



# **The Chartered Institute of Transport Administration of Nigeria {CIOTA}**

**Established in 1986 | Chartered by Act No. 27 of 2019**

Premier transport professional body, with the responsibility of advancing the study, training and regulating the practice of transport management and administration in Nigeria in all its ramifications

## **AFRICAN JOURNAL OF TRANSPORT (2025)**

## **EDITORIAL TEAM**

1. Editor-in-Chief: Prof. I. C. Ogwude
2. Associate Editor: Prof. M. S. Stephens (FUTA, Ondo)
3. Managing Editor: Dr A. A. Akanmu (Oke-Ogun, Oyo)
4. Prof. Umar Adam Katsayal (Federal University of Transportation, Daura)
5. Prof. B. A. Badejo (LASU, Lagos)
6. Prof. C. C. Ibe (FUTO)
7. Prof. E. E. Okoko (Uni. Calabar)
8. Dr. K. Opeifa

## **BOARD OF ADVISERS**

1. Dr. Segun Obayendo (Chairman)
2. Prof. Samuel Odewumi
3. Prof. O. I. Akpoghomeh
4. M.D. NRC, Dr Kayode Opeifa
5. DG. NCAA, Captain Chris Ona Najoma
6. MD. NPA, Dr Abubakar Dantsho
7. MD. FAAN, Mrs Olubunmi Oluwaseun Kuku
8. DG. NIMASA. Dr. Dayo Mobereola

## TABLE OF CONTENT

1. Perceived Effects of Transportation Land Use on Mobility Crisis in Selected Nigerian Cities Ayobami Ademola Akanmu<sup>1</sup>, Umar Obafemi Salisus<sup>2</sup>, and Sekinat Motunrayo Sanni<sup>3</sup> Department of Transport Planning and Management, The Oke-Ogun Polytechnic, Saki<sup>1</sup>, Department of Urban and Regional Planning, Olabisi Onabanjo University, Ago-Iwoye<sup>2</sup>, Transport and Logistics Limited, Ibadan<sup>3</sup>
2. Perceived Satisfaction with Quality of Travel Modes for Tourism Activities in Lagos State, Nigeria Umar Obafemi Salisus <sup>1</sup> , Samuel G. Odewumi <sup>2</sup> Forson Ibrahim Abdul-Azeez <sup>2</sup> Department of Urban and Regional Planning, Olabisi Onabanjo University, Ago-Iwoye <sup>1</sup>, School of Transport and Logistics, Lagos State University, Ojo
3. Developing Strategies for Managing Electoral Logistics in Nigeria Ibraheem Forson Abdul-Azeez<sup>1</sup> , Samuel G. Odewumi<sup>1</sup> , Charles O. Asenime<sup>1</sup> , and Babatunde O. Kumolu-Johnson<sup>2</sup> Department of Transport Management<sup>1</sup>, and Department of Business Administration<sup>2</sup>, Lagos State University, Ojo
4. The Impact of Logistics Out-Sourcing Activities on the Organisational Performance of Nigeria's Manufacturing Industry Chijioke Udechukwu Akpudo <sup>1</sup> and Yoade Temitayo <sup>2</sup> Department of Logistics and Transport Technology, Federal University of Technology, Akure, Nigeria<sup>1</sup>, Department of Logistics and supply chain management, Sheffield Hallam University<sup>2</sup>
5. Service Quality, Willingness-to-repurchase, and the Mediating Functions of Satisfaction and Value-for-money: Study of Domestic Airlines in Nigeria Adetayo Olaniyi Adeniran; Mobolaji S. Stephens; Ikpechukwu Njoku Department of Logistics and Transport Technology, Federal University of Technology, Akure
6. Evaluating the Significant Drivers of Domestic Airline Failures in Nigeria: an Analytical Evidence Okwudili Ben Sidiq<sup>1</sup> , Mobolaji S. Stephens<sup>2</sup> , Chijioke U. Akpudo<sup>2</sup> , and Funto O. Kanyio<sup>2</sup> Bamidele Olumilua University of Education, Science and Technology Ikere-Ekiti<sup>1</sup>, and Department of Logistics and Transport Technology, Federal University of Technology, Akure<sup>2</sup>

7. Rail Passenger Satisfaction Factors: The Mediating Effect of Word of Mouth  
Olayiwola Mojeed<sup>1</sup> , Seyed Mohammadreza Ghadiri<sup>1</sup> , and Olorunnimbe,  
R.O<sup>2</sup> Malaysia University of Science and Technology<sup>1</sup> and School of  
Transport and Logistics, Lagos State University, Nigeria<sup>2</sup>
8. Driver Behaviour in Developing Countries: Evidence from Modelling Anger  
and Aggressive Performance of Nigerian Drivers on Inter-city Trips  
Innocent C. Ogwude,<sup>1</sup> Uche S. Ogwude<sup>2</sup> and Sikiru B. Balogun<sup>3</sup>  
Department of Transport and Marine Logistics, Nigeria Maritime University,  
Okerenkoko<sup>1</sup>, Aston Business School, Aston University, Birmingham and  
Federal Road Safety Corps, Abuja.
9. The Challenges of Urban Mobility in Kogi State, Nigeria. Samuel O.  
Olorunfemi<sup>1</sup> , Enobng E. Okoko<sup>2</sup> , and Kolawole T. Gbadamosi<sup>1</sup> Department  
of Logistics and Transport Technology, School of Logistics and Innovation  
Technology, Federal University of Technology, Akure<sup>1</sup> and Department of  
Urban and Regional Planning, University of Calabar, Calabar<sup>2</sup>

## **The Impact of Logistics Out-Sourcing Activities on the Organisational Performance of Nigeria's Manufacturing Industry**

**Chijioke Udechukwu Akpudo<sup>1</sup> and Yoade Temitayo<sup>2</sup>**

Department of Logistics and Transport Technology,  
Federal University of Technology, Akure, Nigeria<sup>1</sup>,  
Department of Logistics and supply chain management,  
Sheffield Hallam University<sup>2</sup>

### **ABSTRACT**

*In the manufacturing industry, logistics outsourcing has become a strategy adopted by industry managers to ensure the effective, successful, and timely execution of customer needs. The discovery of logistics outsourcing as a strategy makes many manufacturing industries move some of their non-core activities to third-party logistics providers. However, the question is, what is the impact of this strategy on the performance of the manufacturing industry? Therefore, at this point, the study aims to examine the impact of Logistics out-sourcing activities on the Organizational performance of Nigeria's Manufacturing Industry. A case study of Friesland Campina WAMCO Nigeria plc. The study objectives are to examine the impact of transport and distribution logistics outsourcing activities on the organisational performance of the industry. The data for the study were obtained from 98 employees, including managers and directors, who work at Friesland Campina WAMCO Nigeria plc. Descriptive survey research was conducted using a structured questionnaire and interview and administered via e-mail and by sending questionnaire links to a WhatsApp platform group of the respondents. The data was analysed using correlation analysis to reveal the relationship between the selected variables. The study established a positive relationship between transport and distribution outsourcing and the performance of the Nigerian manufacturing industry. The recommendation is that when adopting the strategic decision to outsource some non-core activities to 3PL, there is a need to consider whether the operational costs of outsourcing are excessively high.*

**Keywords:** Logistics, Outsourcing, performance, manufacturing industry, Transport, Distribution.

### **1. Introduction**

Logistics, which involves the flow of goods and services from the point of origin to the point of consumption, is part of supply chain management, whose core objective is to plan and execute supply chain activities to meet customer needs. Most organisations across the world, due to the rapidly changing environment, have observed that logistics services play an essential function in the operational efficiency of an organisation. The emergence of globalisation and competitive pressure in the world has forced many managers to adopt various strategies, such as outsourcing organisational logistic activities to third-party logistics

providers (whom they believe to be the best in those activities) to achieve great results. According to Jean (2019), the term "outsourcing is defined as the management strategy adopted by a company to assign some non-core company activities to more specialised service providers so that the company can focus attention and concentrate on the core business or primary activities. Irina et al. (2012) state several reasons firms adopt this business strategy (outsourcing). According to him, he established that cost reduction and the achievement of best practices are the main motives behind the adoption of this strategy. Nowadays, logistics outsourcing is one of the most widely adopted business strategies for achieving outstanding services to consumers in all sectors of the economy, both private and public. Globalisation has led numerous firms, like the manufacturing and construction sectors, to mention a few, to outsource some of their non-core activities or services, such as transportation, distribution, warehousing, and inventory activities, to specialised 3PLs to place more emphasis on their competitive advantage. Muiruri and Iravo (2015) noted that logistic service in the manufacturing sector is not as good as required since logistics service is not a core activity of the manufacturing industry. Therefore, the manufacturing industry needs enormous logistical mechanisms and careful management for effective organisational performance. The core business of the manufacturing industry is to turn raw materials into finished goods. However, they must still procure raw materials, manage inventory, and transport them to distribution centres. All these other activities are non-core and can be outsourced so that the manufacturing industry can focus on its core function, production. Based on that, logistic outsourcing methods were introduced in the manufacturing industry in the early nineties due to the existing position impact it created in the construction industry. According to Waters and Rinsler (2014), the total number of firms in the manufacturing industry adopting outsourced operations is increasing yearly due to benefits such as cost reduction, competitive benefit, experience gained, risk reduction, and quality provided. Other benefits include launching new possibilities, experiences, contracts, and sophisticated thinking methods (Waters & Rinsler, 2014).

However, since the introduction of logistics outsourcing into the manufacturing industry due to numerous advantages, the impact on the performance of the Nigerian manufacturing industry has not been established. Before the adoption of outsourcing strategies in the sector in 2012 by most of the manufacturing industry in Nigeria (NBS, 2013), it was revealed that the gross domestic product (GDP) contribution of the sector in Nigeria was 12.3% in 2006 from 2009 to 2012, the contribution increased by 14.3%, 15.1%, 15.2%, and 17.2%, respectively. This contribution was made before outsourcing activities were introduced in the Nigerian manufacturing industry. This contribution has not changed since the introduction of these activities. For instance, according to the data released by the Nigeria Bureau of Statistics (Nigeria Bureau of Statistics, 2013), the contribution of the manufacturing and construction industries to GDP was as low as 11.5% in 2013. However, in 2014 and 2015, it rose to 16.2% and 16.9%, respectively. Although the sudden decrease in 2013 was attributed to the adverse effects of the crunch experienced during the period (NBS 2013), In a recent report by Damilola (2023), it was shown that infrastructural activities in the manufacturing sector in Nigeria were reduced to 7.5 per cent of their contribution to the Nigerian GDP in the first quarter of 2023.

Another report by Yinka (2023) established that the Nigerian manufacturing sector, during the past five years spanning from 2018 to 2022, recorded an aggregate contribution of 32.346 trillion to the Nigerian economy, representing 9 per cent. The sudden drop from 14.3% in 2012 to 7.5% in 2023 during and after the implementation of this strategy is the reason behind the study.

Jean (2019) revealed that the outsourcing concept in Nigeria, especially in the manufacturing industry, has not received much attention and support, which can be said to be favourable and can enhance organisational growth and performance in Nigeria. The manufacturing sector, therefore, needs enormous logistical approaches, which require good management supervision for effective organisational performance. Although several studies, like Bhattacharya et al. (2013), Kroes and Ghosh (2010), and Mulama (2014), show that logistics outsourcing has a positive impact on organisational performance,

Secondly, research on the impact of logistic outsourcing activities on the Nigerian manufacturing industry is scarce. Some of the completed studies done in respect of this strategy fail to look at the influence of transport, distribution, warehouse, and inventory outsourcing activities on the performance of the manufacturing industry in Nigeria. Hence, there is a need for further studies to mitigate this literature gap. Therefore, the study aims to examine the impact of transport and distribution logistics outsourcing activities on the organisational performance of the Friesland and Campina WAMCO Nigeria plc.

## **2. Literature Review**

### **2.1 Logistics outsourcing and organisational performance**

Jenatabadi (2018) defines organisational performance as a collection of financial and non-financial indicators that provide insight into the extent to which set goals and outcomes have been achieved. Cocoa & Alberti (2010) affirmed that organisational performance can be measured using the following parameters: efficiency, effectiveness, quality, quality of life, productivity, profitability, innovation, and learning. According to Cocoa & Alberti (2010), organisational effectiveness refers to an organisation's capacity to carry out its objectives correctly and at the correct cost. Also, efficiency refers to properly using resources to achieve predetermined goals. The ability to successfully meet or surpass customer expectations is called quality. Productivity is the ratio of output to input; quality of work life is the affective response of employees towards their work and organisation (Pavlov & Bournce, 2011). According to Pavlov and Bournce (2011), profitability is the excess of revenues generated over the costs of the product; innovation is the development of a new idea or improvement of a product for better service (Rhee *et al.*, 2010); and learning is defined as the ability of an organisation to acquire more knowledge to improve or expand the use of the product (Liao & Wu, 2010); looking at the manufacturing industry, organisational performance refers to the efficacy and efficiency of the firms to 'established and meet standards, specifications, objectives, and goals; secondly, guaranteeing the satisfaction of all pertinent stakeholders, and upholding relevant laws and regulations.

## **2.2 Logistic Outsourcing Activities in Manufacturing Industry**

Logistics performance involves the practical trade-off relationship between quality and cost. This assumption is equal to and parallel to the service quality, which must be highly utilised at the lowest logistics costs. As things stand, many companies' transportation costs are currently the highest logistical cost. The cost of transport is usually seen as freight charges. Transportation refers to the movement of raw materials or finished goods from one source to the point of need (Chopra & Meindl, 2007). Knowing when the material will be delivered is essential during the production of any product in the manufacturing industry. Regarding customer satisfaction, short transit times and on-time delivery give transport costs a new dimension. In the manufacturing industry, transportation contributes to and plays a significant role in manufacturing activity and its supply chain (Ballou, 2007). Transportation of commodities in the manufacturing industry is a multi-disciplinary process whereby materials, equipment, and other items are loaded and unloaded, transported, packed, and allocated from place to place (Mariuz Szuster, 2010). Before manufacturing any product occurs, organisations seek and determine the appropriate mode, scheduling time, inexpensive cost, and high-quality guaranteed delivery of material supply. They perform these activities by the third party directly involved in them by providing those services. In most manufacturing industries, especially in Nigeria, delivering raw materials and shipping finished goods or products is not essential to the core competencies (Sherifat *et al.*, 2022). Therefore, it is an activity to outsource. An example of a transport outsourcing provider is a freight forwarder. Freight forwarders are like international agents who facilitate logistics services from the point of sale or purchase to the destination. Sometimes, he covered the following activities: transportation, insurance, and clearance of goods from the port.

## **2.3 The Impact of Logistics Outsourcing on Organizational Performance**

However, several researchers have examined the concept of logistics outsourcing, its benefits, and its impact on organisational performance in various sectors of the economy in developed countries. For example, in the recent study by Akindele (2023), who examined the effect of outsourcing logistic activities of three indigenous shipping industries in Nigeria, observed that logistic outsourcing in the shipping industry has a significant impact, especially on inventory control and the purchase of shipping fuel.

In Nigeria, studies like Akindele (2018) study the impact of logistics outsourcing activities on the performance of the Nigerian shipping industry. The study focuses on crewing outsourcing, bunker supply outsourcing, and warehousing outsourcing in the shipping industry. It was established in the study that cost reduction, lack of technology, lack of personnel, lessening operational risk, and improving productivity and efficiency are contributing factors influencing outsourcing activities in the Nigerian shipping industry. Finally, the study also established a positive relationship between crewing outsourcing, bunker outsourcing, and warehousing outsourcing and the performance of the Nigerian shipping industry. Sherifat *et al.* (2022) examined the effect of logistics outsourcing on the operational performance of the selected manufacturing companies in southwestern Nigeria. The study was done using a descriptive survey design. The study revealed that logistics outsourcing activities significantly



affected the operational performance of the manufacturing companies selected in southwestern Nigeria. The study establishes that logistics outsourcing significantly enhances the operational performance of manufacturing companies. Jenabata & Huang (2017) study the impact of logistic outsourcing on a firm's performance using 51 publicly traded firms as a case study. Unlike most previous studies on outsourcing activities, the study used annual report data to measure the firm's performance. The analysis shows some evidence that outsourcing positively impacts the performance of the traded firms. Siquiet (2015) examined the relationship between distribution outsourcing logistics and the organisational performance of 34 hotels in Sweden. The study shows a positive relationship between organisational effectiveness, productivity, profitability, quality, continuous improvement, quality of work life, and social responsibility levels. Bustinza et al. (2010) examined outsourcing, its competitive capabilities, and the performance of service firms in Spain. The study concluded that there is a positive relationship between outsourcing decisions and company performance resulting from the impact of outsourcing decisions. The recent study by Bhattacharya et al. (2013), titled "Outsourcing as a Key Debate for Organisational Performance," looks at five organisations in Australia as a case study. The key focus of the debate is how the parties (the receiver and the provider) involved in outsourcing services perceive outsourcing from different perspectives, for example, areas of convergence and divergence. The study revealed that several parties often split opinions regarding conflict among the parties, environmental unpredictability, information imbalance, and contract duration. In contrast, different opinions were based on the degree of the guideline, ingrate behaviour, mutual obligation of the parties, goal compatibility, and costs. Petter & Mats (2023), in their study on organising construction logistics outsourcing: a logistics strategy perspective, show that logistics capabilities at the strategic and tactical levels are the key to procuring construction logistics services successfully. Muiruri et al. (2015) determine the effects of outsourcing logistics services on operational efficiency in a DMKL Thika Branch case study. The study adopts a quantitative survey method with a sample of 45 employees. The study revealed that freight logistics, road transportation distribution, customs brokerage, packaging and removals, and warehousing are the logistic outsourcing activities adopted by the firms. Further findings show that logistic outsourcing positively impacts the firm's operational efficiency. Javed, Rafique, and Muhammad (2020) analyse the impact of outsourcing services in the Karachi construction industry. The study used qualitative and quantitative research methods to obtain data from 150 respondents. The results revealed a significant relationship between dependent and independent variables. Further analysis shows that heating, ventilating, or air-conditioning logistic services do not significantly impact organisational performance. In contrast, electrical, civil works, and transportation positively impact organisational performance. Otieno & Jackson (2020), in their study on the influence of outsourcing practices on the performance of construction projects in four public-level hospitals in Nakuru County, Kenya, the study adopted a descriptive survey design method as an appropriate method to achieve the stated objective. The study established a strong relationship between dependent and independent variables (outsourcing activities and performance). Diyuoh and Mensah (2014) conducted a study to determine the influence of supply chain management on the performance of Kasapreko Company Limited, using a sample of 200. The study findings revealed that the

company utilised supply chain practices for six years, from 2004 to 2010. Also, the study ascertained that supply chain practices, as shown in the sales trend, strongly and significantly affect the company's performance. The study listed inventory management, outsourcing, information sharing, and green supply chain practices as among the significant supply chain management practices. Mahulo (2015) conducted a study on supply chain management practices and performance, focusing attention on the cement manufacturing companies in Kenya. The study used the principal components analysis to determine the major supply chain practices adopted in the cement manufacturing industry in Kenya. The result established that all seven components measured in the study explain 84.55% of the performance of cement companies in Kenya. Furthermore, Tinney (2012) examines the relationship between supply chain attributes such as orientation, management, and collaboration and the effects of those concepts on organisational performance. The study employed only primary data collected using a questionnaire and interviews as the means of data collection. Out of the three attributes of the supply chain measured, orientation and collaboration were linked to organisational performance. In the study, Kaluki (2015) analysed supply chain management practices and service delivery using some selected humanitarian organisations in Kenya. The regression analysis results show a positive relationship between supply chain management and service delivery. The study also found that the employment of SCM in humanitarian organisations in Kenya has helped to save lives, enhance stability to respond to different magnitudes of disasters, improve resource utilisation, and reduce time spent responding to disasters. Clement and Daniel (2019) evaluated the impact of outsourcing transport logistics on organisational performance. Six alcoholic beverage-producing companies in Ghana were adopted using a mixed-research approach to address the study's objectives. The study results show that firm improvement, competition, global recognition, risk minimisation, and cost control or reduction are the reasons for outsourcing fast-moving consumer goods in Ghana. The study revealed that outsourcing activities, which help greatly reduce transport costs, lead to increased profitability for selected alcoholic beverage-producing companies in Ghana.

In conclusion of the review, the research mentioned above should have examined the influence of transport outsourcing, distribution outsourcing, or warehousing outsourcing services on the business performance of manufacturing industries in Nigeria.

### **3. Methodology**

For this study, a quantitative research approach was used because the study seeks to test a set of hypotheses, and the literature reviewed ascertains that the approach is an appropriate method for a study designed to analyse the theory through narrow hypotheses proposition and data-gathering to agree or disagree these hypotheses. The questionnaire used for the study was constructed using the feedback method. This means that the information used to formulate the questionnaire was obtained and developed based on the information from the target population. This method helps to ensure that respondents used in the study have enough information or expertise to answer the questions truthfully. The study population comprised logistics department employees of the Friesland Campina WAMCO Nigeria Plc.

