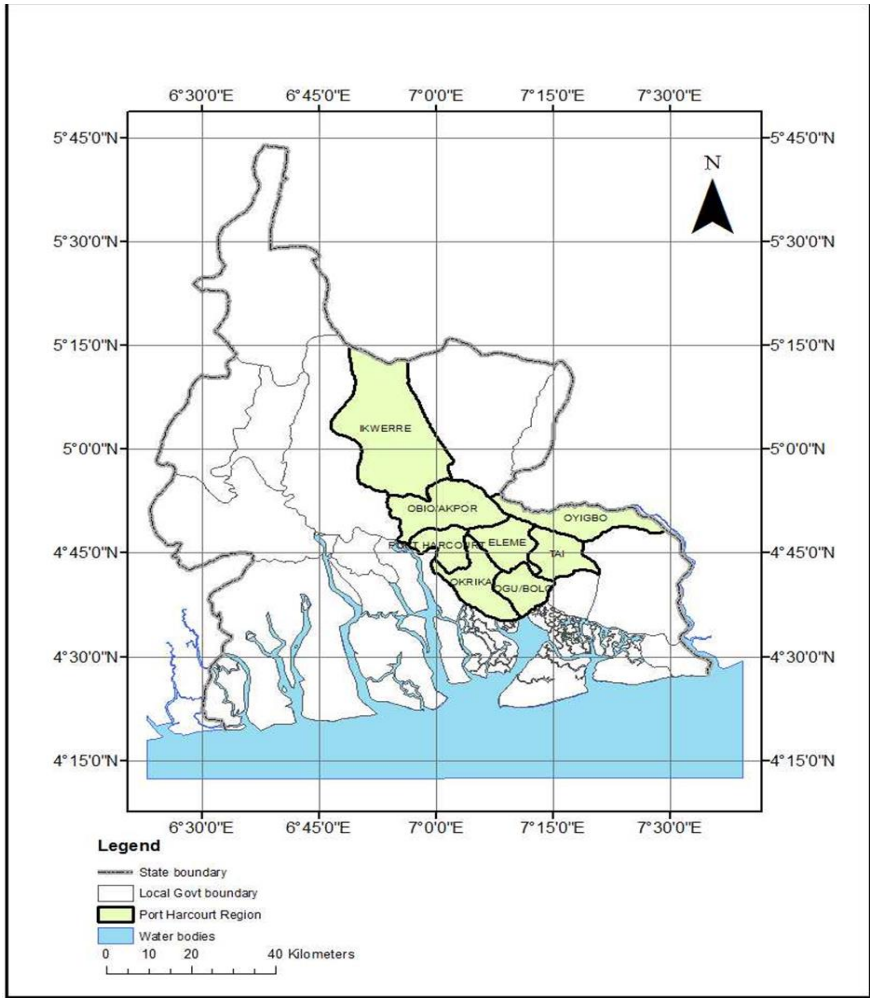

Fig. 1: The study area – Port Harcourt region in Rivers State

Port Harcourt region is the entire area undergoing review in this study. Port Harcourt region comprises the city itself and parts of the Obio/Akpor Local Government Area. It was highly congested being the major city of the state. During Governor Chubuike Amaechi regime, a law was passed by the State house of assembly, to spread the development of the Port Harcourt region to the surrounding communities as part of the effort to decongest the area with a name "Greater Port Harcourt" (Sangari, 2018). Port Harcourt region (Greater Port Harcourt) covered eight local government areas which include: Port Harcourt Local Government Area, Okrika, Obio/Akpor, Ikwerre, Oyigbo, Ogu/Bolo, Tai and Eleme Local Governments Area.

Population

The place of Port Harcourt region in Rivers State extends over eight local government areas and it covers a land area of 190,000 hectares which is approximately 1900 square kilometres (The Tide, 27/5/2012). National Population Commission of Nigeria has the population projection of 2016 for the eight local government areas as stated in the table below.