### 3.1 Overview and Belief History of Friesland Campina WAMCO Nigeria (FCWN) Plc

Friesland Campina WAMCO Nigeria Plc is a multinational manufacturing company and one of Nigeria's fastest-moving consumer goods industries, located at Plot 7B, Acme Road, Ikeja Industrial Estate, Ogba, Ikeja, Lagos, southwest Nigeria. The company is an affiliate of Royal Friesland Campina in the Netherlands, the world's largest dairy cooperative. Since the company's establishment, it has been managed by three levels: top management, middle management, and low management. FCWN has been leading similar industries in providing high-quality dairy products through its powdered and evaporated milk brands, such as Peak Milk, Three Crowns, Coast, NUNU, and Olympic. Over the years, FCWN Plc has been involved in Nigeria by addressing three significant national challenges, such as nutrition security, sustainability, and good living for all Nigerians, and contributing to the nation's gross domestic product. The company operates an extensive distribution network across Nigeria's 36 states and the Federal Capital Territory, with about 3,000 permanent staff deployed in various locations nationwide. At the same time, the main branch has one hundred thirty (130) permanent staff as of the fourth quarter of 2023, as shown in Table 1 below.

**Table 1:** Number of staff at the Head Office

Staff categories	First quarter 2022	Second quarter 2022	Third quarter 2022	First quarter 2023	Second quarter 2023	Third quarter 2023	Fourth quarter 2023
Senior manager	11	11	10	11	11	11	11
Middle-level manager	15	15	13	15	14	15	15
Superior	40	40	40	39	39	37	37
Junior Staff	61	61	61	61	61	67	67
Total	127	127	124	126	125	130	130

**Source:** Friesland Campina WAMCO Plc staff strength report (2022- 2023)

The company operates under the following departments: maintenance and engineering department, finance department, marketing department, sales department, operations department, inventory management department, and transport department. The first logistics outsourcing activity for the company was in 2014, when the company outsourced some of the non-core activities, such as transport and distribution activities. FCWN Plc was selected as one of the first five leading fastest-moving consumer goods industries in Nigeria that are into transport and distribution outsourcing activities to an external third-party logistics provider. This study's population is all FCWN Plc staff working at their head office. The reason for choosing the head office is because they know what is happening in terms of outsourcing arrangements and their impact on the organisational performance of the industry. Therefore, a total of one hundred thirty (130) permanent staff as of the fourth quarter of 2023, as shown in Table 3.1, serves as the population of the study. In all, the study's sample size was determined using the Yamane (1967) technique. Descriptive and correlational analysis were employed in the data analysis process using SPSS version 25.0.

## 4. Discussion of Result

### 4.1 Social-economic Characteristics of the Respondents

The socioeconomic characteristics of the respondents were considered necessary in this study because the reliability of any study partly depends on the source of information or data and

the methodology adopted. Therefore, Figure 1 shows the gender of the study's seventy (70) respondents. The result indicates that 71% of the respondents are male, while the remaining 29% are female. The significance of this is that gender parity was achieved during the study; therefore, the responses obtained were from male and female respondents. This implies that both genders are well represented in the survey. Secondly, the result implied that women are on the rise and competing with men in Nigeria's manufacturing industry. This result contradicts the study of Obinna (2018), who recorded as few as 14% of female participants in the Nigerian manufacturing industry.

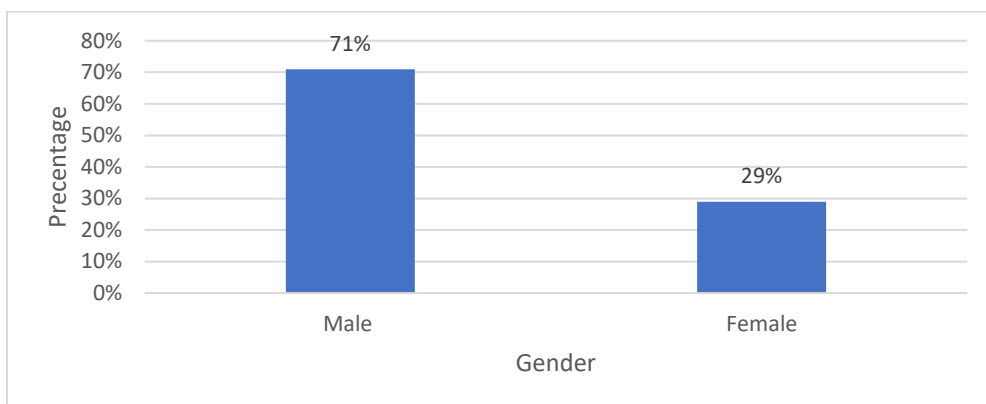


Figure 1 The gender of the respondents

Source: Author's finding (2024)

The respondents' education level was considered necessary because it ensured that respondents understood the questions on the theme of the study and, hence, gave reliability and confidence in the data provided. The analysis in Figure 2 shows that 36% of the respondents have a bachelor's degree certificate, 51% have a master's degree, 5% have a doctorate degree certificate, and 8% belong to others. In addition to their degree level, most possess professional certifications in various fields, making them qualified and worthy of their position in the organisation. The results show that most of the respondents acquired a master's degree certificate, and the least number of respondents had a doctorate. This implies that the information from the respondents was reliable and can provide an accurate picture of outsourcing activities in the company.

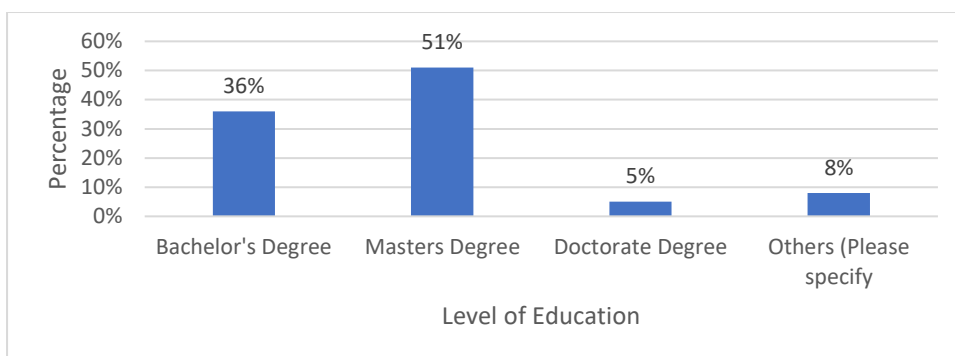


Figure 2 Level of Education  
Source: Author's finding (2024)

Figure 3 shows the result of the respondent's position in the company. From the result, 20% of the respondents are in the managerial category, 25% are supervisors, 38% are middle-level officers, and 17% belong to other categories of staff. The above result implies that most respondents are middle-level officers of the company, such as assistant managers, supervisors, and engineers. This was followed by the supervisor and managers of the company.

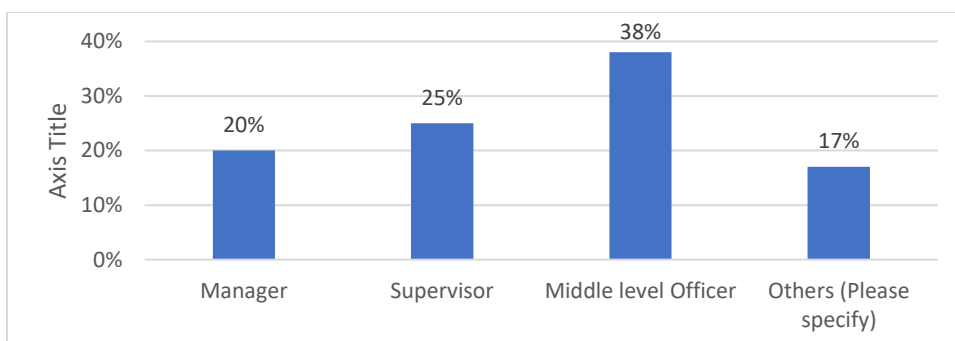


Figure 3: Respondent's position in the company  
Source: Author's finding (2024)

Furthermore, the study sought to know the respondents' years of experience. According to Figure 4, The study found that most respondents had worked in the industry for more than a year. The breakdown shows that 23% of the respondents had worked for less than one year. 64% of the respondents worked between 1 and 5 years, 8% worked between 6 and 10 years, and only 5% had worked for ten years and above. The significance of this result is that the respondents have been in the company long enough to understand various issues outlined in the topic of study and, as such, are in the best position to participate. Secondly, it strengthens the claim that the respondents chosen were the best to take part in the study based on their experience level. Thirdly, the experience level implied that they were knowledgeable in the subject area and other industry-related activities. Therefore, their responses to the study's propositions were valid and relevant.

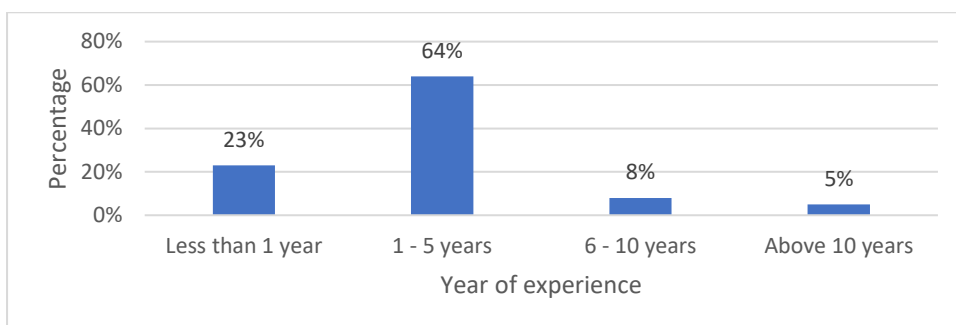


Figure 4 Years of experience  
Source: Author's finding (2023)

This section deals with the questions related to the objective of the study. Questions like “Does your company outsource non-core activities?” were asked. The results in Figure 5 show that 89% of the respondents attested that Friesland Campina WAMCO Nigeria (FCWN) plc outsourced some of their non-core activities to a third-party logistics provider. This finding is in line with the study of Sherifat et al. (2022).

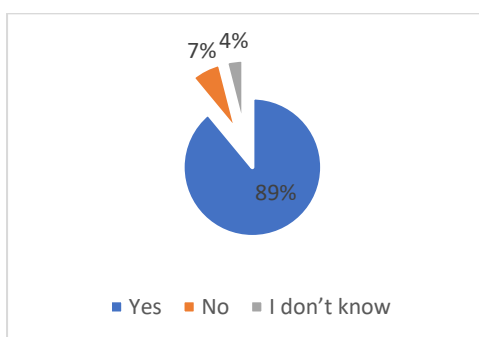


Figure 5 Does your company outsource non-core activities  
Source: Author's finding (2023)

Table 2 shows the descriptive analysis result with the mean value of the level of implementation of the outsourcing activities in FCWN. Based on the 5-point Likert scale used, such as not implemented, not sure, neutral, slightly implemented, and fully implemented, the mean value was interpreted as follows: 1.0-1.49 show very low implemented; 1.5-2.49 show low implemented; 2.5-3.49 show moderate implemented; 3.5-4.49 show extensive implemented; 4.5-5 show very large implemented.

The analysis in Table 2 indicates that most respondents affirm that all the listed outsourcing activities, such as transportation, distribution, warehousing, and inventory outsourcing, are fully outsourced, having scored a percentage of agreement more significant than 50%, respectively. The mean score of 4.0, 4.4, 3.8, and 3.6 implies that FCWN has implemented

non-core activities such as transportation, distribution, warehousing, and inventory for third-party logistics providers. However, these results indicate that the most outsourced component is distribution, followed by transportation.

**Table 2 Outsourcing logistics activities implementation in the FCWN plc**

Outsourcing activities	Not Implemented	Not sure	Neutral	Slightly implemented	Fully implemented	Mean Value
Transportation outsourcing	5%	2%	2%	25%	65%	4.0
Distribution outsourcing	4%	2%	1%	26%	67%	4.4
Warehousing outsourcing	11%	5%	4%	32%	49%	3.8
Inventory outsourcing	5%	6%	11%	31%	48%	3.6

Source: Author's finding (2024)

## **4.2 The Significance of Transport Outsourcing Activities on the Organisational performance of FCWN**

The study sought to assess the effect of transport outsourcing activities on the organisational performance of FCWN Ltd. From the results in Table 3; the descriptive statistical analysis results show that the participants strongly agreed that transport outsourcing leverages the Nigerian manufacturing industry with third-party logistics providers, with a mean of 3.5 within a standard deviation of 0.81542. This agrees with the study of Bore et al. (2020). The findings show that the participants strongly agreed that transport outsourcing activities help the organisation to ship large volumes of commodities at lower prices, with a mean of 3.7 within a standard deviation of 0.8523. Also, the study shows that the participants strongly agreed that transport outsourcing operations help transfer transportation risks to 3PL, with a mean of 3.8 within a standard deviation of 1.0672. The participants agreed that outsourced activities protect the organisation from penalties, with a mean value of 3.983.

Finally, the participants strongly agreed that transport outsourcing activities enhance operational control, with a mean value of 3.7 and a standard deviation of 1.0991. Going by the above result, most of the respondents strongly agree with the statement presented in the study on the impact of transport outsourcing activities on the performance of FCWN Ltd. During the interview session with the head of the transport department; he acknowledged that transport outsourcing strategies had a positive impact on the operation of the company. He affirmed the introduction of transport outsourcing to help FCWN Ltd. save costs such as penalties and charges during the shipment of commodities or products from port to port. Secondly, he also affirmed that transport outsourcing helps improve the company's productivity and service quality in the sense that the company focuses on its main activity, production. This implied that transport outsourcing services have an encouraging impact on the operational efficiency of the Nigerian manufacturing industry. Finally, the study affirmed that the FCWN opted for transport outsourcing due to its advantages and its possible influence on organisational performance, because it helps the organisation focus on its primary business line. According to Wisdom (2016), in his study on the impact of transport outsourcing

activities on organisational performance, the study established that without transport, there is no innovation.

Table 3: the effect of transport outsourcing on the organisational performance

Statements	Agree and strongly agree (Cumulative percentage)	mean	Std derivation
Transport outsourcing leverage Nigeria Manufacturing Industry with third-party logistics provider	61%	3.5	0.81542
Shipment of large volume of commodities with lesser prices	65%	3.7	0.8523
Transport outsourcing totally transfers the risks of transportation	71%	3.8	1.0672
Transport outsourcing activities protects the organisation from penalties	76%	3.9	1.0863
Transport outsourcing activities enhance operational control	72%	3.7	1.0991
<b>Average</b>		<b>3.72</b>	

Source: Author's finding (2024)

The respondents' ratings based on the statements above were cumulated to obtain a composite score for the variable, which was then correlated. The result of the correlation analysis using Pearson product-moment correlation between transport outsourcing and performance is presented in Table 4. The result revealed a positive relationship between transport outsourcing and the performance of FCWN, with  $r = 0.713$  and a  $p$ -value of 0.001. This implies that the performance of FCWN is associated with the level of transport outsourcing undertaken by industry management.

Table 4: Correlations between transport outsourcing and Performance of FCWN

		Transport	Performance
Transport outsourcing	Pearson correlation	1	.713**
	Sig. (2 tailed)		.001
	N	68	68
Performance of FCWN	Pearson correlation	.713**	1
	Sig. (2 tailed)	.001	
	N	68	68

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Author's finding (2024)

### 4.3 Assess the Significance of Distribution Outsourcing Activities on the Organisational Performance

Table 5 shows the descriptive analysis of the effect of distribution outsourcing on organisational performance. From the analysis, most of the participants (78%) agreed that distribution outsourcing activities help the organisation have access to specialised skills and technology, with a mean value of 4.3. This result is in line with the study of Bore and Peter (2020). During the interview with the distribution manager, he established that the distribution outsourcing activities adopted help the organisation distribute their product quickly to various business outlets across the country with the help of modern technology equipped by their third-party logistic provider. This implies that both the respondent and the distribution manager are of the same view. Secondly, the results show that most participants agreed that outsourcing distribution activities help the organisation deliver their goods to their warehouses on time, with a mean value of 4.0. The distribution manager also confirmed this during the interview. According to him, customers are satisfied with the distribution strategy because



products are received when needed without damage. All these are the results of the distribution outsourcing strategy. The results show that 77% of the respondents agreed that vehicles are easily tracked when engaged in 3PL. The results also show that most respondents believed order dispatching was done in the nearest outsourced warehouse using the most available distribution outsourcing providers. This was also confirmed by the distribution manager during the interview section. The interview affirmed that FCWN uses an external third-party logistics provider to distribute the product to reduce costs and risks and gain a competitive advantage.

**Table 5: The effect of distribution outsourcing on the organisational performance**

Effect of distribution outsourcing on organisational performance	Mean	Std derivation
Distribution outsourcing activities help the organisation gain access to specialised skills and technology.	4.3	0.831
Distribution outsourcing activities help the organisation deliver their goods at their various warehouse on time	4.0	0.798
Easy tracking of vehicle and vehicle visibility	4.3	0.892
Dispatching of orders is done in the nearest outsourced warehouse using the most available distribution outsourcing providers	3.8	0.7318
<b>Average</b>	<b>4.1</b>	

Source: Author's finding (2024)

The result of the correlation analysis in Table 6 revealed a positive relationship between distribution outsourcing and the performance of FCWN, with  $r = 0.633$  and a  $p$ -value of 0.000. This implies that the performance of FCWN is associated with the level of distribution outsourcing undertaken by industry management.

**Table 6: Correlations between distribution outsourcing and Performance of FCWN**

		Distribution	Performance
Distribution outsourcing	Pearson correlation	1	.633**
	Sig. (2 tailed)		.000
	N	68	68
Performance of FCWN	Pearson correlation	.633**	1
	Sig. (2 tailed)	.000	
	N	68	68

\*\*Correlation is significant at the 0.01 level (2-tailed).

Source: Author's finding (2024)

## 5. Conclusion

In conclusion, the assessment has shown that outsourcing activities significantly impact the operation and performance of the FCWN. The study established a positive relationship between transport and distribution outsourcing and the performance of the Nigerian manufacturing industry. Based on the significant findings established in the study, when adopting the strategic decision to outsource some non-core activities to 3PL, there is a need to consider whether the operational costs of outsourcing are excessively high. If outsourcing costs are within an acceptable range and are similar to those of running the service by the organisation, then logistics outsourcing should not be undertaken.

## References

- Akindele, O. E. (2023). *The effect of out-sourcing logistics activities on the performance of Nigeria's shipping industry*. Federal University of Technology Akure.
- Bhattacharya, A., Singh, P. I., & Bhakoo, V. (2013). Re-visiting the outsourcing debate: two sides of the same story. *Production Planning & Control*, 24(4-5), 399-422.
- Bore, C. L., & Peter, M. (2020). Influence of Logistics Outsourcing Services on Supply Chain Performance in Commercial State Corporation in Nandi County, Kenya. *Journal of Business Management and Technology*, 4(3), 332- 348.
- Bustinza, O., Arias-Aranda, D., & Gutierrez-Gutierrez, L. (2010). Outsourcing, competitive capabilities and performance: an empirical study in service firms. *International Journal of Production Economics*, 126(2), 276-288.
- Cocoa, P., & Alberti, M. (2010). A framework to assess performance measurement systems in Firms. *International Journal of Productivity and Performance Management*, 59(2), 186-200.
- Damilola, A. (2023). *Construction, real estate GDP to Nigeria*. Punch online.
- Diyuoh, C., & Mensah, D. O. (2014). Assessment of Supply Chain Management Practices and Its Effects on the Performance of Kasapreko Company Limited, *European Journal of Logistics Purchasing and Supply Chain Management*, 2(1), 1-16.
- Irina, S., Liviu, I., & Ioana, M. (2012). *A study on the benefits and the risks of outsourcing logistics in the Romanian industry* (Vol. 21). The Annals of the University of Oradea.
- Javed, A., Rafique, A. K., & Muhammad, M. B. (2020). Perceived Effect of Outsourcing on Organizational Performance in Pakistani Construction Industry. *Proceedings of the 5th Padang International Conference On Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA-5 2020)*, 152, pp. 1040- 1054.
- Jenabata, H. E., & Huang, H. I. (2017). Impact of supply chain management on the relationship between enterprise resource planning system and organisational performance. *International Journal of Business and Management*, 11(12), 109-117.
- Jenatabadi, H. (2018). *An Overview of Organizational Performance Index: Definitions and Measurements*.
- Kaluki, B. (2015). *Supply Chain Management Practices and Service Delivery In Humanitarian Organisations In Kenya*.

- Kroes, J. R., & Ghosh, S. (2010). Outsourcing congruence with competitive priorities: Impact on supply chain and firm performance. *Journal of Operations Management*, 28(2), 124- 143.
- Liao, S.-H., & Wu, C.-E. (2010). System perspective of knowledge management, organisational learning, and organisational innovation. *Expert Systems with Applications*, 37(2), 1096-1103.
- Mahulo, E. (2015). *Supply chain management practices and. Performance of cement companies in Kenya*. Kenya: Unpublished MBA project, University of Nairobi Kenya.
- Muiruri, G., & Iravo, M. (2015). THE EFFECTS OF OUTSOURCING LOGISTICS SERVICES ON Operational efficiency in the manufacturing industry: Case of Del Monte Kenya Ltd. *Journal of Management*, 2(16), 291-316.
- Mulama, O. (2014). *Logistics outsourcing practise and performance of larger manufacturing firms in Nairobi*. Unpublished MBA project, University of Nairobi.
- Nigeria Bureau of Statistics. (2013). *Gross domestic product yearly report*. Punch.
- Otieno, J. Y., & Jackson, M. N. (2020). Influence of Outsourcing Practices on Performance of Construction Projects in Public Level Four Hospitals in Nakuru County, Kenya. *The International Journal of Business Management and Technology*, 4(3), 168-177.
- Pavlov, A., & Bournce, M. (2011). Explaining the effects of performance measurement on performance – an organisational routines perspective. *International Journal of Operations and Production Management*, 31(1), 101-122.
- Petter, H., & Mats, J. (2023). Organising construction logistics outsourcing: a logistics strategy perspective. *Construction logistics outsourcing*.
- Rhee, J., Park, T., & Lee, D. H. (2010). Drivers of innovativeness and performance for innovative Firms in South Korea: mediation of learning orientation. *International Journal of Technovation*, 30(10), 65-75.
- Sherifat, O. A., Olubodun, I. E., & Saka, A. N. (2022). Effect of logistics outsourcing on operational performance of the selected Manufacturing companies in Southwestern Nigeria. *Open Journal of Business and Management*, 10, 3485-3499.
- Siquiet, S. Q. (2015). Examination of the distribution outsourcing logistic and organisational performance. *International Journal of Social Science*, 3(7), 8-15.
- Tinney, A. (2012). *The effects of supply chain orientation, supply chain management and collaboration on perceived performance*. USA: Air Force Institute of Technology, Air University graduate research project.

- Waters, D., & Rinsler, S. (2014). *Global Logistics: New Directions in Supply Chain Management (7th ed.)*. London, United Kingdom: Kogan Page Publishers.
- Wisdom, E. (2016). Impact of human investment on organisation performance. *Journal of human development*, 101- 109.
- Yinka, K. (2023). *Manufacturing sector contribution to GDP*. Punch online.

***Perceived Effects of Transportation Land Use on Mobility Crisis in Selected Nigerian Cities***

**Ayobami Ademola Akanmu<sup>1</sup>, Umar Obafemi Salisus<sup>2</sup>, and Sekinat Motunrayo Sanni<sup>3</sup>**

Department of Transport Planning and Management, The Oke-Ogun Polytechnic, Saki<sup>1</sup>,

Department of Urban and Regional Planning, Olabisi Onabanjo University, Ago-Iwoye<sup>2</sup>,

Transport and Logistics Limited, Ibadan<sup>3</sup>

ORCID number <https://orcid.org/0000-0002-9264-5863>

ORCID number <https://orcid.org/0000-0003-1630-3420>

ORCID number <http://orcid.org/0000-0002-0713-4699>

**Abstract**

*Traffic generation is a significant function of land use; hence, this study appraised the perceived influence of transportation land use on the urban mobility crisis in Nigerian cities towards ensuring optimal transportation system performance. The objectives include identifying respondents' trip and travel characteristics, determining the nexus between transportation land use and mobility crisis, identifying challenges of transportation land use and evolving strategies for improved transportation land uses in Nigeria. A multistage sampling technique was used to administer 600 copies of a questionnaire to household representatives across the capital cities in southwestern Nigeria. Mean-weighted analysis was also used for the data analysis. Results indicated that taxis/cabs, minibuses, tricycles, ride-hailing, and private cars were the predominant means of commuting. Critical transportation land uses identified included bus stops with or without shields, motor parks, event centres, roadside automobile workshops, fuel/gas dispensing stations, mini-marts, and cafeterias. Noteworthy elements contributing to the urban mobility crisis encompassed land use development and pattern, poor parking habits, traffic delays, and traffic incidence and accidents. In contrast, consequences of transportation land use on urban mobility included increased travel time, encouragement of road encroachment, reduction of roadway capacity, heightened traffic delay and incidences, and an elevated risk of travel discomfort. In light of these findings, the study recommends the efficient coordination of transportation projects, adequate funding for transportation infrastructure, formulation and implementation of sustainable public policies, and improved coordination between transportation and land use processes to enhance transportation land use. Therefore, efficient coordination of transportation projects, adequate funding of transportation infrastructure, effective implementation of public policy, and better coordination of the transportation and land use developmental processes are recommended for improved transportation land use in Nigerian cities.*

**Keywords:** Transportation Land Use, Transportation Infrastructure, Urban Mobility Crisis, Commuter Travel Options and Nigeria

## **1. Introduction**

Land use constitutes a fundamental aspect of spatial development within human settlements, involving transforming land from its natural state or one form to another. Morenikeji (2011) defines land use as any temporary or permanent intervention to enhance living standards for individuals, society, and the nation. The socio-economic value of a region is closely tied to its land use properties. Human settlements, particularly in urban areas, exhibit diverse land uses that often change due to evolving demand and supply dynamics for various purposes such as residential, industrial, commercial, public, semi-public, and circulation (Ogunsesan, Akanmu & Oyejide, 2016).

Transportation land use, a significant component of urban land use, holds considerable sway over other land uses, given its role in traffic generation. It is indispensable for residents, investors, and visitors in providing access, mobility, and ancillary facilities and services. This study evaluates the perceived impact of transportation land use on the urban mobility crisis in Nigeria, aiming to optimise the transportation system's performance and overall city development. Oyesiku (2014) notes that urbanisation, industrialisation, population growth, and infrastructure demands compel land-use changes. Transportation and other land use are intricately connected, particularly in facilitating efficient circulation in urban, rural, and regional settings.

Rodrigue, Black and Comtos (2006) emphasise that various land-use activities and decisions can influence transportation land-use projects, affecting time, cost, and traveller volume on roads or transit routes. In many Nigerian cities, the rate at which cities grow and expand surpasses the available land capacity for transportation infrastructure, resulting in increased vehicle miles travelled, traffic crashes, and non-active transport users (Oyesiku, 2021). Meanwhile, cities, with their attractive attributes, continue to draw population and investments, often due to enabling infrastructure and accessible transportation options (Salisu, Akanmu, Fasina & Sanni, 2020; Olorunfemi, Akanmu & Salisu, 2022). Accordingly, Akanmu, Fasina, Salisu, Adeyemo, and Olorunfemi (2022) opined that urban residents appreciate the accessibility and mobility functions of the transportation system, which, influenced by the structure, capacity, and connectivity of transportation systems, face challenges such as changing activity patterns, demand and supply fluctuations, distribution flow, and traffic bottlenecks.

Against this backdrop, the study examines the impacts of transportation land use on the mobility crisis in Nigerian urban centres. The objectives include identifying the trip and travel characteristics of respondents, determining the nexus between transportation land use and mobility crisis, identifying challenges of transportation land use, and evolving strategies for improved transportation land uses to optimise transportation land use for enhanced accessibility and wellbeing of city residents in the Southwestern region capital cities of Nigeria.

## **2. Literature Review**

Transportation and transportation land uses have played tremendous roles in the development and growth of human settlements and economies since time immemorial. Hence, there is an increasing research interest in transportation studies in both the global North and South. Among the scholars who have examined transportation is Wee (2002), who opines that transportation fulfils people's aspirations to engage in diverse activities such as residing, working, shopping, and recreating in various locations and also establishes that land-use patterns significantly influence transportation; hence, it is essential to assess potential plans for land use and transportation based on a comprehensive range of factors. In another study by Hrelja (2015) on integrating transport and land use planning in two Swedish municipalities, the study affirmed that integrated planning is essential for achieving aims concerning more environmentally friendly transport operations and thus established that management and working practices in local authorities, referred to as steering cultures, affect the implementation of integrated land-use and public transport planning approaches.

In the opinion of the European Road Transport Research Advisory Council (2013), the road system connects territories at all spatial scales (countries, regions, urban areas, municipalities, etc.), while on the other hand, passenger and freight travel behaviour is strongly influenced both by land use (the density and nature of activities and people, for instance) and the road transport system (availability and costs of the different transport means); hence, the road transport system is closely linked to the land-use system.

Moreover, one influential concept shaping transportation land use is Transit-Oriented Development (TOD), introduced in the late 1980s by Peter Calthorpe and later detailed in his 1993 publication, 'The New American Metropolis.' According to Calthorpe (1993), TOD envisions a mixed-use community that encourages individuals to reside close to transit services, reducing their reliance on personal vehicles. In other words, TOD serves as a neo-traditional guide to sustainable communities, addressing various social issues and creating vibrant, compact communities centred around transit facilities. Supporting this perspective, Carlton (2007) and Still (2002) argue that TOD addresses the ecological aspects of communities, offering a comprehensive solution for regional growth. Hence, it meets the needs of transit agencies for alternative revenue sources, potentially enhancing residents' quality of life, minimising household transportation costs, and establishing stable mixed-income neighbourhoods that reduce environmental impacts and alleviate traffic congestion. Meanwhile, TOD has emerged as a prominent urban planning model in the United States over the last decade, emphasising compact development, integrated land uses, and a pedestrian-friendly environment, all contributing to a well-balanced transportation system. Messenger and Ewing (1996) define TOD as a development activity within walking distance of transit routes, characterised by a mix of residential, retail, office, and public uses in a walkable environment. This approach makes it convenient for residents and employees to travel by

transit, bicycle, or on foot, facilitating efficient interactions with socio-economic land use activities.

Meanwhile, the majority of previous research, including studies by Akanmu, Gbadamosi and Omole (2022), Ogunsesan, Akanmu and Salisu (2022), Oyesiku (2021; 2014), Salisu, Akanmu, Fasina and Sanni (2020), Morenikeji (2011), and Still (2002), has primarily focused on various aspects such as urban transportation, traffic congestion, urbanisation, land use planning, transit-oriented development, and other urban issues. However, more empirical investigations are needed concerning transportation land use and its correlation with persistent mobility crises, particularly in third-world countries and cities. Therefore, this research aims to address and justify this gap by delving into the effects of transportation land use on mobility crises in selected Nigerian cities.

### **3. Materials and Methods**

Southwestern Nigeria lies between latitude 6° N and 8½° N of the equator and longitude 3° E and 5° E of Greenwich Meridian Time (GMT). It comprises six (6) states, namely Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti States, have a total area of 79 048 sq. kilometres. However, the study area comprises all the capital cities (Abeokuta, Ado-Ekiti, Akure, Ibadan, Ikeja, and Osogbo) of the Ogun, Ekiti, Ondo, Oyo, Lagos, and Osun States in the economically driven Southwestern geopolitical region of Nigeria. Capital cities are characterised by increasing daily mobility demand due to the apparent population advantage and socio-economic actions that propel rapidly changing land uses and complex traffic situations.

The study adopted the cross-sectional research design, which uses survey techniques that are relatively inexpensive to gather and analyse the data based on the quantitative approach. Both primary and secondary sources of data were used. Primary data detailed the use of questionnaires administered to residents (a household representative) found within three (3) kilometres of the significant transport infrastructural facilities, including roads, railways, etc., in the capital cities in southwestern Nigeria. During the literature search, the secondary data was sourced from previously published and unpublished materials like journal articles, books, and maps.

A multistage sampling technique that uses convenience, simple random and systematic sampling methods was used to administer copies of the questionnaire to respondents who are representatives of residential households within a 1km radius of major roads in the selected capital cities. In the first stage, convenience sampling was used to select 100 residential buildings within a 1km radius of major roads in the selected capital cities. In the second stage, simple random sampling was used to select the first residential building sampled along the 1km radius of the major road in the capital chosen cities. The first household was picked when the residential building was a tenement structure with more than one household. In the third and last stage, the systematic sampling technique was used to select every third residential



building after the first building had been chosen randomly. This was done until each selected city's sample size (100) proportion reached. The study engaged the use of research assistance, while representatives of households were seriously motivated to participate. In all, 600 copies of a questionnaire administered to the residents across the capital cities in Southwestern Nigeria were retrieved and used for analysis. A close-ended structured questionnaire was developed based on the research objectives. The study adopted the 4-point multiple option Likert scale for data collection and used frequency percentage distribution tables and Relative Mean Index (RMI) for data analysis. The Cronbach Alpha score reliability test was done to determine the reliability of the scales used in the questionnaire, and the results of the eight sub-scales range between 0.75 and 0.90. However, descriptive (frequency percentage tables, line graph, and Mean Index Value through the weighted index analysis) was deployed using the Statistical Package for Social Sciences IBM version 21.

#### **4. Results and Discussion**

This section presents the results of the analysed data. Subsequently, it discusses the trip and travel characteristics of respondents, the nexus between transportation land use and the prevailing mobility crisis in Nigeria's urban centres, the effect of transport land use on mobility crisis and challenges of transportation land use and strategies to optimise transportation land use in Nigeria's urban centres with a particular focus on the cities in the southwestern region of Nigeria.

##### **4.1 Trip and Travel Characteristics of Respondents**

Initially, the findings from the gathered and subsequently analysed data on the socioeconomic characteristics of residents before their trips are presented in Table 1. Regarding gender classification, it is noted that slightly over half (57.3%) of respondents are male, while the remaining 42.7% are female. This suggests that females display a relatively higher participation rate and responsiveness to the administered questionnaire than their male counterparts, challenging the common belief that women are more inclined and involved in land use than men, particularly in urban settings.

In terms of age distribution, the data analysis in Table 1 reveals that only 2.0% fall below the age of 30, with over one-tenth (11.90%) falling between the ages of 30 and 40. Additionally, over one-third (36.2% and 33.2%) fall within the age brackets of 41-50 and 51-60, respectively, while one-tenth (11.7%) are above 60 years. These results suggest that many respondents belong to the energetic working-age group. Regarding marital status, over one-tenth (16.8%) of respondents are still single and unmarried, close to two-thirds (61.3%) are married, and the remaining 21.8% are not married. Consequently, it can be inferred from the results that a substantial portion of respondents are married, indicating a potential understanding of the central focus of the study on land use and transport planning in their surrounding area.

Concerning educational attainment, the data from Table 1 indicate that only 1.2% do not have formal education, while over one-third (39.3%) have either a primary or secondary level of education. Additionally, nearly half (48.8%) have a Higher National Diploma/first-degree level of education, and one-tenth (10.7%) have a postgraduate level of education. These results suggest a high literacy level among respondents, indicating their awareness of events in their surroundings. Similarly, the data on employment status analysed in Table 1 shows that unemployed or students account for 14.3% of respondents, while close to half (46.5%) are self-employed. Additionally, slightly more than one-tenth (12.7%) of the population are civil servants working in various government organisations, and more than one-quarter (26.5%) are employed in private or corporate sectors. These results suggest that self-employed individuals and those in the private sector dominate respondents' employment status, possibly influencing land use and transport-related activities in urban areas.

Table 1: Socioeconomic characteristics of sampled Residents

S/no	Type	Variables	Frequency	% population
1	Gender classification	Male	256	42.7
		Female	344	57.3
		Single	101	16.8
		Married	368	61.3
		Others	131	21.8
		Below 30	12	2.0
		30-41	102	17.0
3	Age group	41-50	217	36.2
		51-60	199	33.2
		Above 60	70	11.7
		Single	101	16.8
4	Marital Status	Married	368	61.3
		Others	131	21.8
		None	7	1.2
5	Level of education	Pry/Second.	236	39.3
		HND/BSc	293	48.8
		Postgraduate	64	10.7
6	Employment status	Unemployed/students	89	14.3
		Self-employed	279	46.5
		Civil servant	76	12.7
		Corporate sector	159	26.5
7	Average Monthly Income	Below ₦50,000	65	10.8
		₦50,000-₦100,000	247	41.2
		₦100,001-₦150,000	165	27.5
		Above ₦150,000	123	20.5
8	Household size	Less than 3	81	13.5
		Between 3 and 5	325	54.2
		Between 6 and 8	152	25.3

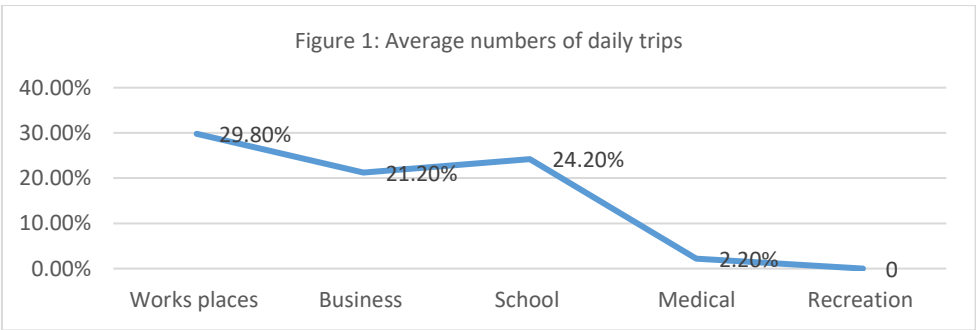
Source: Authors' Field Survey, December 2021 and January 2022

Further to the employment status is the average monthly income of respondents, in which the results of the analysed data revealed that almost one-tenth (10.8%) earn less than ₦50,000 monthly, while close to half (41.2%) earn between ₦50,000 and ₦100,000. Furthermore, more than one-quarter (27.5%) earn between ₦100,000 and ₦150,000 per month, while the remaining 20.5% earn more than ₦150,000 per month. Considering the previously discussed employment characteristics and the average monthly income, it can be inferred from these findings that the respondents are predominantly individuals who earn daily incomes, resulting in a moderately aggregated income by the end of the month. The household size of respondents varies from less than three (3) to more than eight (8) people, as evidenced by the

data analysis presented in Table 1. Specifically, more than one-tenth (13.5%) have a household size of less than three people, while slightly more than half (54.2%) have a household size ranging from 3 to 5 people. Additionally, a quarter (25.3%) have a household size of 6 to 8 people, and the remaining 7.0% have more than eight people. These results unequivocally indicate a prevalence of married respondents in the study area.

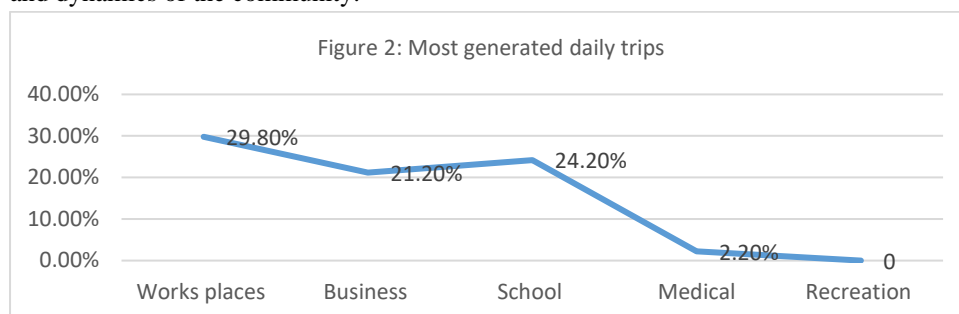
Examining the data, it is noted that the majority of respondents (60.2%) do not possess personal vehicles, while more than one-quarter (27.7%) have one personal vehicle, and 9.7% own two (2) personal cars. However, the remaining 2.5% own more than two vehicles. This outcome aligns with numerous empirical observations suggesting that vehicle ownership is generally low in many cities in developing countries, including Nigeria.

Furthermore, Figure 1 illustrates the analysis outcomes regarding the number of daily trips generated by respondents, with more than one-third (33.2%) making fewer than three (3) trips. Close to half (40.8%) make between three (3) and five (5) trips daily, and less than one-quarter (22.7%) make between six (6) and eight (8) trips daily. The remaining 3.3% of respondents make more than eight (8) daily trips. Upon careful examination, it is evident that most respondents make more than three (3) trips daily, highlighting the significance of land use and transportation activities in the study area. Hence, it can be deduced from the results in Figure 1 that the majority make more than three (3) trips daily, underscoring the integral role of land use and transportation activities in the respondents' daily lives, reflecting a dynamic urban environment.



Additionally, the results from the collected and analysed data on the most frequently generated trip purposes by respondents, as presented in Figure 2, indicate that almost one-third (29.8%) of trips are work-related, while slightly less than one-quarter (21.3%) are for business purposes. About a quarter (24.2%) of respondents make trips to school for themselves or their children, while trips to medical facilities constitute 2.2% of trips. Slightly more than one-tenth (12.5%) of trips are for recreation purposes, and trips to the shop account for the remaining 10.0% among the sampled respondents. This finding aligns with the common observation that trips related to work, shopping, school, and recreation typically dominate land use.