Table 1: Projected population of study area

S/No	Local Government Area	**Population** Census 26-11-1996	**Population** Census 21-3-2006	**Population** Projection 21-3-2016	**Population** Projection 21-3-2020
1	Port Harcourt	440,399	538,558	756,600	879168
2	Obio-Akpor	263,017	462,350	649,600	754,834

3	Oyigbo	85,334	125,331	176,100	204,628
4	Eleme	---	190,194	267,200	310,486
5	Etche	---	249,939	351,200	408,095
6	Ikwerre	125,385	188,930	265,400	308,394
7	Okrika		222,285	312,300	362,892
8	Ogu–Bolo		75,282	105,800	122,939
Total		**914,135**	**2,052,869**	**2,884,200**	**3,351,436**

Source: *Researcher's population analysis of 2020.*

Analysis from population census of March 21, 2006 and population projection of March 21, 2016 National Population Commission of Nigeria web, and National Bureau of Statistics web as in Table 1.1 above gave room for population projection of March 21, 2020. The population projection for 2016 was based on 40.4996% growth in ten years for each local government area. It implies that the population projection for each year was centred on 4.04996% growth. Going by this projection, the population of Port Harcourt region as at March 21, 2020, was Three million, three hundred and fifty-one thousand, four hundred and thirty-six (3,351,436) persons against Two million, eight hundred and eighty-four thousand, two hundred (2,884,200) projected for March 21, 2016. The population census figure of November 26, 1991, and March 21, 2006, were Nine hundred and fourteen thousand, one hundred and thirty-five (914,135) and Two million, fifty-two thousand, eight hundred and sixty-nine (2,052,869) persons respectively. These estimations epitomize the agglomeration of the Port Harcourt region, which typically includes all urban inhabitants in addition to nearby suburban areas. The route network structure of Port Harcourt road transportation has an interconnected system across most Local Government Areas in Rivers State and another state of the federation.

The descriptive survey research design was the technique used in collecting and analyzing information about the quality of services offered by both public and private transportation enterprises operating in the Port Harcourt region. However, data on passengers' preferences for public or private road transit operations were gathered from assessment of respondents' responses to questions on functionalities (attributes) that determined efficiency in road transit system which include: safety, comfort, competence, availability, reliability, environmental consequences, traffic observance and technological advancement. In determining the population for this study, data on the volume of passengers travel were taken from various terminals of public and private road transport firms operating in the Port Harcourt region amounted to Twenty Two Thousand, Five Hundred and Seventy-Nine (22,579) from One Thousand, Five Hundred and Forty-Five (1545) public and private road transit vehicles. A viable thirty per cent (30%) of the population was drawn from both public and private transit firms as the study population amounted to Eighteen Thousand, Six Hundred and Eighty-Four (18684). This figure (18684) was substituted into Taro Yamani statistical formula to determine the number of respondents among commuters in both public and private transit vehicles. Thus, the sample population is 400 respondents. The questionnaire was the main tool used for the gathering of information from respondents, and data collected were analyzed with the use of statistical methods.

II RESULTS AND DISCUSSION

Respondents' rating of attributes used in measuring efficiency in public and private road transit operations

Presentation of respondents' rating of each attribute used in measuring efficiency in public or private road transit operations was based on a comparison of performances between the two transit systems. Respondents indicated their opinion by marking what conform to their perception concerning each attribute. A summation up of respondents' ratings from three hundred and seventy-four (374) that returned the questionnaire filled, shows the ranking of the various attributes used in measuring the level of efficiency for public and private road transit firm's services with their percentage (%) in Table 2.