Therefore, based on Figure 2, it is observed that these findings corroborate the significance of crucial land uses such as workplaces, commercial establishments, and educational institutions in shaping travel patterns. Above all, the study's findings highlight the intricate interplay between socioeconomic characteristics, land use, and transportation activities in the study area. The demographic composition, employment structure, and travel patterns underscore the importance of a comprehensive approach to urban planning that considers the diverse needs and dynamics of the community.



Moreover, an analysis of the nine categorised means of travel used for discretionary trips, such as excursions to recreational spots, visits to friends and family, trips to religious centres, and attendance at social functions, was conducted. The results, presented in Table 3, were based on a four-point Likert scale yielding a Total Weighted Value (TWV) of 24.5134 for the nine (9) indicators. In this context, the findings revealed that five means of travel took the lead among the nine modal options assessed by respondents. Specifically, the use of taxi/cab (3.1267), mini-bus (3.000), tricycle (3.8933), and ride-hailing (2.8800) continued to dominate the travel options. They were followed by the use of private cars (2.7917), while the use of the remaining options, including conventional bus/BRT (2.5500), ferry ride (2.3350), commercial motorcycle (2.4367), and train ride (2.3350), was less prominent.

Upon closer examination, it is noted that many cities in southwestern Nigeria, excluding Lagos, need more functional conventional public transportation and ferry services. Lagos is the sole city with dedicated Bus Rapid Transit (BRT) routes for mass commuters along specified routes. Additionally, restrictions on commercial motorcycle operations in Lagos and other cities in the region have undoubtedly decreased commuters' reliance on this mode of transportation. Lastly, intracity train services and rides are only available in some regional towns, indicating operational and geographical limitations to rail and ferry services for commuters and the broader population in the study area.

Based on the preceding, it can be deduced that a clear hierarchy emerges among the various modes assessed for such trips. Hence, taxi/cab, mini-bus, tricycle, and ride-hailing stand out as the dominant means, garnering higher preference from respondents, which indicates a shared inclination towards convenience, accessibility, and potentially cost-effectiveness,

influencing the popularity of these modes. Meanwhile, utilised private cars occupy a lower rank than shared transportation options, implying a significant reliance on communal modes of travel for discretionary activities, possibly reflecting considerations such as affordability or environmental consciousness among respondents. The lower rankings of conventional bus/BRT, ferry rides, commercial motorcycles, and train rides further indicate that these modes have less prominence or availability in the considered cities. Also, geographical landscape plays a crucial role in shaping transportation options. Unlike Lagos, the absence of functional conventional public transportation and ferry services in southwestern towns influences regional disparities. While Lagos stands out with dedicated Bus Rapid Transit (BRT) routes, showcasing a more developed infrastructure for mass commuting, limitations in intracity train services and rides in several cities highlight operational and geographical constraints, limiting the accessibility of rail and ferry services for the broader population. In addition, regulatory measures exert a notable influence on travel choices. Hence, the observed reduction in the use of commercial motorcycles in response to operational restrictions in Lagos and other cities highlights the impact of regulations on transportation preferences, as such measures not only affect the popularity of specific modes but also influence the overall dynamics of the transportation ecosystem.

Table 2: Transport Means for Discretionary Trips

Indicators	TWV	Relative Mean Index	Mean Index Value	Rank
Private cars	1675	2.7917	24.5134/9= 2.7371	5
Commercial motorcycle	1462	2.4367		8
Tricycle	1736	2.8933		3
Taxi/cab	1876	3.1267		1
Minibus	1800	3.0000		2
Conventional Bus/ BRT	1530	2.5500		6
Ferry/ Boat	1500	2.5000		7
Train ride	1401	2.3350		9
Ride-hailing	1728	2.8800		4

Source: Authors' Field Survey, December 2021 and January 2022

The assessment of transport modes for non-discretionary trips, encompassing commuting to work, school, shopping, and essential routine journeys, employed a four-point Likert scale. The analysis resulted in a Total Weighted Value (TWV) of 21.735 and a Mean Importance Value (MIV) of 2.4139. The detailed findings, outlined in Table 3, unveil that respondents' primary choices for non-discretionary trips, ranked in descending order, include minibus (3.1267), taxi/cab (3.0000), tricycle (2.6833), and private cars (2.5000). These preferences are closely followed by ride-hailing (2.467) and commercial motorcycles (2.3350). In contrast, respondents express a preference for ferry/boat (1.9100), conventional bus/BRT (1.8933), and train ride (1.8400) as their favoured transportation modes for non-discretionary trips. Based on the preceding, it can be deduced from the results that there is growing momentum in utilising tricycles and ride-hailing services across cities while relying on commercial motorcycles for non-discretionary trips is diminishing. Concurrently, the limited availability of conventional bus/BRT systems, especially outside Lagos, contributes to its lower patronage. This underscores the imperative for comprehensive and purposeful reforms within

the urban transportation system. These reforms should encompass enhancements in infrastructure and modal operational capacity to effectively cater to the diverse needs of residents in the southwestern region of Nigeria.

It is deduced from the findings that there is a discernible shift in the preferred transportation modes for non-discretionary trips among respondents. Thus, the increasing popularity of tricycles and ride-hailing services suggests a growing acceptance and reliance on these modes of transportation for essential and routine journeys. At the same time, the diminishing use of commercial motorcycles for non-discretionary trips indicates a decreasing preference for this mode, potentially influenced by factors such as safety concerns, regulatory restrictions, or a shift towards more convenient alternatives. Furthermore, the lower patronage of conventional bus/BRT systems, especially outside Lagos, underlines the operational and infrastructural challenges these public transportation services face. These findings affirm the position of Akanmu, Gbadamosi and Omole (2022), who advocated for significant reform in the public transportation system in the country. Hence, there is a pressing need for comprehensive reforms in the urban transportation system, emphasising infrastructure improvements and enhanced operational capacities that align with the diverse needs and ensure a more sustainable and efficient urban mobility landscape.

Table 3. Transport mode for non-discretionary trips

Indicators	TWV	Relative Mean Index	Mean Index Value	Rank
Private cars	1500	2.5000	21.725/9=2.4139	4
Commercial motorcycle	1401	2.3350		6
Tricycle	1610	2.6833		3
Taxi/cab	1800	3.0000		2
Minibus	1876	3.1267		1
Conventional Bus/ BRT	1136	1.8933		8
Ferry/ Boat	1146	1.9100		7
Train ride	1104	1.8400		9
Ride-hailing	1462	2.4367		5

Source: Authors' Field Survey, December 2021 and January 2022

The evaluation of factors influencing the travel modal choices of respondents involved assessing nine criteria on a four-point Likert scale. The analysis presented in Table 4 yielded a Summated Weighted Value (SWV) of 27.16 and a Mean Importance Value (MIV) of 3.0177, indicating a vital consideration for the identified and assessed factors. Specifically, the findings, as outlined in Table 4, underscore that respondents place significant importance on the availability of travel modes (3.3983), accessibility of travel modes (3.3333), affordability (3.0783), and ease of navigation (3.0717). These factors emerged as respondents' most crucial and influential considerations when making travel mode choices. Additionally, safety (2.9100), comfortability (2.8917), reliability (2.8500), response functionality (2.8083), and speed (2.7767) also played a role in the decision-making process, although their values fall below the Mean Importance Value. Therefore, the results indicate that the most available, accessible, and affordable travel modes take precedence and remain the leading considerations for urban commuters when choosing their mode of transportation.

Table 4: Factors influencing travel modal choice

Indicators	TWV	Relative Mean Index	Mean Index Value	Rank
Availability	2039	3.3983	27.16/9= 3.0177	1
Reliability	1710	2.8500		7
Affordability	1847	3.0783		3
Safety	1746	2.9100		5
Speed	1666	2.7767		9
Comfortability	1735	2.8917		6
Response functional	1685	2.8083		8
Accessibility	2000	3.3333		2
Maneuverability/ ease of navigation	1843	3.0717		4

Source: Authors' Field Survey, December 2021 and January 2022

### 4.3 Nexus between Transportation Land Use and the Urban Mobility Crisis

In delving into the connection between transportation land use and the urban mobility crisis, the study scrutinised fourteen prevalent types of transportation land uses within the study area, employing a 4-point Likert scale. The outcomes of this evaluation, presented in Table 5, yielded a cumulative weighted value of 42.5715 for the fourteen indicators assessed, resulting in a 3.2251 Relative Index Value. Upon comparison of these results, nine indicators emerged as particularly noteworthy, signifying the prominence of certain transportation land uses in the cities. These indicators include bus stops with or without shields (3.4433), motor parks (3.4417), event centres (3.4083), roadside automobile workshops (3.3883), auto display marts (3.3883), fuel/gas dispensing stations (3.3733), mini marts and cafeterias (3.3133), and car cleaning facilities (3.0200). As anticipated, these land uses consistently generate and attract daily city traffic, serving as essential hubs for residents to fulfil their daily tasks and obligations. In contrast, the remaining transportation land uses, such as cycling paths (2.8417), pedestrian walkways (2.8083), traffic information and signal posts (2.5433), and pedestrian bridges (2.3417), are less conspicuous within the urban landscape. These findings shed light on the differential impact and prevalence of various transportation land uses in the study area, offering valuable insights into urban mobility dynamics.

The inference drawn from the assessment of transportation land use and its correlation with the urban mobility crisis in the study area is that specific types of land use significantly influence and contribute to the challenges faced in urban mobility. The examination of fourteen distinct transportation land uses revealed that certain facilities and infrastructure, such as bus stops, motor parks, event centres, and others, play a prominent role in generating daily traffic. These transportation hubs, characterised by their high relative importance values, attract substantial, essential and non-essential commuter activity, contributing to the urban mobility crisis. However, other transportation land uses like cycling paths, pedestrian walkways, traffic information and signal posts, and pedestrian bridges exhibit lower prominence, indicating a relatively reduced impact on urban mobility dynamics. This affirms the findings of Akanmu, Gbadamosi and Omole (2021), who articulated provisions of active transportation infrastructure as strategies for enhancing city livability.

Table 5: Nature of Transportation Land Use

Indicators	TWV	Relative Mean Index	Mean Index Value	Rank
Event centre	2045	3.4083	42.5715/14=3.2251	3
Fuel/gas dispensing station	2024	3.3733		6
Mini marts and cafeteria	1998	3.3133		7
Cycling path	1705	2.8417		9
Motor parks	2065	3.4417		2
Auto display mart	2033	3.3883		4
Traffic safety and monitoring post	1526	2.5433		13
Traffic information and signal post	1577	2.6283		12
Parking facility	1579	2.6317		11
Pedestrian walkway	1685	2.8083		10
Car cleaning facility	1812	3.0200		8
Roadside automobile workshop	2033	3.3883		4
Pedestrian bridge	1405	2.3417		14
Bus stops with or without shields	2066	3.4433		1

Source: Authors' Field Survey, December 2021 and January 2022

Moreover, the nature of the mobility crisis identified in the selected cities was assessed using a four-point Likert scale with varying gradations, resulting in a SWV (Severity Weighted Value) of 68.67565 and an RIM (Relative Importance Measure) of 2.7503. This serves as a baseline for comparing the perceived severity of the mobility crisis among commuters in the study area. The detailed outcomes of the analysis, as presented in Table 6, indicate that seventeen (17) indicators exhibit a high level of mobility crisis in Nigerian cities. Taking into account the above, factors such as land use development and pattern (3.4433), road encroachment (3.4417), poor parking habits (3.4083), traffic delay and congestion (3.3883), inadequate travel and traffic information (3.3733), deficient traffic flow and coordination (3.3133), subpar urban connectivity and navigation (3.0783), insufficient transport infrastructure maintenance (3.0767), a high rate of traffic accidents or crashes (3.0450), weak multimodal integration (3.0417), and inadequate design or absence of active transportation facilities (3.0200) reflect the substantial extent of the mobility crisis experienced by respondents across various surveyed cities.

Furthermore, additional urban mobility crises that hold prominence include complicated and unregulated travel mode operations (2.9100), violence and traffic insecurity (2.8600), insufficient parking facility supply and management (2.8567), unpredictable and extended travel time (2.8417), elevated travel risk and discomfort (2.8083), and the proliferation of informal travel modes (2.7767). These findings underscore the imperative for comprehensively reviewing Nigerian cities' transportation land use and urban activities. This aligns with the conclusions drawn by Akanmu, Gbadamosi and Omole (2021) and Fasina, Akanmu and Salisu (2020).

Based on the preceding, the detailed analysis breakdown highlights seventeen key indicators contributing to the observed high level of the mobility crisis. The factors include land use development and pattern, road encroachment, poor parking habits, traffic delay and congestion, inadequate travel and traffic information, and deficient traffic flow and coordination, which are among the primary contributors to the perceived severity of the



mobility crisis. These elements collectively emphasise the challenges in urban planning, infrastructure, and coordination that impact the efficiency of transportation systems in the surveyed cities. Therefore, the analysis identifies other salient urban mobility crises, including complicated and unregulated travel mode operations, violence and traffic insecurity, insufficient parking facility supply and management, unpredictable and extended travel time, elevated travel risk and discomfort, and the proliferation of informal travel modes. These issues further compound the challenges commuters face in the studied urban centres.

Table 6: Nature of Mobility Crisis in Selected Nigeria Cities

Nature of the problems	TWV	Relative Mean Index	Mean Index Value	Rank
Poor road-rail capacity and network maintenance	1063	1.7717	68.2249/25= 2.7290	22
Poor land use development and pattern	2066	3.4433		1
Poor traffic flow and coordination	1998	3.3133		6
Poor parking habits	2045	3.4083		3
Road encroachment	2065	3.4417		2
Traffic delay and congestion	2033	3.3883		4
Poor parking facilities supply and management	1714	2.8567		14
Unaffordable parking pricing	887	1.4783		24
Unaffordable road pricing and tolling	882	1.3700		25
Poor design or absence of active transportation facilities	1812	3.0200		11
Violence and traffic insecurity	1716	2.8600		13
Poor modal choice accessibility	1526	2.5433		19
High vehicle operating and maintenance costs	1405	2.3417		20
Unpredictable and longer travel time	1705	2.8417		15
Poor travel and traffic information (as	2024	3.3733		5
High travel risk and discomfort	1685	2.8083		16
Expensive transportation fares	956	1.5933		23
Proliferation of informal travel mode	1666	2.7767		17
Poor urban connectivity and navigation	1847	3.0783		7
High rate of traffic accidents or crashes	1827	3.0450		9
Poor transport infrastructure maintenance	1846	3.0767		8
Inadequate transport infrastructural facilities	1136	1.8933		21
Complicated and unregulated travel mode operations	1746	2.9100		12
Weak multimodal integration	1825	3.0417		10
Poor implementation of transport policies and regulations	1530	2.5500		18

Source: Authors' Field Survey, December 2021 and January 2022

Meanwhile, an examination was conducted on the influence of transportation land use on the mobility crisis, and the collected data in this regard were analysed using a four-point Likert scale. The analysis of twenty (20) indicators, as presented in Table 7, yielded a weighted sum of 54.5499 and a relative mean index value of 2.7275. Given these outcomes, it is evident that certain factors, including increased travel time (3.4433), encouragement of road encroachment (3.4417), reduction of roadway capacity (3.4083), increased traffic delay and congestion (3.3883), and heightened travel risk and discomfort (3.3733), stand out as the primary adverse influences of transportation land use on urban mobility. This observation is based on the fact that the relative index value for each indicator significantly surpasses the entire analysis's relative index value. Following closely in terms of adverse effects on the mobility crisis are increased transportation infrastructure damage (3.0767), heightened urban stress (3.0450), the complication of city livability (3.0417), and increased difficulty for pedestrians and cyclists (3.0200). Respondents identified increased parking difficulties (2.8417) and greater use of informal travel modes (2.7767), contributing to the perceived negative impact of land

transportation use on urban mobility. However, other indicators, such as the reduction in parking supply, increased vehicle operating costs, decreased city functionality, heightened transportation costs, reduced urban connectivity, increased parking pricing and management, and the encouragement of road pricing and tolling, are deemed less impactful by the respondents in terms of their influence on the urban mobility crisis.

The inference drawn from these findings suggests that certain aspects of transportation land use have a pronounced and detrimental effect on urban mobility. The identified challenges, ranging from increased travel time to road encroachment and traffic congestion, signal the need for comprehensive urban planning and transportation infrastructure interventions. In other words, the analysis results emphasise the importance of understanding the nuanced dynamics between transportation land use and urban mobility to provide a foundation for targeted interventions and policy considerations.

Table 7: Effect of transport land use on mobility crisis

Indicators	TWV	Relative Mean Index	Mean Index Value	Rank
Reduce roadway capacity	2045	3.4083	54.5499/20= 2.7275	3
Reduce traffic flow and speed	1998	3.3133		6
Increase parking difficulties	1705	2.8417		11
Encourage road encroachment	2065	3.4417		2
Increase traffic delay and congestion	2033	3.3883		4
Reduce parking supply	1526	2.5433		13
Increase parking pricing and management	887	1.4783		18
Encourage road pricing and tolling	882	1.3700		19
Increase pedestrian and cycling difficulties	1812	3.0200		10
Increase access difficulty	2033	3.3883		4
Increase vehicle operating costs	1405	2.3417		14
Increase travel time	2066	3.4433		1
Increased travel risk and discomfort	2024	3.3733		5
Increase transportation cost	1063	1.7717		16
Increase the use of informal travel mode	1666	2.7767		12
Reduce urban connectivity	956	1.5933		17
Increase urban stress	1827	3.0450		8
Increase transport infrastructure damage	1846	3.0767		7
Reduce city functionality	1136	1.8933		15
Complicate city livability	1825	3.0417		9

Source: Authors' Field Survey, December 2021 and January 2022

#### 4.4 Challenges of Transportation Land Use in Nigerian Urban Centres

Residents in the selected Nigerian cities assessed the seventeen (17) challenges associated with transportation land use by utilising a four-point Likert scale. The outcomes of this evaluation, as detailed in Table 8, yielded a weighted sum of 44.7500 and a relative mean index value of 2.6234, identifying nine (9) predominant constraints. Specifically, the challenges perceived as most critical include the attitude of members of the public (3.4417), corruption and mismanagement of funds (3.2233), encroachment (3.200), activities and excesses of miscreants (3.15967), poor transport-land use planning (3.1317), unprecedented population growth (3.1200), and the abandonment of professionals in land use transportation plan implementation and facilities instalment (3.0550). According to the residents' assessments, these challenges collectively represent the most pressing issues. Additionally,

factors such as lack of transport policy (2.9683), poor synergy between ministries of transportation, works, and physical planning (2.8983), and inadequate funding (2.7550) are considered pertinent constraints but are ranked in the second category.

Meanwhile, the remaining seven (7) challenges, including weak political will (2.2783), inadequate advocacy and public enlightenment on encroachment (2.1417), inadequate transport planning institute (2.0567), poor institutional framework (1.8200), weak policy implementation (1.6867), and political instability (1.6683), are perceived as less critical by the residents. In other words, the assessment provides valuable insights into the perceived challenges associated with transportation land use. From this evaluation, nine (9) challenges emerge as the most predominant and critical factors influencing transportation land use in these urban centres. Accordingly, the most pressing challenges, according to resident assessments, include the attitude of members of the public, corruption and mismanagement of funds, encroachment, activities and excesses of miscreants, poor transport-land use planning, unprecedented population growth, and the abandonment of professionals in land use transportation plan implementation and facilities instalment. These challenges collectively point to a complex interplay of societal, administrative, and planning issues that significantly impact the effectiveness of transportation land use in Nigerian cities.

Also, the secondary category of challenges, including the need for more transport policy, poor synergy between ministries of transportation, works, and physical planning, and inadequate funding, underscores additional constraints that contribute to the overall complexity of the transportation landscape. While not deemed as critical as the primary challenges, these challenges still require attention and intervention to ensure a holistic and sustainable approach to transportation planning and implementation.

Table 8: Challenges of transportation land use

Nature of challenges	TWV	Relative Mean Index	Mean Index Value	Rank
Weak policy implementation	1012	1.6867	44.75/17=2.6234	16
Poor institutional framework	1092	1.8200		15
Poor funding	1653	2.7550		10
Corruption and mismanagement of funds	1934	3.2233		2
Unprecedented population growth	1872	3.1200		6
Political instability	1001	1.6683		17
Weak political will	1367	2.2783		11
The poor synergy between ministries of transportation works and physical planning	1739	2.8983		9
The dearth of workforce and qualified personnel	1265	2.1083		13
Inadequate transport training institute	1234	2.0567		14
Poor planning	1879	3.1317		5
Lack of transport policy	1781	2.9683		8
Inadequate advocacy and public enlightenment on encroachment	1285	2.1417		12
Activities and excesses of miscreant	1918	3.1967		4
Abandonment of professionals in plan implementation and facilities installation	1833	3.0550		7
Encroachment	2064	3.200		3
The attitude of the public	1974	3.4417		1

Source: Authors' Field Survey, December 2021 and January 2022

4.5 Strategies for Improved Transportation Land Uses and Urban Mobility

Residents were requested to evaluate and propose strategies to enhance transportation land use planning and urban mobility. Their assessments were conducted using a four-point Likert scale. The outcomes of this analysis, as presented in Table 9, revealed a weighted sum of 25.7451 and a relative mean index value of 3.2181. From the results outlined in Table 9, it is evident that respondents exhibited favourable inclinations towards four (4) out of the eight (8) identified and evaluated strategies for improving transportation land use in the country. Specifically, respondents advocated for the establishment of a road transport administration (3.3667), the development and deployment of a commercial travel demand model (3.3600), adequate funding (3.2533), and better coordination of the transportation and land use process (3.3217) as the most prominent strategies. The respondents deemed these strategies essential to enhancing land transportation use in the country.

Additionally, residents identified strengthening transport education at the tertiary level (3.1317), improving the technical capacities of transport planners (3.1967), and enhancing travel demand model plans (3.1767) as viable additional strategies. It is worth noting that while improved technical capacities of transportation planners are considered, the respondents should emphasise them more. These findings align with the research conducted by Salisu, Akanmu, and Fasina (2020) and Fasina, Akanmu, Salisu, and Okunubi (2020), reinforcing the importance and viability of the identified strategies in the context of transportation land use planning and urban mobility improvement.

Table 9: Strategies to improve transportation land use planning in Nigeria

Nature of strategies	TWV	MIV	RIV	Rx
Adequate funding	1952	3.2533		3
Integration of land use forecasting models with travel demand models	1973	2.9883		8
Development and deployment of commercial travel demand model	2016	3.3600		2
Better coordination of transportation land use process	1993	3.3217		4
Improved technical capacities of transportation planners	1918	3.1967		6
Strengthening transport education at the tertiary institution level	1879	3.1317	25.7451/8=	5
Improved travel demand model in the plan	1876	3.1267	3.2181	7
Establishment of road transport administration	2020	3.3667		1

Source: Authors' Field Survey, December 2021 and January 2022

4. Conclusion and Recommendations

Arguably, transportation land use is a significant component of urban land use, significantly affecting and influencing other land uses. With traffic generation as a function of land use, transportation land use becomes indispensable to all the residents, investors, and visitors in the cities, providing access and mobility as well as other ancillary facilities and services to ensure seamless overcoming of the friction of distance for various purposes. Based on the preceding, this study investigated the perceived effects of transportation land use on the mobility crisis in six Nigerian cities in the southwestern region: Ikeja, Ibadan, Abeokuta, Osogbo, Ekiti, and Akure. The study, therefore, appraised the socio-economic attributes of the residents, trip characteristics including forms of transportation for daily commuting, travel modal options for both discretionary and nob-discretionary trips, factors influencing travel

modal choice, and the nature of transportation land use and mobility crisis in Nigerian cities, as well as the effects of transportation land use on urban mobility crisis, challenges of transportation land use, and strategies for improving transportation land use and mobility crisis.

Consequently, the study established the significance of transportation land use to the efficient functioning of cities and the socio-economic and environmental development of people and societies. As such, it concluded that inappropriate transportation land use does influence the urban mobility crisis. The availability of transportation land use influences the development of various business investments, improving trade and commerce and the value of the properties adjoining the transportation land use. Unfortunately, the attitude of the public, corruption and mismanagement of funds, and the unguided development of road encroachment are among the most pronounced challenges affecting transportation land use in Nigerian cities. In the quest to ameliorate the attributed issues and challenges and improve the transportation land use in Nigerian cities, it is recommended, among others, that:

- a. Efficient coordination of transportation projects and programmes is needed for efficient spatial development. In this regard, better coordination of the transportation ministry and other land-use-related ministries, including the Ministry of Physical Planning, the Ministry of Works, and the Ministry of Environment, is required to resolve various dimensions of the mobility crisis in the cities.
- b. Adequate funding of transportation infrastructure to cater for both discretionary and non-discretionary trips of all transportation system users. This includes the development of active transportation infrastructure that prioritises pedestrians, cyclists, and other vulnerable users of the transportation system.
- c. formulation and implementation of sustainable public policy for conventional transportation systems. In this regard, the cities and residents require implementing and maintaining various transportation reforms, including provisions for Bus Rapid Transit and other conventional transit schemes.
- d. Better coordination of the transportation and land use processes is needed to eliminate friction, encroachment, and displacement of transportation land use in the cities and other land urban centres.
- e. expansion of public enlightenment to strengthening transportation education and advocacy in society, especially at the tertiary education level.
- f. Enforcement of traffic rules and regulations governing banning unlawful encroachment and displacement of transportation land uses, including street trading, hawking, and begging.

## **References**

Akanmu, A. A., Gbadamosi, K. T. & Omole, F. K. (2022). The Nexus Between City Livability And Transportation in Lagos Metropolis, Nigeria. *Logistics, Supply Chain,*

- Sustainability and Global Challenges*, 13(1), 1-18. <https://doi.org/10.2478/jlst-2023-0001>.
- Akanmu, A. A., Fasina, S. O., Salisu, U. O., Adeyemo, L., & Olorunfemi, S. O. (2022). Socio-Economic and environmental implications of roadside automobile workshops in Ota City. *Nigeria. Journal of Social Science*, 5(3), 48-70.
- Akanmu, A. A., Salisu U. O., Fasina S. O., Adeyemi A. A. & Sanni, S. M. (2022). Transportation land use planning in Nigerian cities: issues, challenges and prospects. In K. Lawal, B. Ogunesan, J. Adejare & D. Olagunju (Eds). *Nigeria's cities, regions and transportation systems, a festschrift in honour of Tpl. Owolabi Dadebo Agboola. Centre for Innovative Design and Development Research (CIDDR)*, Ibadan. Pp. 260-271.
- Akanmu, A. A., Salisu, U. O., Fasina, S. O., Sanni, S. M., Olatunji, O. M., & Faleti, C. A. (2020). State of urban transport in a traditional Nigerian city. *Transport and Communications*, VIII(II),1-12. DOI: 10.26552/tac.c.2020.2.1
- Calthoper, P. (1993). *The new American Metropolis: ecology, community and the American Dream*. California: Princeton Architectural Press.
- Carlton, I. (2007). *Histories of transit-oriented development: perspectives on the development of TOD concept for real estate and transit, urban and social movement*. California: University of California
- European Road Transport Research Advisory Council (2013). Land use and transport interactions, *Integrated Research Initiative*, June 2013
- Fasina, S.O., Salisu, U.O., Odufuwa, B.O., & Akanmu, A.A. (2020). Travel behaviour and mobility challenges of disabled elderly in selected Ogun State, Nigeria cities. *LOGI Scientific Journal on Transport and Logistics*, 11(1), 25-36.
- Fasina, S. O., Salisu, U. O., & Akanmu, A. A. (2020). Curtailing the disaster of moving Monsters in Lagos, Nigeria. *Journal of Academic Research in Economics*, 12(1), 151-173.
- Fasina, S. O., Akanmu, A. A., Salisu, U. O., & Okunubi, S. A. (2020). Intra-city mobility and The characterisation in the fast-growing city of Lagos, Nigeria. *Logistics & Sustainable Transport*. 11(1), 33-50.doi: 10.2478/jlst-2020-0003.
- Giuliano, G. (1995). Land Use Impacts of Transportation Investments: Highway and Transit”, In T. Litman (2012). *Evaluating Transportation Land Use Impacts*. Victoria: Victoria Transport Policies Institute VTPI.
- Hrelja, R. (2015). Integrating transport and land-use planning: How steering cultures in local Authorities affect the implementation of integrated public transport and land-use planning. *Transportation Research Part A: Policy and Practice*, 74: 1-13  
<http://dx.doi.org/10.1016/j.tra.2015.01.003>
- Messenger, T. & Ewing, R. (1996). Transit-oriented development in the Sun Belt. *Transportation Research Record*, 1552, 145-153.

- Morenikeji, W. (2011). Land use planning and transport system in cities (*Lecture paper presented at 2-Day Mandatory Continued Professional Development Programme*), Town Planner Registration Council of Nigeria and Nigeria Institute of Town Planners, Nigeria.
- Obateru, I. O. (2003). *Yoruba has been a city in history from the 11th century to the present*. Ibadan: Penthouse Publications.
- Ogunsesan, A. S., Akanmu, A. A. & Salisu, U. O. (2022, November). Urbanisation and regional security breaches in Nigerian southwestern communities: the residents' Experiences. *Paper presented at the 53<sup>rd</sup> National Conference of the Nigerian Institute Of Town Planners*, held at International Conference Centre, Abuja.
- Ogunsesan, A. S., Akanmu, A. A. & Oyejide, I. O. (2016). World Bank Contributions to Physical Planning and Disaster Management in Oyo State. In K. Lawal and L. Agboola, (Eds.), *Physical Planning in Nigeria: The Oyo State Experience* (pp. 256-266). Penthouse Publications.
- Olorunfemi, S. O., Akanmu, A. A., Salisu, U. O. (2022). Government investment in road Infrastructure in Kogi State, Nigeria: the impact on urban mobility. *Journal of Social Sciences*, 5 (3), 88-104. [https://doi.org/10.52326/jss.utm.2022.5\(3\).07](https://doi.org/10.52326/jss.utm.2022.5(3).07).
- Oyesiku, K.O. (2014). Managing fast-growing cities in developing countries: The role of urban and regional planners. (*Paper presented at the 27th TOPREC Induction Ceremony*), Town Planning Registration Council of Nigeria, Nigeria.
- Oyesiku, K.O. (2021). *Transport and Logistics in Nigeria*. HEBN Publishers Plc, Ibadan.
- Rodrigue, J. P., Comtois, C. & Slack, B. (2006). *The geography of transport systems*. New York: The Guilford Press.
- Salisu, U. O., Akanmu, A. A., & Fasina, S. O. (2020). Information and communication Technology for improved intra-city traffic flow in Ibadan city, Nigeria. *Journal of Academic Research in Economics*, 12(2), 388-407.
- Salisu, U. O., Akanmu, A. A., Fasina, S. O., & Sanni, S. M. (2020). Traffic congestion and Intelligent transport system in a fast-growing Nigerian city. *Transport and Communications*, VIII(I), 36-49. DOI: 10.26552/tac.C.2020.1.6.
- Still, T. (2002). *Transit-oriented development: reshaping America's Metropolitan Landscape On common ground*. Washington D.C: Winter.
- Wee, B. V. (2002). Land use and transport: research and policy challenges, *Journal of Transport Geography*, 10(4), 259-271.

***Rail Passenger Satisfaction Factors: The Mediating Effect of Word of Mouth***  
**Olayiwola Mojeed<sup>1</sup>, Seyed Mohammadreza Ghadiri<sup>1</sup>, and Olorunnimbe, R.O<sup>2</sup>**  
**Malaysia University of Science and Technology<sup>1</sup>**

**and**

**School of Transport and Logistics, Lagos State University, Nigeria<sup>2</sup>**

**Abstract**

This article provides empirical evidence of how the relationship between passenger satisfaction and word-of-mouth regarding rail service gets stronger or weaker. A study on the variables affecting rail passengers' satisfaction with word-of-mouth as an aspect of the model has progressed to a point that demands further analysis. Limited research shows that moderators' effects on factors affecting passengers or travel and word-of-mouth in the context of rail services have yet to be fully assessed. The authors evaluate the mediating effect of WOM variables on rail passengers using variables from the modified RAILQAUL model and a sample size of 321 passengers. This study employed structural equation modelling (SEM). Findings show that more needs to be published about the influence of WOM on passengers' plans to engage in positive WOM in rail sector settings. It also demonstrates that if rail passengers feel confident in the service, they will be more inclined to share their opinions with friends and acquaintances about how well the service is run and their experiences using it. As a result, WOM and PS are crucial to helping passengers create demand for RS based on word-of-mouth reviews while increasing information and SQ. Retaining this information from the passengers is vital, and at the same time, the information provided must be improved to account for any negative features.

**Keywords:** Passenger, Public, Rail, Service Quality, Transportation, Word of Mouth

**1. Introduction**

Effective transportation services can fulfil the needs of the entire population. According to a 2015 study by the African Development Bank, rail transportation is expected to play an increasingly important role in delivering services over long distances. Railways are more effective in public transport networks for inter-city and metropolitan contexts than other modes of transportation. Because it is less expensive, more convenient, and able to meet demand, a well-developed rail transport system must satisfy its primary goal and the needs of passengers because of its reduced greenhouse gas emissions, higher energy efficiency, and lower cost per tonne mile. On the other hand, word-of-mouth is particularly vital in social media, where people regularly share direct information on sizable digital networks.

As a result, one of the critical objectives of the train system is to boost WOM and foster customer loyalty. Passengers' satisfaction significantly impacts whether they are prepared to spread good word of mouth (Berger & Milkman, 2013; Kang et al., 2020). When there is an adequate connection to the content, passengers are likelier to speak about it. Soderlund and Rosengren (2007) claim that emotions are good and negative, such as affection, enjoyment, and comfort. The "feeling-as-information" theory contends that people's attitudes and



behaviour toward a product or a company are influenced by their feelings. In other words, the spread of WOM is controlled by emotional information or situations. Advertising can evoke emotions using emotive messaging, visuals, music, and celebrity endorsements.

WOM has been proposed as one of the most reliable ways for travellers to get information about services and decide whether to use them (Ameri et al., 2019; Paley et al., 2019). As it links to brand awareness and customer purchasing behaviour, earlier studies should address WOM as a significant component of the marketing communication mix (Chen & Xie, 2008; Nguyen et al., 2020). Train managers must, therefore, be aware of the factors affecting WOM. Despite the significance of information sharing in modern activities, most research on WOM has focused on the psychological causes of passengers' WOM. It is yet unknown how knowledge-sharing programmes' determinant affects passengers' WOM. Potential carriers will be extremely mindful of the passenger experience since customers now have a powerful voice on social media that they can use to demand better service. By drawing on their individual experiences, both settings may learn more about their passengers and keep creating engaging passenger experiences.

Considering this, the passenger, who is now a part of two universes, is integral to the entire procedure. In the same way that our previous study (Siqueira et al., 2019) looked at how an in-store experience influenced online customer behaviour in the form of social media word of mouth, it would be interesting to see future research examine how people behave in the physical world in terms of word-of-mouth intention and interactions with peers. Numerous studies have discovered that these actions boost customer satisfaction or loyalty and the number of people using public transit (Lierop & El-Geneidy, 2016; Ratanavaraha et al., 2016). Similarly, several factors affect passenger satisfaction. Before using the service, users will form their own opinions on it. The quality of the service has an instant effect on how satisfied the passengers are. The delight of passengers is the goal of excellent service. Additionally, when a passenger makes a comparison, overall satisfaction reduces. Other forms of transportation besides train service require passengers to make decisions quickly. The swap will make it less enjoyable for passengers.). The focus of this study will be the variables affecting rail passenger satisfaction. According to Bieger and Laesser (2004) and Murphy, Mascardo, and Benckendorff (2007), understanding the WOM mediator is particularly important for management because travel and destination decisions are frequently based on information disseminated through WOM.

## **2. Literature Review**

Previous studies (Duan et al., 2008; Liu et al., 2017) show that WOM impacts customers' decisions. Public transportation, particularly the rail service, has attempted to sway passengers' inclination to recommend the service due to word-of-mouth (Park et al., 2020). This can be done by using a variety of communication channels, like advertisements and digital content (Bu et al., 2020). Both Sara and her coworkers (2021). Service providers can

measure the service's effectiveness and efficiency objectively, while passenger opinions and expectations can be used to measure the subjective quality of rail service. Surveys of passenger satisfaction can be used to achieve the latter objective. The subjective measure of satisfaction at any given time is based on performance evaluations and market expectations. The service is also evaluated or compared to prior satisfaction based on consumer responses from time to time. For public transport to be successful, passenger satisfaction must be a crucial intermediate goal in service operations as a performance assessment (De Ona et al., 2016). Wieseke et al. (2017) conducted an empirical investigation on the role of service and how it affects customer satisfaction. According to a study, customers treated well are more inclined to visit and are more willing to overlook any possible mistakes. Irfan et al. (2017) also researched how satisfied rail customers were with the service by incorporating five service quality factors explicitly highlighted in the survey.

Similar to a prior study that looked at how a physical experience affects customer behaviour through social media word-of-mouth, it would be interesting to see future research analyse the circumstances in the physical world regarding word-of-mouth intention and interactions with peers (Siqueira et al., 2019). Therefore, word-of-mouth (WOM) is a type of informal interpersonal communication that is not driven by profit and can happen as a result of their experience with the service (Berger, 2014; Godes & Mayzlin, 2004; Lin et al., 2021; Paley et al., 2019). Studies have been keen to create and maintain a positive WOM for their expectations because the success of their service is inextricably linked to WOM. Babic Rosario et al. (2016), Nisar et al. (2020), Asmagilova et al. (2010), Gauri et al. (2008), Awad and Ragowsky (2008), Gauri et al. (2008), Chevalier and Mayzlin (2006), (2008). Prior studies have already helped to identify several causes of WOM. From the consumer's perspective, self-enhancement, self-efficacy, compassion, need for social interaction, social support, and identity signalling are some of the psychological precursors of WOM (Angelis et al., 2012; Berger, 2014; Hennig-Thurau et al., 2004; King et al., 2014). WOM is thought to be fueled by consumer trust, contentment, self-connection, loyalty, commitment, perceived quality, and perceived value (Borah et al., 2020; Brown et al., 2005; Gill-Simmen et al., 2018; Matos & Rossi, 2008).

Researchers in the service sector have discovered a variety of strategies for boosting positive WOM for a business. For instance, Berger and Schwartz (2011) examined how product attributes affect WOM. According to Thomas et al. (2020), companies may use celebrities to increase WOM. Lu et al. (2020) investigated how piracy affects word-of-mouth (WOM). Other strategies for producing WOM include using quick nudges or suggestions, interacting with customers in communities, and letting clients showcase themselves to others (Rosario et al., 2020). However, very few studies have examined how factors related to rail services, such as sharing and passengers, can improve positive WOM. This study will add rail passenger satisfaction to the WOM literature. Building on the body of literature already available, The Mediating Role of Word of Mouth.

Table 1: Construct a quantifiable summary based on the literature

Fredrik. et al. 2021	Analysing how rail delays affect passenger satisfaction	Transportation Research Part A	<a href="#">Volume 152</a> , October 2021, Pages 19-35
Veronique, et al 2021	The effort is where satisfaction is found. Is Gandhi's adage applicable to satisfaction with commuting as well?	Transportation Research Part A	<a href="#">Volume 151</a> , September 2021, Pages 214-227
Adebola, et al.2021.	Evidence from Ibadan, Nigeria's multicriteria evaluation of the quality of informal public transportation	Case Studies on Transport Policy	journal homepage: www.elsevi
Juan de Ona <sup>a</sup> et al,2021	How do users of private vehicles view the calibre of public transportation services in major cities? Using a European example	Transport Policy	<a href="https://doi.org/10.1016/j.tranpol.2021.08.005">https://doi.org/10.1016/j.tranpol.2021.08.005</a>
Kaspan Eka.et al,2021.	The impact of public transportation on Medan City's quality of life	Procedia - Social and Behavioral Sciences	Elsevier Ltd. This is an open-access article.
Adane Obsie et al,2020.	Passengers' perspectives on the Addis Abeba Light Rail Transit's service quality	Springer	Urban Rail Transit <a href="https://doi.org/10.1007/s40864-020-00135-2">https://doi.org/10.1007/s40864-020-00135-2</a>
Naveena, et al,2019.	The Causation-Effect Chain Relationship between the Service Quality Model and Overall Satisfaction	Transportation Research Procedia	World Conference on Transport Research - WCTR 2019Mumbai 26-31 May 2019
Ivan Ka Wai Lai (2020)	An investigation of Portuguese cuisine word-of-mouth satisfaction in Macau: Using the idea of integrated satisfaction	Journal of Hospitality and Tourism Management	<a href="#">Volume 43</a> , June 2020, Pages 100-110

## 2.1 Research hypothesis

H1: Accessibility to rail services positively mediates Word of Mouth

H2: Commitment to rail services mediates Word of Mouth

H3: Rail convenience has a practical mediating effect on word-of-mouth

H4: The cost of the train has a mediating effect on word-of-mouth

H5: Word of mouth is mediated with rail tangible.

H6: Word of mouth influences passenger satisfaction in a way that acts as a mediator.

## 3. Research Methodology

This study employs a quantitative method based on creating a structured self-administered questionnaire to examine the conceptual model and test the proposed hypotheses. A group of statistical methods for data analysis make up the SEM approach. The series includes path analysis, confirmatory factor analysis (CFA), structural regression, and late change models. The structural model shows the direction and intensity of the relationships between the latent variables. The study was carried out using a standardised questionnaire, and data from 321 respondents was gathered using the survey approach. The average score of the items as aggregate measures and Cronbach's alphas are used in the report to illustrate the characteristics of the data. Cronbach's alpha measures consistency. On average, a credible indication is one with an Alpha value greater than 0.7. (Hair et al., 2019; Shmueli et al., 2019).