Table 2: Level of efficiency in the two road transit firm's services

S/No	Attributes	Public Transit	Private Transit	Total
1	Safety	165 (44%)	209 (56%)	374 (100%)
2	Comfort	150 (40%)	224 (60%)	374 (100%)

3	Competence	142 (38%)	232 (62%)	374 (100%)
4	Availability	168 (45%)	206 (55%)	374 (100%)
5	Reliability	247 (66%)	123 (33%)	374 (100%)
6	Environmental Consequences	217 (58%)	157 (42%)	374 (100%)
7	Traffic observance	161 (43%)	213 (57%)	374 (100%)
8	Tech. advancement	175 (47%)	198 (53%)	374 (100%)
	Average	**178 (48%)**	**195 (52%)**	**374 (100%)**

Source: *Researcher's field Survey of 2019*

Analysis of Table 2 above shows that efficiency found in the service of private road transit firms are relatively higher than their counterpart operating under the auspices of public road transit firms, with a gap of four per cent (**4%).**

Technology advancement as an attribute for measuring efficiency in public and private road transit firms' vehicles

Commuters within the study region saw the introduction of tachograph and information and communication technology (ICT) into commercial vehicles as technology advancement that brought new faces to the transportation sector. It is an indication that the transportation system is undergoing a dramatic change. New transit firms are developing applications that will aid the delivery of affordable transport services within the areas. Transportation technological innovations in transit firms' operations, helps to make the system even more effective, useful, and cost-efficient.

Measuring efficiency in public and private road transit firms' vehicles with technological devices

Commuters' perception in relation to the use of technological devices in public or private road transit firms' vehicles functioning in the study was evaluated based on the use of tachograph and information and communication technologies (ICT) in transport systems. Tachographs were used in both transit systems to advance drivers' working conditions besides road safety while Information and communication technologies (ICT) were used to provide commuters with access to travel information (arrival/departure time, transit fare, booking/payment, and communicate travel patterns), as well provides drivers with traffic information. Table 3 below shows respondents' ranking of the use of technological devices in public and private road transit systems.

Table 3: The use of the technological device by the two transit firms.

No	Transit	Tachograph	ICT (Travel information)
1	Public	120 (32%)	172 (46%)
2	Private	254 (68%)	202 (54%)
	Total	374(100%)	374 (100%)

Source: *Researcher's field Survey of 2019*

Using technological advancement in measuring efficiency in public and private road transit firms' services as indicated in Table 3 shows that, 32% of respondents' responses noticed the use of tachographs in public transit firms' vehicles against 68% for private transit firms' vehicles. In the area of information and communication technologies (ICT) introduced into public and private road transit firms' services, respondents' responses indicated that 46% of the commuters sampled, noted its presence in public transit firms' vehicles against 54% for private transit firms.

Tachograph for advancing drivers' working conditions

The use of tachographs to advance drivers' working conditions of public and private road transport systems were seen by respondents as means of aiding compliance to traffic rules/regulations. Tachograph as a technological device fixed into a vehicle, routinely records the transit system speed and distance, along with the driver's activity in motion. Table 4 underneath shows how tachograph advances drivers' working conditions in the public and private road transport system.

Table 4: Ranking tachograph advances of drivers' working conditions.

S/No	Transit System	Advances of driving conditions	Percentage
1	Public	120	32%
2	Private	254	68%
	Total	**374**	**100%**

Source: *Researcher's fieldwork of 2019*

In ranking of tachograph aid in advancing drivers' working conditions of the public and private road transport system, Table 4 presents 32% respondents in support of tachograph aid for public transit firms' operators and 68% for private transit firms' operators.

Tachograph support to road safety

Commuters observed that tachograph installed the transit systems limit the speed of the vehicle when exceeded the prescribed speed bound. It monitors and ensures that appropriate breaks are taken to limits on the working hours of drivers of certain vehicles, for instance, buses and trucks. It as well ensures that appropriate breaks are taken which could be checked by the employers, police and other authorities with the help of the tachograph. Table 4.35 shows how respondents perceived that tachographs aided the safety of public and private road transit vehicles.

Table 5: Tachograph support to road safety.

S/No	Transit System	tachograph aid to road safety	Percentage
1	Public	183	49%
2	Private	191	51%
	Total	**374**	**100%**

Source: *Researcher's fieldwork of 2019*

In rating how tachograph aided safety of public and private road transport vehicles with other road users, Table 5 presents 49% of respondents in support of tachograph aid for public transit firms' vehicles and 51% for private transit firms' vehicles.