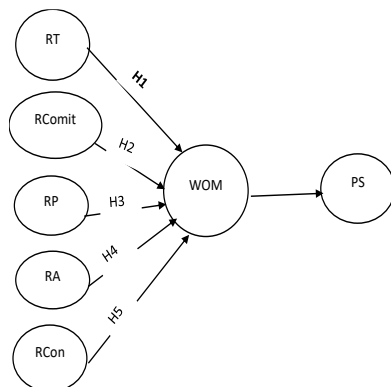


Figure 1: Proposed conceptual framework

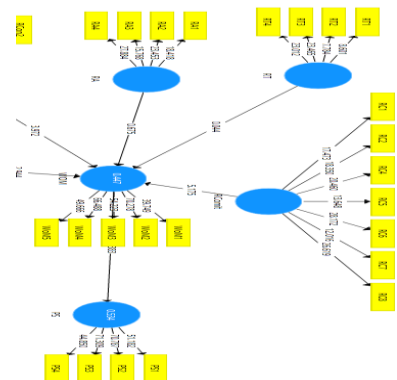


Figure 2: Struc

### 3.1 Structural equation modeling

Before evaluating the structural link between constructs, a two-step SEM technique, measurement model and structure model, was used to establish the reliability and validity of the measures. The maximum likelihood estimation method was utilised in this work because it gives a consistent approach to parameter estimation issues that may be created for a wide range of estimate scenarios.

### 3.2 Measurement model

The concept measures' reliability, convergent validity, and discriminant validity were examined to evaluate the measurement model.

### 3.3 Reliability analysis

Compared to the predicted components, Cronbach's alpha and composite reliability values for all factors, as shown in Table 4, are more significant than 0.50, indicating more robust indication reliability.

### 3.4 Convergent validity

The standardised loading elements in Table 4 were deemed significant because they were more than the cut-off value of 0.50. (Hair et al.,2010). Indicating that their theoretical constructs accounted for more than half of the variances in the items, the average variance extracted (AVE) of latent constructs was more significant than the indicated threshold value of 0.50 (Hair et al., 2010), ranging from 0.468 to 0.763. The resulting high level of convergent validity is established by the data available.

### 3.5 Discriminant validity

By contrasting the shared variances of components with the square root of AVE for each construct, the discriminant validity of the square root of AVE was evaluated. The discriminant validity was satisfactory, as shown in Table 3 by the fact that all shared variances of one construct with other constructs were less than the square root of the AVE of the individual variables. As a result, each construct differed statistically from the others. Pearson correlation coefficients were calculated to investigate the relationship between variables. Because a single construct in the questionnaire consists of many items, the multi-items for each construct were first calculated to obtain a composite score.

**Table 2: HTMT and R<sup>2</sup> Output**

	PS	RA	RComit	RCon	RP	RT	WOM
PS							
RA	0.412						
RComit	0.722	0.416					
RCon	0.706	0.43	0.868				
RP	0.404	0.159	0.408	0.412			
RT	0.52	0.317	0.717	0.571	0.214		
WOM	0.805	0.289	0.703	0.668	0.4	0.407	

**Table 3: Loading**

	R Square	R Square Adjusted
PS	0.534	0.533
WOM	0.447	0.438

Constructs	Loading	CA	CR	AVE
Passenger Sat	0.857			
	0.892	0.896	0.928	0.763
	0.895			
	0.85			
Rail accessibility	0.792			
	0.863	0.857	0.895	0.681
	0.788			
	0.856			
Rail Commitment	0.653			
	0.68			
	0.743	0.811	0.859	0.468
	0.61			
	0.763			
	0.577			
	0.741			
Rail Connivance	0.824			
	0.841	0.843	0.894	0.68
	0.787			
	0.844			
Rail Price	0.788			
	0.861	0.897	0.922	0.705
	0.871			
	0.901			
	0.769			
Rail Tangible	0.595			
	0.559	0.692	0.813	0.53
	0.847			
	0.857			
Word of Mouth	0.839			

0.885			
0.873	0.918	0.939	0.754
0.884			
0.859			

Studies on the influence of WOM on passengers' intentions to engage in positive WOM are scarce in rail sector contexts. In this study, we propose that if rail passengers have confidence in the service, they will be more open to discussing the quality of the service and their experiences using it with their friends and acquaintances. Raffaele (2015) In fact, passengers are more likely to enhance their decision-making if they follow the advice of other passengers. For instance, by studying passenger evaluations, travellers may experience lodging, dining, or off-the-beaten-path activities. As a result, the passenger may be inspired to spread the word to others about the advice they obtained from train excursions. Because there is very little danger and high reliability, passengers with more confidence in RS's reliability are more inclined to inform their friends and acquaintances where the advice originated from (Tab. 3). This is why we make a hypothesis.

**Table 4: Results**

	Original Sample (O)	SE	T Statistics ( O/STDEV )	P Values	Results
RA -> WOM	0.024	0.036	0.675	0.25	Unconfirmed
RComit -> WOM	0.378	0.073	5.175	0	Confirmed
RCon -> WOM	0.25	0.063	3.972	0	Confirmed

RP -> WOM	0.145	0.049	2.944	0.002	Confirmed
RT -> WOM	0.002	0.05	0.044	0.483	Unconfirmed
WOM -> PS	0.731	0.029	25.383	0	Confirmed

#### 4. Theoretical Contribution

For the first time, this study considers five second-order formative notions drivers of WOM and passenger satisfaction. The study also adds a second-order construct (Rail commitment) to the RAILQUAL model and restructures the inter-relationships between variables.

The results show that WOM and PS are pattern drivers; those considering WOM based on passenger experience were also satisfied with the RS, and RS advocated the service to other WOM. That satisfaction led to reinforcing recommendations to others.

##### 4.1 Practical Contribution

The project aims to empirically validate a model that uses the second additional formative factor to enable rail service operators to understand how WOM and PS expectations are intertwined. As a result, WOM and PS are essential components in assisting passengers' activities in generating demand for RS based on word-of-mouth recommendations while enhancing information and SQ. Retaining this information from passengers while refining the information offered as a feedback check on the unfavourable aspects is critical. Passengers' satisfaction with the WOM offered and their experience with the service is insufficient to persuade them to recommend it to others. Rail managers should know that passenger satisfaction and word-of-mouth are critical to generating loyalty. Passengers must have faith in the rail service for management to decrease and detect fraudulent reviews on the WOM information by some disgruntled passengers.

##### 4.2 Conclusion/Recommendations

In various respects, our findings add to the notion of satisfaction. First, our study presents and investigates a new and significant potential advantage of WOM for public transportation, particularly rail service, namely increasing positive WOM among passengers. Second, whereas earlier research on WOM has focused on the mental histories of WOM, our study adds to this body of knowledge by demonstrating the use of passenger awareness as a unique technique for generating good WOM for an RS. Moreover, our findings are consistent with Ameri et al., 2019 Paley et al., 2019 Nguyen et al., 2020 and Siqueira et al., 2019. According to the study, rail operations might benefit from targeting specific passenger categories to boost the positive WOM benefits of their passenger efforts. For example, varieties may target inexperienced consumers unfamiliar with a service. Passengers who are socially engaged and eager to share information with others in their every day lives might be a target for business customer education initiatives. Furthermore, traditional passenger WOM-building initiatives have primarily focused on short-term incentives. WOM, on the other hand, may be thought of as a long-term strategy with continuous benefits. We also looked at the mechanism and boundary conditions of such WOM impacts, giving us a more detailed picture of how public transportation might achieve good WOM.

### **4.3 Limitations and ideas for additional research**

Even though the study was thoroughly done, a few limitations should be mentioned, and some suggestions should be made for future research. To begin, the questionnaire might be expanded to include additional nations, with the results compared to extend the findings appropriately. Second, the model could be examined using several modes of public transportation grouped by mode of transportation. Nonetheless, we endorse the model, which shows three to five constructs that comprise the respective mediator of WOM constructs. Third, long-term research would be interesting to do to establish causation.

### **References**

- African Development Bank report (2015). Rail infrastructure in Africa. Financing policy options
- Ameri, M., Honka, E., & Xie, Y. (2019). Word of mouth observed adoptions and anime-watching Decisions: The role of the personal vs. the community network. *Marketing Science*, 38(4), 567-583.
- Berger, J. (2014). Word of mouth and interpersonal communication: A review and directions for future research. *Journal of Consumer Psychology*, 24(4), 586–607.
- Berger, J., & Schwartz, E. M. (2011). What drives immediate and ongoing word of mouth? *Journal of marketing research*, 48(5), 869-880.
- Berger, J., & Milkman, K. L. (2013). Emotion and virality: what makes online content go viral. *NIM Marketing Intelligence Review*, 5(1), 18.
- Babić Rosario, A., Sotgiu, F., De Valck, K., & Bijmolt, T. H. (2016). The effect of electronic word of mouth on sales: A meta-analytic review of the platform, product, and metric factors. *Journal of Marketing Research*, 53(3), 297-318.
- Bu, Y., Thaichon, P., & Parkinson, J. (2021). Igniting the Flame with Electronic Word-of-mouth in Digital Marketing. In *Developing Digital Marketing*. Emerald Publishing Limited.
- Brown, T. J., Barry, T. E., Dacin, P. A., & Gunst, R. F. (2005). Spreading the word: Investigating antecedents of consumers' positive word-of-mouth intentions and behaviours in a retailing context. *Journal of the academy of marketing science*, 33(2), 123–138.
- Bieger, T., & Laesser, C. (2004). Information sources for travel decisions: Toward a source process model. *Journal of travel research*, 42(4), 357-371.
- Berger, J. (2014). Word of mouth and interpersonal communication: A review and directions for future research. *Journal of Consumer Psychology*, 24(4), 586–607.
- Bogale, H. (2018). Challenges faced during the development of the Addis Ababa light railway project with limited budget, land, and time constraints in Addis Ababa, Ethiopia. Ethiopian Railways Corporation, Addis Ababa



- Cioca, L.I & Ivascu, L. (2017). Risk indicators and road accident analysis for the period 2012–2016. *Sustainability*, 9, 1530.
- Chen, Y., & Xie, J. (2008). Online consumer review: Word-of-mouth as a new element of the marketing communication mix. *Management Science*, 54(3), 477-491.
- Chevalier, J. A., & Mayzlin, D. (2006). The effect of word of mouth on sales: Online book reviews. *Journal of marketing research*, 43(3), 345-354.
- De Oña, J. & De Oña, R. (2015). Quality of service in public transport based on customer satisfaction surveys: A review and assessment of methodological approaches. *Transport Science*, 49, 605–622.
- De Oña, J.; De Oña, R.; Eboli, L. & Mazzulla, G. (2016). Index numbers for monitoring transit service quality. *Transport Residence Part A Policy Practical*, 84, 18–30.
- Duan, W., Gu, B., & Whinston, A. B. (2008). The dynamics of online word-of-mouth and product sales: an empirical investigation of the movie industry. *Journal of Retailing*, 84(2), 233–242.
- de Oña, J., de Oña, R., & López, G. (2016). Transit service quality analysis using cluster analysis and decision trees: a step forward to personalised marketing in public transportation. *Transportation*, 43(5), 725-747.
- De Angelis, M., Bonezzi, A., Peluso, A. M., Rucker, D. D., & Costabile, M. (2012). On braggarts and gossips: A self-enhancement account of word-of-mouth generation and transmission. *Journal of Marketing Research*, 49(4), 551-563.
- Eboli L, Mazzulla G. (2012). The structural equation for analysing passengers' perceptions about railway services. *Procedia - Soc Behavioural Science*, 54, 96-106.
- Fu Y, Eboli L, Mazzulla G. & Zhang Y. (2017). Railway service quality in northern Italy: A multilevel synthetic assessment. *Advance Mechanical Engineering*, 9(3), 1-12.
- Gill-Simmen, L., MacInnis, D. J., Eisingerich, A. B., & Park, C. W. (2018). Brand-self connections and brand prominence as drivers of employee brand attachment. *AMS Review*, 8(3), 128-146.
- Gauri, D. K., Bhatnagar, A., & Rao, R. (2008). Role of word of mouth in online store loyalty. *Communications of the ACM*, 51(3), 89–91.
- Godes, D., & Mayzlin, D. (2004). Using online conversations to study word-of-mouth communication. *Marketing Science*, 23(4), 545–560.
- Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). Electronic word-of-mouth via consumer-opinion platforms: What motivates consumers to articulate themselves online? *Journal of interactive marketing*, 18(1), 38-52.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*.
- Hair, J. F., Celsi, M., Ortinau, D. J., & Bush, R. P. (2010). *Essentials of marketing research* (Vol. 2). New York, NY: McGraw-Hill/Irwin.
- Holmberg B, & Hyde'n C (2016). *Trafiken i smallest: grunder for planering och forming. Studentlitteratur*

- Irfan SM, Kee D.M.H, & Shahbaz, S. (2017). Service quality and rail transport in Pakistan: a passenger perspective. *World Applied Science Journal* 18(3), 361–369
- Ismagilova, E., Slade, E. L., Rana, N. P., & Dwivedi, Y. K. (2020). The effect of electronic word of mouth communications on buying intention: A meta-analysis. *Information Systems Frontiers*, 22(5), 1203–1226.
- Jomnonkwao, S. & Ratanavaraha, V. (2016.) Measurement modelling of the perceived service quality of a sightseeing bus service: An application of hierarchical confirmatory factor analysis. *Transport Policy*, 45, 240–252.
- Kang, J. A., Hong, S., & Hubbard, G. T. (2020). The role of storytelling in advertising: Consumer emotion, narrative engagement level, and word-of-mouth intention. *Journal of Consumer Behaviour*, 19(1), 47–56.
- Karlsson, J. & Larsson E (2015). Passengers' valuation of quality in public transport with focus on comfort: A study of local and regional buses in the City of Gothenburg, *Transport Policy*, 2(1), 21-33
- Lu, S., Wang, X., & Bendle, N. (2020). Does piracy create online word of mouth? An empirical analysis of the movie industry. *Management Science*, 66(5), 2140-2162.
- Marinov M, Agajere O, Bigotte M, Proietti D, & Gerenska I (2015). Customer satisfaction factors for light rail: What can we learn from a successful case? *Transport Probability* 9, 45–59
- Mouwen A. (2015). Drivers of customer satisfaction with public transport services. *Transport Response Part A Policy Practice*, 78: pp. 1- 20
- Murphy, L., Mascardo, G., & Benckendorff, P. (2007). Exploring word-of-mouth influences on travel decisions: friends and relatives vs. other travelers. *International Journal of Consumer Studies*, 31(5), 517-527.
- Nguyen, H., Calantone, R., & Krishnan, R. (2020). Influence of social media emotional word of mouth on institutional investors' decisions and firm value. *Management Science*, 66(2), 887–910.
- Nisar, T. M., Prabhakar, G., Ilavarasan, P. V., & Baabdullah, A. M. (2020). Up the ante: Electronic word of mouth and its effects on firm reputation and performance. *Journal of Retailing and Consumer Services*, 53, 101726.
- Popp, B., & Woratschek, H. (2017). Consumer–brand identification revisited: An integrative framework of brand identification, customer satisfaction, price image and their role for brand loyalty and word of mouth. *Journal of Brand Management*, 24(3), 250-270.
- Ponrahono Z, Bachok S, Osman M.M, Ibrahim M, Abdullah M.F & Abdullah A (2015). Assessing the urban and rural stage bus services disparities in Peninsula Malaysia. *Plan Malays Journal*, 13(5), 65–84.
- Paley, A., Tully, S. M., & Sharma, E. (2019). Too constrained to converse: The effect of financial constraints on word of mouth. *Journal of Consumer Research*, 45(5), 889–905.
- Quach, S., Septianto, F., Thaichon, P., & Chiew, T. M. (2021). Mixed emotional appeal enhances positive word-of-mouth: The moderating role of a narrative person—*Journal of Retailing and Consumer Services*, 62, 102618.

- Ratanavaraha, V.; Jomnonkwao, S.; Khampirat, B.; Watthanaklang, D. & Iamtrakul, P. (2016). The complex relationship between school policy, service quality, satisfaction, and loyalty for educational tour bus services: A multilevel modelling approach. *Transport Policy*, 45, 116–126.
- Sajjakaj, J., Thanapong C. & Vatanavongs R. (2020). Methodologies for Determining the Service Quality of the Intercity Rail Service Based on Users' Perceptions and Expectations in Thailand. *Sustainability*, 12(4259), 1-30.
- Shen, W.; Xiao, W. & Wang, X. (2016). Passenger satisfaction evaluation model for Urban rail transit: A structural equation modelling based on partial least squares. *Transport Policy*, 46, 20–31
- Saenger, C., Thomas, V. L., & Bock, D. E. (2020). Compensatory word of mouth as symbolic self-completion: When talking about a brand, it can restore consumers' self-perceptions after self-threat. *European Journal of Marketing*.
- Söderlund, M., & Rosengren, S. (2007). Receiving word-of-mouth from the service customer: An emotion-based effectiveness assessment. *Journal of retailing and consumer services*, 14(2), 123-136.
- Siqueira Jr, J. R., Peña, N. G., ter Horst, E., & Molina, G. (2020). A 2020 perspective on "Spreading the word: How customer experience in a traditional retail setting influences consumer traditional and electronic word-of-mouth intention". *Electronic Commerce Research and Applications*, 40, 100930.
- Tan, W. K., & Lin, C. H. (2021). Why do individuals' word-of-mouth destinations never? Visited. *Service Business*, 15(1), 131–149.
- Trusov, M., Bucklin, R. E., & Pauwels, K. (2009). Effects of word-of-mouth versus traditional marketing: findings from an internet social networking site. *Journal of Marketing*, 73(5), 90-102.
- Van Lierop, D., & El-Geneidy, A. (2016). Enjoying loyalty: The relationship between service quality, customer satisfaction, and behavioural intentions in public transit. *Research in Transportation Economics*, 59, 50-59.
- Zhang, M., Hu, M., Guo, L., & Liu, W. (2017). Understanding relationships among customer experience, engagement, and word-of-mouth intention on online brand communities: The perspective of service ecosystem. *Internet Research*.

***The Challenges of Urban Mobility in Kogi State, Nigeria.***  
**Samuel O. Olorunfemi<sup>1</sup>, Enobng E. Okoko<sup>2</sup>, and Kolawole T. Gbadamosi<sup>1</sup>**  
**Department of Logistics and Transport Technology,**  
**School of Logistics and Innovation Technology,**  
**Federal University of Technology, Akure<sup>1</sup>**  
**and**  
**Department of Urban and Regional Planning,**  
**University of Calabar, Calabar<sup>2</sup>**

**Abstract**

*Since the conception of the world, mobility has become inevitable for man to satisfy his social, economic and political needs. Regrettably, today, mobility has been mired in most of the urban centres in the world due to some challenges emanating from poor coordination of the existing urban systems. These challenges threaten mobility and deny urban dwellers maximum satisfaction while embarking on their daily trips. To this end, this study assessed challenges impeding urban mobility in selected urban centres in Kogi State, Nigeria, using a structured questionnaire and personal field observation. Using a systematic sampling method, the structured questionnaire was administered to thousand two hundred fifteen (1,215) household heads in the study area to elicit their perception of the challenges militating against urban mobility. The collected data were analysed using descriptive statistics in the form of frequency counts and percentages. Findings revealed that traffic congestion was the most striking impedance to urban mobility in Okenne and Lokoja; poor quality of road transportation inhibits seamless mobility in Ankpa and Ajaokuta; poor road condition dotted Dekinna, Mopa-Amuro and Bassa-Oguma urban space; and high cost of transportation was manifestly standard in Adavi and Kabba-Bunu. From the preceding, it is recommended that the government develop modern transportation systems that are safe, secure, comfortable and affordable for urban dwellers. Also, there is a need for a standard road capacity framework for road construction, rehabilitation and maintenance across the urban centres in Kogi State. Efficient and effective implementation of the above will significantly enhance urban mobility in the selected urban centres in Kogi State and, by extension, across all the urban centres in Nigeria.*

**Keywords:** *Challenge, transportation, urban mobility, Kogi State, Nigeria.*

**1.0 Introduction**

Since immemorial, mobility across geographical space has been integral to human activity for leisure, comfort, and meeting other needs. People's needs are closely reflected in social, political, and economic interaction. As such, it becomes a paramount issue for urban planners and transport planning experts to ensure sustainable mobility. Arup Climate Group (n.d) remarked that people need to move around to source for basic human needs; mobility is a frill, contributing to the quality of life by allowing exploration, leisure and recreation. Since the beginning of the industrial revolution, in which transportation has been among the prime factors, human settlements have been growing and expanding at an alarming rate regarding territorial space and population (Fasina et al., 2020). Even though the development of modern cities such as New York, Los Angeles, Peking (Beijing), London and Berlin, among others, was anchored on the Industrial Revolution as revealed by Boareto (2003), Un-habitat (2013),

Fasina et al. (2020); the functions of mobility and accessibility provided by transportation boosted the importance of those cities as people continually exploit socio-economic possibilities in them (Un-Habital, 2013; Fasina *et al.*, 2020).

In the city, high-quality mobility is essential for the success of other urban sectors and the creation of jobs, and it plays a prominent role in cultivating an attractive environment for residents and businesses. However, mobility is widely cited as one of the most intractable and universal challenges cities face worldwide (Arup Climate Group, n.d). Montana and Fafael (2016) noted that constant increases in urban mobility have caused particular circulation, parking, traffic congestion, noise, and other pollution problems, profoundly affecting the quality of human life. About the above, Arup Climate Group (n.d) emphasised that as the urban populations increase, existing and emerging cities face the challenge of meeting rising demands for efficient mobility within limited physical infrastructure capacity. According to Sudhakara & Balachandra (2012), urbanisation has been discovered as one of the significant challenges of the 21st century owing to the high population and resources in cities. As the economies grow and cities expand, there is a considerable increase in transportation needs. Kenworthy (2008) argued that many towns are automobile-dependent, with established rates of automobile ownership and mass transit. Kenworthy (2008) and Sudhakara & Balachandra (2012) remarked that the increasing urbanisation rates in developing countries with the pooled effect of population upswing, rapid economic growth, increased mobility and vehicle ownership are a cause for concern. Despite the importance of transportation, its inherent problems, especially road transportation, pitched into tumult of public controversy and subject to the whimsies of political, economic and social expediency (Osuji & Onyenechere, 2013).

Sustainable mobility in urban areas is crucial for the smooth operation of the local and national economies (Yannis & Constantinos, 2013). Congestion, accidents, delays, air pollution, noise, and infrastructure damage are some of the significant adverse effects of urban mobility. Urban traffic is responsible for 40% of carbon oxide (CO<sub>2</sub>) emissions and 70% of other pollutants from road transport (European Commission, 2007). Furthermore, the European Commission (2007) also noted that the number of road traffic accidents in towns and cities is increasing every year: one in three fatal accidents now happen in urban areas, and it is the most vulnerable people, namely pedestrians and cyclists, who are the primary victims. The management of road transportation systems in some world cities is poor, which aggravates the suffering passengers go through while commuting (Ohakwe & Ezirim (2006). Evidence from Nigeria and other developing nations shows that most urban centres' road infrastructure needs to be more robust regarding the number provided, capacity required, and maintenance needed. This, in turn, gives rise to over-loading of vehicles, traffic congestion, surface wear-off of the roads, and road traffic accidents (Basorun & Rotowa, 2012; Osuji & Onyenechere, 2013).

The above is also true of Kogi State, an intervening State between the Northern, Southern and the Eastern part of Nigeria. It usually absorbs more traffic from all parts of the country with attendant road transport problems. Olorunfemi (2020) affirmed that roads across Kogi State are grossly inadequate, as potholes, poor quality transport services and inadequate sub-infrastructure such as drainage systems, bus stops, parking facilities, bridges, and street lights characterise most. The above cumulatively hindered efficient and effective mobility. Against this background, this study assessed urban mobility challenges in Kogi State, Nigeria, to suggest sustainable strategies for improved urban mobility.

## **2.0 Literature Review**

Mobility is an indispensable human need. Human survival and societal collaboration depend on the ability to move people, goods, and services within rural or urban areas. Urban mobility can be viewed as the movement of people or freight in a metropolitan area and revolves around all urban transportation systems (Rodrigue, 2017). Undoubtedly, efficient mobility systems are essential facilitators of economic development. Cities could not exist, and global trade could not occur without systems that could transport people and goods cheaply and efficiently (World Bank, 2002). Owing to the increase in human activities across the globe that warrant constant mobility, it is noteworthy that the last twenty years have experienced massive growth in the number of cars, bikes, motorised two-wheelers and para-transit vehicles (such as minibuses) in many developing countries (Olorunfemi, 2020). Corroborating the above, Okoko (2018) stated that vehicle ownership is rising at a rate of 15 to 20 per cent annually in much of the developing world as more people travel, live and work in cities. However, the necessary transport infrastructure such as roads, pavements, bus stops, bike lanes, lay-by, public transport, traffic management, drainage systems, parking facilities, traffic lights, street lights and emissions controls are developing more slowly, generating congestion, pollution and high accident rates posing a severe threat to mobility.

Fasina *et al.* (2020) declared that the importance of transportation as an unavoidable interface, irrespective of the demographic class, cannot be overemphasised as it principally facilitates vital links for accessibility and mobility for all and sundry appropriately and safely (Badejo, 2014; Bimal, 2014; Salisu, 2019). Despite the noticeable significance of transportation to the socio-economic development and prosperity of any city, urban transit, most especially in third-world countries including Nigeria, is still encumbered with numerous accessibility and mobility issues which are directly connected with the increasing and unguided population agglomeration and urbanisation, industrialisation and land-use changes (Fasina *et al.*, 2020).

Basorun (2005) identified the reasons for mobility within an area or region, including business, education, health, recreation and visits to family and friends. In Europe, for example, between 1990 and 2010, passenger transport in the EU27 increased 35% to 6.4 billion passenger kilometres, which is, on average, almost 13,000 km per person. From the total

passenger kilometres, passenger cars accounted for 73.7%; buses and coaches 7.9%; railways 6.3%; powered two-wheelers 1.9%; and tram and metro 1.4%. Intra-EU air and intra-EU maritime transport contributed 8.2% and 0.6%, respectively (European Union, 2013). In India, according to Sanjay (2006), road-based passenger mobility has increased tremendously over the years. From 1950-51 to 2000-01, passenger mobility rose from 36 billion passenger-kilometres (BPKm) to 3079 BPKm due to a more than 30-fold increase in annual distance travelled by the people (from 100 in 1950-51 to 3021 Kms in 2000-01) and a 2.84-fold rise in population (from 359 million in 1950-51 to 1019 million in 2000-01). It is interesting to know that between 1980-81 and 2000-01, in light of a 50% population growth, motorised mobility by road in India has risen by 425% (from 585 to 3079 BPKm).

In many African countries, especially Nigeria, a sprawling environment has increased commuters' volume and trip lengths, of which 95% of such trips are carried out on the road (Oni, 1992; Asenime, 2008; Asenime, 2013). Over the years, these vast movements of commuters have put considerable pressure on the existing transport infrastructure, resulting in severe deterioration of the infrastructure and the environment (Asenime, 2013). This manifests in the massive daily traffic congestion experienced during peak hours, with a loss of productive person-hours, stranded passengers, and endless waiting for buses that take too long to arrive (Asenime, 2008).

Over the years, several authors have researched urban mobility. Some of these authors look at the travel pattern of commuters, transport infrastructure, and commuter's safety and comfort, among others. Fasina et al. (2020) studied Intra-City Mobility and Characterization in the Fast-growing City of Lagos, Nigeria. The author used a questionnaire to collect data from 182 commuters, which was analysed using descriptive and inferential methods. The study revealed variations in socioeconomic parameters of intra-city trip makers and factors influencing trip making. It was observed that journeys to work, school, shopping cum business formed the significant reasons for trips to Lagos. However, the author failed to identify challenges encountered by commuters in the study area.

Solanke (2013) examined urban transportation challenges in Nigeria and discovered that rapid growth and uncontrolled horizontal motion of cities are essential for urbanisation in Nigeria. In conjunction with inadequate transport infrastructure and services, the above has made the urban transportation system chaotic, complex and almost intractable. Nevertheless, the study needed to analyse the results to reflect the findings empirically.

Okoko (2009) worked on global cities and the quandary of mobility using the P3 paradigm as a panacea in Lagos megacity. The study investigated the role of the Lekki Concession Company. This private firm entered into a Public-Private Partnership on a Build-Operate-and-Transfer arrangement, with a conception period of 30 years, with the Lagos State Government. The study indicated that before the BOT arrangement, the state of road infrastructure in the

area could have been better, with crumbling sidewalks, badly pot-holed road surfaces, non-functional traffic lights, poor signage and blocked or non-existent drainage systems. The study revealed that the company provided high-quality road infrastructure and related services along the Lekki peninsula axis in Lagos. Specifically, the LCC ensured greater ease and convenience in commuting, reduced journey time, improved road safety through better street lighting, reduced traffic congestion, attenuated the cost of motorists and abated wear-and-tear on motor vehicles. The study advocated replicating PPP projects to provide transportation facilities in other parts of Lagos metropolis and Nigeria to enhance urban mobility.

Hyodo, Montalbo, Fujiwara, and Soehodho (2015) observed that several factors, such as the level of motorisation, availability of facilities, city structure, the pace of economic growth, and local culture, among others, influence transportation demand. Notably, where there is commotion between the above factors, as opined by Hyodo et al. (2015), there will be many challenges to be encountered by people as the need for mobility arises. These noticeable challenges stand as the research gap this study aimed to address to suggest better measures to improve urban mobility and trip-making for the safety and comfort of commuters.

### **3.0 Study Area**

Kogi State, Nigeria, was carved out of Kwara State and Benue State in 1991 and is one of the major states in the central region of Nigeria with a population of 3,314,043. The state was created by General Ibrahim Babangida, the then Military President of Nigeria. It is popularly called the Confluence State because the confluence of River Niger and River Benue is at its capital, Lokoja, which is the first administrative capital of modern-day Nigeria. Kogi State is between latitudes 7°30<sup>1</sup>N - 7°52<sup>1</sup>N and longitudes 6°38<sup>1</sup>E – 6°42<sup>1</sup>E. Agriculture and fishing are the mainstay of the economy. The State is blessed with mineral resources such as limestone, coal, marble, and iron ore,

There are three main ethnic groups and languages in Kogi; these are Igala, Ebira, and Okun (Yoruba Group) with others such as Bassa-Nge, a people of Nupe extraction in Lokoja and Bassa Local Government Area, Bassa-Komo of Bassa Local Government Area, Gwari, Kakanda, Oworo people (A Yoruba Group), Ogori, Magongo, and the Eggan community under Lokoja Local Government. Kogi State consists of twenty-one (21) local government areas, and these are Adavi, Ajaokuta, Ankpa, Bassa, Dekina, Ibaji, Idah, Igalamela-Odolu, Ijumu, Kabba/Bunu, Koton-Karfe, Lokoja, Mopa-Muro, Ofu, Ogori/Magongo, Okehi, Okene, Olamaboro, Omala, Yagba East and Yagba West. The modes of transportation in the state include road and water transportation. Kogi State connects the Federal Capital Territory with Nigeria's South Western and South Eastern States. Being near the Federal Capital Territory, Abuja International Airport is the national and international gateway for air travellers from and to the state. The notable farm produce in the study area are coffee, cocoa, palm oil, cashews, groundnuts, maize, cassava, yam, rice and melon. The state is home to the largest iron and steel industry in Nigeria, known as Ajaokuta Steel Company Limited, located



in Ajaokuta, and the largest cement factory in Africa, located in Obajana, Lokoja Local Government Area



Figure 1: Map of Nigeria showing Kogi State.

Source: Kogi State Ministry of Works and Urban Development, Lokoja (2018)

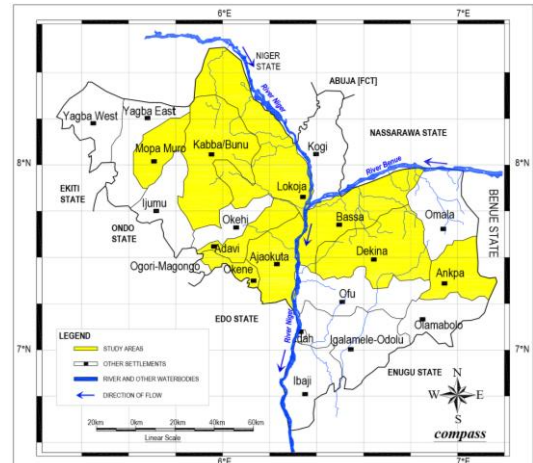


Figure 2: Map of Kogi State Showing Selected Urban Centres for the Study

Source: Kogi State Ministry of Works and Urban Development, Lokoja (2018)

#### 4.0 Methodology.

Both primary and secondary sources of data were used for this research. Personal observation and structured questionnaires were the primary sources of data utilised. The population census figure of Kogi State sourced from the National Population Commission in Lokoja was used as the secondary data. To determine the sample size for the research, the population census results in 2006 of the selected urban centres in the study area were sourced and summed up to 1,717,087 (NPC, 2006). This was projected to 2017 at a growth rate of 2.8%; this amount to 2,321,140, from which 1,658 of the household heads were sampled with the aid of structured questionnaires using a systematic sampling method. From the sampled household heads, 1215 questionnaires were retrieved, analysed and used for this study (see Table 1). The data were presented using descriptive statistics in the form of frequency counts and percentages.

**Table: Projected Population of selected Urban Centres in Kogi State from 2006-2017**

S/N	Name of Settlements	X1 2006 Population Figure	X2 2017 Projected Population Figure	X3 Household Heads to be Sampled	X4 0.005% of Household Heads (Sample Size)	X5 Number of Questionnaires Received
1	Adavi	217,219	294,332	10,512	210	150
2	Okenne	325,623	434,707	15,525	311	205
3	Ankpa	266,176	360,668	12,881	258	200
4	Dekinna	260,968	353,612	12,629	253	195
5	Mopa-Amuro	43,760	59,295	2,117	42	35
6	Kabba/Bunu	144,579	195,905	6,997	140	80
7	Lokoja	196,643	266,451	9,516	190	150
8	Ajaokuta	122,432	165,895	5,925	119	100
9	Bassa	139,687	189,276	6,761	135	100
	Total	1,717,087	2,321,140	82,863	1,658	1,215

Source: X1 – National Population Commission 2006; X2, X3, X4 and X5 – Author's Computation, 2018.

## 5.0 Findings and Discussion

### 5.1 Mode Choice and Purpose of Mobility

Mode choice is the way through which the means of travelling is determined. The means of travel refers to the travel mode used by individual road user to accomplish their journey. This includes walking, bicycling, motorcycling, and bus and car (private or public). There are various means of mobility available to the urban dwellers in Kogi State (see Figure 1a) that are used for their daily commuting, and the analysis revealed that 2.1% of the urban dwellers move on foot, 5.6% use bicycles, 40.2% relied on cars/buses and 50.4% used motorcycle/tricycle. Going by the above, it is evident that most urban dwellers in the study area relied on motorcycles/tricycles to embark on their daily trips. This is so because of its affordability and propensity to provide door-to-door services compared to car/bus. The above situation has been elucidated by Rietveld (2001) and Gbadamosi and Olorunfemi (2016) that the attractiveness or acceptability of motorcycle/tricycle as an essential means of transportation in most parts of developing countries is predicated on its ability to (i) provide door-to-door transport (ii) complement the concept of multi-modal transport chains, and (iii) serve as a cheap or affordable transport mode. For movement, most urban dwellers (36.6%) revealed that their daily movement is to their place of work, business, and trading engagement, and considerable proportions are generated between 2-3 trips daily.

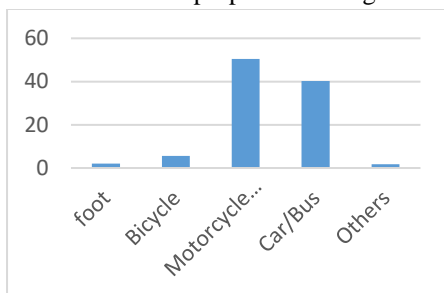


Figure 1a: Means of Mobility  
Source: Author's Fieldwork, 2020

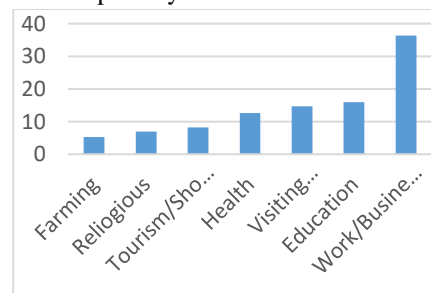


Figure 1b: Purpose of Mobility  
Source: Author's Field Work, 2020

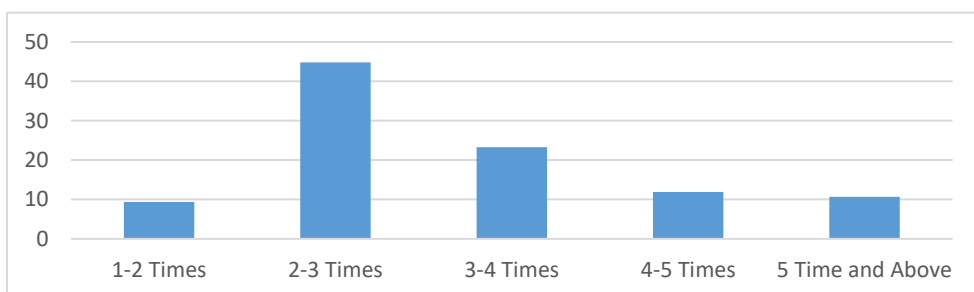


Figure 1c: Frequency of Movement

Source: Author's Field Work, 2019.

### ***5.2. Challenges Impeding Effective Mobility of Urban Dwellers in Kogi State.***

From creation, mobility has become inevitable for man to satisfy his social, economic and political needs. Unfortunately, mobility has been hindered in most urban centres due to challenges from poor coordination of the existing urban systems or growth. These challenges threaten mobility and deny urban dwellers maximum satisfaction while embarking on their daily trips. Table 2 reveals the mobility challenges in the Kogi State. The study showed that most of the respondents in Okenne (28.8%) and Lokoja (36.7%) highlighted traffic congestion as the significant factor impeding urban mobility. Most of the respondents in Ankpa (28.0%) and Ajaokuta (45.0%) see the poor quality of road transportation as the prevailing impedance to mobility. The majority of the respondents in Dekinna (30.8%), Mopa-Amuro (31.4%) and Bassa-Oguma (52.0%) stressed that poor road conditions significantly inhibit urban mobility. Also, a high cost of transportation was observed in Adavi (34.7%) and Kabba-Bunu (45.0) as a significant impediment to urban mobility. Urban dwellers in Adavi, Okenne, Kabba-Bunu, Lokoja and Bassa-Oguma identified accident and robbery, among others, as factors militating against urban mobility.

Across the urban centres, traffic congestion was the most striking concern affecting urban mobility in Okenne and Lokoja. The two urban centres are significant traffic collectors from the country's Southern, Eastern and Northern parts. In addition to the above, these urban centres were surrounded by geographic features such as hills, rocks and rivers, which impede road construction and free traffic flow within the urban centre. Other causes of traffic congestion in Okenne and Lokoja include poor roundabout management, on-street parking, poor road condition, vehicle breakdown, incessant picking and alighting of passengers on the road, and poor drainage system, among others. Corroborating the above, especially in Lokoja, Adetunji (2017) Atomode et al. (2019) identified vehicle manoeuvrings along the road intersections, parking problems, broken down vehicles, impatience on the part of motorists on the right of way, particularly during peak hour, accidents, and roadside hawking/trading among others as the significant causes of traffic congestion.

Poor quality of road transport service has been discovered to be a significant challenge confronting urban mobility in Ankpa and Ajaokuta. This is because most must wait more than 20 minutes before getting a vehicle for their trips. This is way beyond the recommended globally acceptable waiting time for cars. Alphonsus (2010) believes that the quality of road transport service can be determined by the waiting time of passengers before getting a car. He remarked that waiting time, i.e., the time a passenger has to wait before getting on a vehicle, is an essential attribute of public transport service used in predicting the quality of the transport system. Alphonsus (2010) stated that the average passenger waiting time (the time passengers are expected to wait for the arrival of buses at bus stops) that is globally acceptable

ranges from 5-10 minutes for high-quality bus services to and 11-20 minutes for moderate-quality services. When the passenger's waiting time exceeds 20 minutes, the service rendered by the transport operators is considered to be poor. Poor quality of road transport services can also be attributed to inadequate public transportation, as pronounced in the selected urban centres for the study. These have resulted in the proliferation of commercial motorcycle transport businesses across all the urban centres for the study.

The poor road condition was identified as the central urban mobility problem in Dekinna, Mopa-Amuro and Bassa-Oguma. This has made it difficult for the urban centres (i.e., in most cases, delayed journey time) as deep potholes and defective drainage systems characterise most roads. This situation explains the high cost of transportation in the study area. Poor road condition across the selected urban centres is a common occurrence that has increasingly impeded smooth vehicular movement in Kogi state. In consonance with the above, Olaleye (2010) claimed that more than half of African roads (Nigeria inclusive) are motorable for less than half of the year. Undoubtedly, the poor state of many African highways and transport networks becomes a limiting factor to the ability of many African countries to compete favourably and effectively in the global competitive markets.