Information and communication technologies (ICT) in optimizing transport operations

Information and communication technologies (ICT) provides commuters with access to travel information, road pricing or safety applications. It aided transit systems in Real-time route guidance and hazard warning. However, commuters alleged that the impacts of ICT sensed from both public and private road transport systems are not equivalent. Table 6 underneath indicated how commuters sensed the impact of ICT in the transit systems' operations.

Table 6: Impact of ICT on the two transit systems.

S/No	Transit System	Impact of ICT	Percentage
1	Public	146	39%
2	Private	228	61%
	Total	**374**	**100%**

Source: *Researcher's fieldwork of 2019*

Analysis impact of ICT on the two transit systems as shown in Table 6 directly above indicated that only 39% of the respondents sensed the positive effects of information and communication technology as technological advancement in the services of public road transit firms, while 61% sensed it in private road transit firms' operations.

ICT in conveyance as intelligent transportation systems (ITS)

ICT as Vehicle Information and Communication System (VICS) provides drivers with traffic information on optimization of travel routes and freight arrival times through intelligent transportation systems (ITS). Commuters fancy transit systems with intelligent transportation systems (ITS) that provide apps for mobile payments services operated under financial regulation and performed from or via mobile devices. Instead of paying with cash, check, or credit cards, commuters use mobile transfer to pay for a wide range of transport services. How of information and communication technology has been used as intelligent transportation systems (ITS) by both public and private road transit operators are displayed in Table 7 underneath.

Table 7: Intelligent transportation systems in the two transit systems.

S/No	Transit System	Intelligent transportation systems	Percentage
1	Public	176	47%
2	Private	198	53%
	Total	**374**	**100%**

Source: *Researcher's fieldwork of 2019*

Respondents' responses on the use of intelligent transportation systems as technological advancement in transport operations by the two transit systems were denoted with 47% for public road transit firms' vehicles against 53% for private road transit firms' vehicles.

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III DISCUSSION OF FINDINGS

Analysis of efficiency in public or private road transit services

From the analysis of factors used in evaluating efficiency in public or private road transit services, the various attributes were measured through commuters' perception of transit service qualities offered. Observations show that efficiency in private firms' operations is greater than public transit corporations. It signified that services offered by private transit firms gave commuters confidence that they can have a quick, reliable journey to their preferred destinations. This confidence in commuters is in line with Knupfer et al. (2018) in defining efficiency in transport as to how fast and consistently a trip could be completed by either public or private transit system.

In the area of technological advancement, tachograph installed in the transit vehicles aided drivers' working conditions besides road safety, while information and communication technologies (ICT) used by the two transit systems, provided commuters with access to travel information (arrival/departure time, transit fare, booking/payment, and communicate travel patterns), as well provides drivers with traffic information as avowed by Gosling (2017) that information and communication technologies (ICT) have considerable standing for transport systems, as they offer access to travel information, planning tools, opportunities to share transport modes, to work at-a-distance, compare transport mode cost, make payment, improve safety and health, and to communicate travel patterns. However, respondents' opinion on the usage of these technological devices shows that private transit firms installed the two advancement instruments in their vehicles more than public road transit firms.

IV CONCLUSION AND RECOMMENDATIONS

It was observed that both government and private sector involvement in the provision of transport infrastructure and their performance in transport services supply across the nation, underscores the fundamental function of transport in the advancement of Nigeria as stated by Afolabi, (2016). Inefficiency in the provision of public transport services conversely increases problems caused by road transport externalities in the area of crashes, traffic congestion and emission of carbon dioxide, which resultant effects are mostly loss of lives and insecurity of passengers' luggage/goods. To advance the services of some public transport buses operating in the region perceived as substandard by commuters, their facilities should be standardized, safe and comfortable for users. In the area, the operational transformation of public transit corporations to the level that their services could be termed efficient, the various tiers of government operating commercial transport, must embrace ideologies and positive actions that could advance their operations.

REFERENCES

1. Adeniran, D. O. (2017). Efficiency of Nigerian transport system: lessons derived from the developed nations. *Developing Country Studies: www.iiste.org 7(2), 2017*
2. Cantwell, Caulfied and O'Mahony (2009). Examining the factors that impact public transport commuting satisfaction. *Journal of Public Transportation,* 12 (2), 2009.
3. Carvalho, Syguly and Silva (2015). Efficiency and effectiveness analysis of public transport of Brazilian cities. *Journal of Transport Literature,* 9(3), 40-44
4. Hansson, J., Pettersson, F., Svensson, H. and Wretstrand, A. (2019). Preferences in regional public transport: a literature review. *European Transport Research Review,* (2019) 11:38
5. İmrea, S. and Celebia, D. (2017). Measuring Comfort in Public Transport: A case study for İstanbul. *Elsevier B.V. Transportation Research Procedia 25 (2017) 2441–2449*
6. Knupfer, S M., Pokotilo, V. and Woetzel, J. (2018). Elements of success: Urban transportation systems of 24 global cities. *McKinsey & Company.* www.mckinsey.com
7. Mayo and Taboada (2020). Ranking factors affecting public transport mode choice of commuters in an urban city of a developing country using analytic hierarchy process: The case of Metro Cebu, Philippines. [Online]Available: *https://doi.org/10.1016/j.trip.2019.100078*
8. Mouwen, A. (2015). Drivers of customer satisfaction with public transport services. *Transportation Research Part A, 78 (2015) 1–20.*
9. Ojekunle, J. A. (2016): Operational characteristics of public transportation in federal capital territory, Abuja Nigeria. *FUTA journal of management and technology*, *maiden edition,* 121-136
10. Oña, et al. (2016). Transit passengers' behavioural intentions: the influence of service quality and customer satisfaction. Taylor & Francis & Hong Kong Society for Transportation Studies Limited. *Journal Transportmetrica A: Transport Science 12(5), 385-412*
11. Rodrigue, J. and Comtois, C. (2020). Transport technical and economic performance indicators. The geography of transport systems: the spatial organization of transportation and mobility. *New York: Routledge, (4), 56*

12. Sampaio, B. R., Neto, O. L. and Sampaio, Y. (2009). "Efficiency Analysis of Public Transport Systems: Lessons for Institutional Planning," *47th Annual Transportation Research Forum, New York.*
13. Sangari, S. S. (2018). The Impact of Road Transport Infrastructure Development in Port Harcourt Metropolis. *A Published Thesis Submitted to Postgraduate School Federal University of Technology, Owerri in Partial Fulfilment of the Requirements for the Award of Masters of Business Administration (MBA) in Transport Management Technology*
14. Sultana, N. (2013). Efficiency Analysis of Public Transit systems in Bangladesh: A Case Study of Dhaka City. *A published thesis presented to the University of Waterloo in fulfilment of the thesis requirement for the degree of Master of Arts in Planning Waterloo, Ontario, Canada*
15. The Tide (2010). Dawn of Competitive Transport in Rivers. Online [available] *http://www.thetidenewsonline.com/2010/01/10/dawn-of-competitive-transport-in-rivers-2*
16. The Tide (2012). The Greater Port Harcourt Project …Myth or Reality? Online [available] *http://www.thetidenewsonline.com/2012/05/27/the-greater-port-harcourt-project-%E2%80%A6myth-or-reality/*
17. Wojuade and Badiora (2017). Users' satisfaction with public transport operations in Ibadan, Nigeria. *The Journal of Social Sciences Research, 3(9), 88-96*
18. Wolff, M. G. and Caldas, M. A. Farah (2018). A Model for the Evaluation of Brazilian Road Transport: A Sustainable Perspective. *Journal of Advanced Transportation 2018 (5274789), 12*