In addition to the above, Ogwude (2016) maintained that city roads in Nigeria share similar problems with other African city roads, with a significant percentage of one poorly maintained lane prone to flooding due to poor drainage. The implication is that capacity is limited in most cities, and service lanes are absent, putting more strain on existing capacity. Of course, inadequate capacity and poor road conditions reduce vehicle speeds, engender traffic congestion, reduce productivity for all vehicle types, increase the cost of vehicle maintenance and cause accidents. Based on the field survey, the deep and very sharp potholes in the study area have been the primary cause of road accidents in Kogi State. This is further aggravated by the driver's carefree attitude of impatience, wrong overtaking and overspeeding.

**Table 2: Urban Dwellers Perception on Mobility Challenges in the Selected Urban Centres**

Urban Centre's Mobility Challenges	Adavi	Okenne	Ankpa	Dekinna	Mopa-Amuro	Kabba-Bunu	Lokoja	Ajaokuta	Bassa-Oguma
Traffic congestion	22 (14.7%)	59 (28.8%)	15 (7.5%)	-	-	-	55 (36.7%)	-	-
Poor quality of road transportation	10 (6.7%)	31 (15.1%)	56 (28.0%)	23 (11.8%)	3 (8.6%)	10 (12.5)	22 (14.7%)	45 (45.0%)	5 (5.0%)
Poor road condition	15 (10.0%)	15 (7.3%)	21 (10.5%)	60 (30.8%)	11 (31.4%)	5 (6.3%)	15 (10.0%)	5 (5.0%)	52 (52.0%)
Delay in journey time	10 (6.7%)	25 (12.2%)	20 (10.0%)	20 (10.3%)	6 (17.1%)	-	20 (13.3%)	10 (10.0%)	11 (11.0%)
Inadequate public transportation	36 (24.0%)	34 (16.6%)	44 (22.0%)	25 (12.3%)	6 (17.1)	27 (33.8%)	23 (15.3%)	20 (20.0%)	18 (18.0%)
High cost of transportation	52 (34.7%)	40 (19.5%)	44 (22.0%)	53 (27.2%)	9 (25.7%)	36 (45.0%)	10 (6.7%)	20 (20.0%)	12 (12.0%)

Others	5 (3.3%)	2 (1.0%)	-	14 (7.2%)	-	2 (2.5%)	5 (3.3%)	-	2 (2.0%)
Total	150 (100.0%)	205 (100.0%)	200 (100.0%)	195 (100.0%)	35 (100.0%)	80 (100.0%)	150 (100.0%)	100 (100.0%)	100 (100.0%)

Source: Author's Field Work, 2019

6.0 Conclusion and Recommendations

This study assessed urban mobility challenges in selected urban centres in Kogi State, Nigeria, and findings revealed that traffic congestion is the dominant impediment to urban mobility in Okenne and Lokoja; poor quality of road transportation hampered mobility in Ankpa and Ajaokuta; poor road conditions dotted Dekinna, Mopa-Amuro and Bassa-Oguma urban space; and high cost of transportation hindered efficient and effective mobility in Adavi and Kabba-Bunu. Remarkably, urban centres, as a hub for diverse economic activities, will only experience diverse challenges if they are fully supported by modern transportation systems that are safe, secure, comfortable, and affordable for all urban dwellers. Therefore, the following are recommended to ensure efficient urban mobility in Kogi State.

- i. There is a need to create an alternative access route by constructing more motorable roads within the urban centres to facilitate easy movement of people, goods and services, especially in Okenne and Lokoja. This will reduce traffic congestion in the area, which can be achieved by adopting workable government-private partnerships in road infrastructure delivery.
- ii. There is a need for public transport services that are affordable and comfortable for the people. This can be done by formulating a national fiscal policy that will encourage private organisations to partner with the government for effective transport services and reduce the cost of spare parts and new vehicles in the country.
- iii. The government should develop a standard road capacity framework for road construction, rehabilitation and maintenance across the urban centres in Kogi State. This will solve the problem of poor road conditions that have hampered efficient and effective mobility in the country.
- iv. The government needs to institute and empower an agency to regulate the cost of transportation or fare charges by transport operators. This will guide against incessant arbitrary charges or constant hikes in transport costs by transport operators in Kogi State and Nigeria.

References

Adetunji, M. A. (2017). Assessment of the quality of urban transport services in Nigeria, *Academic Journal of Interdisciplinary Studies* 2 (1):49-58.

Alphonsus, N. A. (2010). An Assessment of the Quality of Interurban Bus Services in the City of Enugu, Enugu State, Nigeria. *Theoretical and Empirical Researches in Urban Management* 6(15):75-91

- Arup Climate Group (n.d). *Urban Mobility in the Smart City Age. Smart cities cornerstone series* retrieved from [www. Arup.com/final\\_scheider\\_Smart-Mobility](http://www.Arup.com/final_scheider_Smart-Mobility) on 26<sup>th</sup> July 2020
- Asenime C. O. (2008). *A Study of Water Transport in Metropolitan Lagos*. An unpublished Ph.D. Thesis. University of Lagos, Nigeria.
- Asenime, C. (2013). Intermodality, Mobility and Traffic Flow in Metropolitan Lagos. *American Journal of Social Issues and Humanities* 3(6): 303-311
- Atomode, T. A., Odusolu, E. S. and Isah, I. O. (2019). Spatio-Temporal Pattern of Traffic Congestion in Lokoja, Nigeria: The Transport Stakeholders' Perspectives in "Perspectives on Research and Sustainable Development in the 21<sup>st</sup> Century, Nigeria. A Book Published by Faculty of Arts and Social Sciences, Federal University Of Lokoja, Nigeria
- Badejo, B. A. (2014). *Transporting the future today: portrait of Nigeria*. Inaugural lecture, Olabisi Onabanjo University, Ago-Iwoye, Ogun State.
- Basorun, J. O. (2005). Human posed barriers to urban commute: Findings and reflections on Akure, Nigeria. *International Journal of Environmental Issues*, 3(1) 88 - 100
- Basorun, J. O. and Rotowa, O. O. (2012). Regional Assessment of Public Transport Operations in Nigerian Cities: The Case of Lagos Island. *International Journal of Developing Societies* 1(2): 82-87 (1):33-50.
- Bimal, D. (2014). *Transport Geography*. Venus Book Publisher and Distributors, New Delhi.
- Boareto, R. (2003). *A brief analysis of informal transportation in Brazil and experiences in regulation*. Published by Ministry of Cities, Brazil.
- European Commission (2007). *Green Paper: Towards a new culture for urban mobility*. Publication of the European Commission, COM (2007) 551 final, Brussels
- Fasina, S. O., Akanmu, A.A., Salisu, U. O. and Okunubi, S. A. (2020). Intra-City Mobility and Characterization in a Fast-growing City of Lagos, Nigeria. *Logistics & Sustainable Transport Journal* 11 (2) 12-22
- Gbadamosi, K. T. and Olorunfemi, S. O. (2016). Rural Road Infrastructural Challenges: An Impediment to Health Care Service Delivery in Kabba-Bunu Local Government Area of Kogi State, Nigeria. *Academic Journal of Interdisciplinary Studies* 5(2):35.44
- Hyodo, T., Montalbo, C. M., Fujiwara, A. & Soehodho, S. (2015). Urban travel behaviour characteristics of 13 cities based on household interview survey data. *Journal of the Eastern Asia Society for Transportation Studies*, 6 (2015): 23–38.

- Kenworthy, J. R., (2008). *Energy use and CO2 Production in the urban passenger transport systems of 84 international cities: findings and policy implications*. In: Droege, P. (Ed.), *Urban Energy Transitions*. Elsevier Science
- Montana, J. E. and Rafael, G. E. (2016). *Comments and Suggestions for Mobility and Road Safety Improvement in Caceres, Spain*.
- Ogwude, I. C. (2016). Managing Transportation Infrastructure In Nigerian Cities. *FUTA Journal of Management and Technology Maiden Edition*, 17-28
- Ohakwe, A. O. & Ezirim, O. N. (2006). *Project planning and evaluation: The planner's perspective*. Port Harcourt, Nigeria: Alpha Armour Investment Ltd
- Okoko, E. (2009). Global Cities and the Quandary of Mobility: The P3 Paradigm as Panacea in Lagos Megacity. *Journal of the Nigeria Institute of Town Planners XXII* (1): pp. 95–104.
- Okoko, E.E. (2018). *Spatial Interaction: The Quintessence of Urban Mobility*. An Inaugural Lecture Series 98 of The Federal University of Technology, Akure, Nigeria, delivered on Tuesday, 8<sup>th</sup> May, 2018.
- Olaleye, F. A. (2010). *Developing the African Economy: The Challenge of Infrastructural*. Paper Presented at International Conference of National Development and Millennium Goals toward Poverty Alleviation, Gimpa, Achimota, Aera Ghana
- Olorunfemi (2020). *Road Infrastructure and Urban Mobility in Selected Urban Centres in Kogi State, Nigeria*. Unpublished PhD Seminar of Department of Transport Management, Federal University of Technology Akure, Nigeria.
- Oni S.I (1992). *A Study of Car parking provisions in metropolitan Lagos*. An unpublished Ph.D. Thesis, University of Lagos, Nigeria.
- Osuji, S .C and Onyenechere, E.C. (2013). The Challenges of Mobility within Owerri City, Nigeria. *Canadian Social Science* 9 (3): 68-73
- Rietveid, P. (2001). *“Biking and Walking: The Position of Non-Motorized Transport Modes in Transport System and Traffic Control*. Pergamon, United Kingdom.
- Rodrigue J. P. (2017). *The Geography of Transport Systems: The Spatial organisation of transportation and mobility*. Retrieved from <http://people.hofstra.edu/geotrans/eng/ch6en/conc6en/ch6c3en.html>.
- Salisu, U.O. (2019). The state of transport administrative structure is in Lagos, Ogun, and Oyo States, Nigeria. *Journal of Spatial and Organizational Dynamics* 7 (1):68–85.

- Solanke, M.O. (2013). Challenges of urban transportation in Nigeria. *International Journal of Development and Sustainability* 2 (2) (2013):891-901.
- Sudhakara, B. R. and Balachandra. P. (2012). Urban mobility: A comparative analysis of megacities of India. *Transport Policy* 21 (2012) 152–164.
- UN-Habitat (2013). *Tool for Rapid Assessment of Urban Mobility–Pilot Test in Nashik City*. Prepared by the Institute of Transportation and Development Policy and Clean Air Asia for UN-Habitat Nairobi, Kenya.
- World Bank, (2002). *Cities on the Move - A World Bank Urban Transport Strategy Review*. Private Sector Development and Infrastructure Department, Washington, D.C, 2006
- Yannis, T and Constantinos, A. (2013). Factors affecting modal choice in urban mobility. *Eur. Transp. Res. Rev.* 2013 (5): 27–39



***Service Quality, Willingness-to-repurchase, and the Mediating Functions of Satisfaction  
and Value-for-money: Study of Domestic Airlines in Nigeria***

Adetayo Olaniyi Adeniran; Mobolaji S. Stephens; Ikpechukwu Njoku

Department of Logistics and Transport Technology,

Federal University of Technology, Akure

***Abstract***

*The study investigates the impact of service quality on passengers' value-for-money, satisfaction, and willingness-to-repurchase among domestic airline passengers in Nigeria. The study dwells on domestic travellers arriving at Lagos' Murtala Muhammed International Airport and Abuja's Nnamdi Azikwe International Airport. The survey included 335 passengers with post-purchase experience and who had utilized the domestic airline's services more than once. Using, Structural Equation Model (SEM), the study found a significant impact between service quality and willingness-to-repurchase ( $p$ -value:  $0.013 < 0.05$ ;  $\beta = 0.113$ ). There is a significant impact between service quality and passengers' value-for-money ( $p$ -value:  $0.000 < 0.05$ ;  $\beta = 0.577$ ). Furthermore, there is a significant impact between service quality and passenger satisfaction ( $p$ -value:  $0.015 < 0.05$ ;  $\beta = 0.245$ ). There is a significant impact between value-for-money and passenger satisfaction ( $p$ -value:  $0.000 < 0.05$ ;  $\beta = 0.463$ ). Additionally, there is a significant impact between passenger satisfaction and passengers' willingness-to-repurchase ( $p$ -value:  $0.000 < 0.05$ ;  $\beta = 0.337$ ), and finally, there is a significant impact between value-for-money and willingness-to-repurchase ( $p$ -value:  $0.032 < 0.05$ ;  $\beta = 0.168$ ). The study showed that airline managers should understand the exact passenger's demand on the economy and business classes, such demands influences passengers' willingness to repurchase.*

***Keywords: Willingness-to-repurchase; Satisfaction; Value-for-money; Service quality; Domestic airline; Nigeria***

**1. Introduction and Background**

Nigeria's airline market is a market with a population of 200 million, is shared by 23 domestic airlines (NCAA, 2022) such as Aero Contractors, Air Peace, Allied Air, Arik Air, Azman Air, Dana Air, First Nation, Green Africa, Ibom Air, Kabo Air, Max Air, Overland Airways, United Air among others. Majority of the domestic airlines operate short-haul routes while some operate both domestic and international routes. In the situation of Nigeria repositioning her agriculture, manufacturing and service sectors and shifting away from a mono-economy that is oil-driven, Nigeria is opening the door to welcome foreign investments from all over the world. This development will be felt in the high standard of living, and the development of tourist attraction centres which will boost the indoor and outdoor tourist market; as a result, the demand for air transportation increasing significantly, and it creates a potential airline market in Nigeria.

Nonetheless, Adeola & Adebisi (2014) noted that the airline industry has been incessantly inflicted with high operational costs leaving them on lean margins. Thus, the high operational costs involved in the business required that they should remain profitable in the industry. Another challenge is that there are different fare variation of flights over time which

can sometimes be enormous (Lu *et al.*, 2017). Additionally, one of the characteristics of airline service (particularly the airline seats being offered by all airlines) is perishability, which implies that once the service is not used, it perishes because it cannot be kept. This can further be explained that immediately the aircraft takes off, the seat cannot be sold, and the existing seats that are not filled are lost (Zhang, 2019). Airlines are faced with different challenges, though they are in different phases. Some of these challenges are usually caused by government policy inconsistencies, political instability, policy defects, among all. As a result, it is essential to find a lasting solution to these challenges. This will enable a tradeoff between airline passenger demand and airline profit, and keep the business thriving such that passengers will not feel cheated.

Following the changing dynamics of various indices such as urbanization, globalization, digitalization, and socio-economic shift that seems to be influencing passenger choice of airline and expected service, the airlines are redesigning and adjusting their level of service offerings. Also, with the limitations brought by the Bilateral Air Service Agreements (BASAs), strategic alliance is been formed by airlines such that they shared code for the purpose of dominating new routes, expanding international route coverage, and delivering excellent service at reduced costs. Competition on prices made the situation worse together with a sharp increase in the foreign exchange (forex) rate, unavailability of forex, and high cost of fuel resulting to frequent losses in Nigeria.

Among the issues impeding the advancement of aviation service is the key criterion used by consumers to evaluate airline services (Adam & John, 2011), which is airline service quality (Chen, 2016). Improving and enhancing quality airline services does not only enhance high-quality growth in the civil aviation industry of any country but also boosts airline revenue (Adeola & Adebisi, 2014; Ma, 2021). Objective evaluation of airline service quality is required for enhancing airline service quality and growing the airline company's client base. Frequent complaints of aviation services being delivered to aviation customers are the manifestation of poor service quality which leads to dissatisfaction (Bellizzia *et al.*, 2018; Zhuo, 2015), and dealing with such complaints is an important aspect of regulating airline service quality. The aftermath of dissatisfaction is complaints, as the duo are found side-by-side. In a situation whereby there are no complaints, it is implied that customers are satisfied with the service offered (Bezerra & Gomes, 2016; Chen, 2016).

Service quality is among the important factors that enhances competitive advantage and airline breakthrough. Studies have been conducted on airline service quality such as Park *et al.* (2004) which focused on service value, satisfaction, and airline image in South Korea; Jin-Woo *et al.* (2005) which focused on reliability, customer service, in-flight service, convenience, accessibility in Australia; Nadiri *et al.* (2008) which focused on airline tangibles, terminal tangibles, personnel, empathy in Cyprus; Clemes *et al.* (2008) which focused on assurance,

convenience, comfort, timeliness, meals, security in New Zealand; Hwa-Kyung (2013) focused on staff attitude, clean interiors, comfortable seats, on-time performance, delicious food in Asia; Gures *et al.* (2014) focused on reliability and airline facilities in Turkey; Faizan *et al.* (2015) focused on airline tangibles, terminal tangibles, personnel quality, empathy, and Image in Pakistan; Rahim *et al.* (2015) focused on reliability, responsiveness, safety, communications, assurance, tangibles, security in UAE; Reza *et al.* (2016) focused on pre-flight service quality, in-flight service quality, and price fairness in Germany.

These earlier studies did not consider passengers' willingness-to-repurchase in their assessments; they did not examine the mediating functions of satisfaction and value-for-money on service quality and willingness-to-repurchase; they were conducted outside Nigeria such that their findings may not be applicable for Nigeria especially the domestic airlines being assessed by domestic passengers. Therefore, in this study, the performance measurement of Nigeria's domestic airlines from the perception of domestic passengers would be conducted and some recommendations would be suggested based on findings for improving the quality of services offered by those airlines, as well as to enhance satisfaction and achieve more than one-time consumption in a form of passengers' willingness-to-repurchase. This study aimed at examining the relationship between service quality and passengers' willingness-to-repurchase, and the mediating functions of satisfaction and value-for-money in the context of the Nigerian domestic airlines.

For this study, the following definitions were adopted:

**Service quality:** This is the customer's judgment based on the overall superiority, distinction or excellence of a product or service after the service offerings (Oliver, 2010).

**Willingness-to-repurchase:** This is a form of post-consumption feedback from the users of the service. An individual tends to repurchase a particular service after a one-time purchase (Schmidt & Bijmolt, 2020).

**Value-for-money:** This is defined as the benefits received by a customer on a product or service in exchange for the price paid (Kashyap & Bojanic, 2000).

**Passenger satisfaction:** This is the pleasure derived by passengers from the consumption of goods or services offered, and it is usually a post-consumption evaluation of a product or service (Giese & Cote, 2000).

## **2. Literature review**

### ***Airline services and categories***

The measurement of airline passenger traffic and airline output is germane to determine the performance of any airline. Airline traffic is the amount of airline output that is sold or consumed. The form of traffic can either be passenger traffic, cargo traffic or both, which can

include air freight, mail and passenger baggage (Peter, Amedeo & Cynthia, 2009). Though the aircraft used for passenger traffic has limited space for carrying air freight which is usually carried in the belly compartments.

Traditionally, airlines have three travel classes in which a passenger may be seated. They are (1) First class, (2) Business class, and (3) Economy class. All these three classes are differentiated by each airline's policies, although there are dynamics by which the classes are differentiated which is based on the cabin configuration (Eric, 2017). The first class, as it connotes, is expensive more than other classes, and the passengers in this category are more comfortable with excellent services. Business class is also referred to as an executive class. The fare of this class is expensive but more affordable than first class. The last is the economy class. This is divided into two categories based on seats in the cabin "regular economy" and "premium economy".

Regular economy class seating is the fundamental form of seating arrangement where passengers receive the basic standard service with no real perks. The major service offered is a seat from point A to point B. The other category of economy class is premium economy seating which is slightly better than regular economy seating but must be less extravagant than business class. Apart from the seating which is a general service, menu items are available for premium economy seating. The distance and row in the seating arrangement in premium economy class are not usually different from that of the regular economy class. The illustration of the traditional classification of airline services is shown in Figure 1 below.

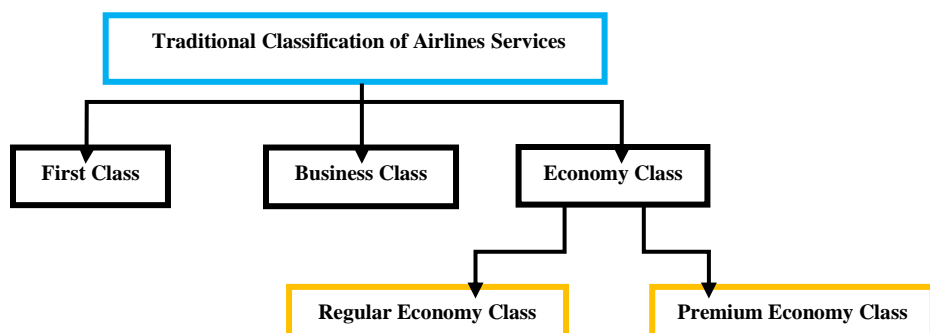


Figure 1: Traditional classification of airline services

Source: Author's design

### ***Service quality measurements of air transport sector***

Various ways of measuring the quality of service and the dimensions have been applied in the air transport sector. Ming-kei & Yui-Yip (2016) examined SERVQUAL dimensions (tangibles, reliability, responsiveness, assurance and empathy) and compared the importance of service quality for airlines and airport. Their study seems to agree with the reality of five

dimensions of service quality as proposed by Parasuraman *et al.* (1988). By applying the perception-expectation gap model, Thomas (2014) investigated how service quality theory impacts on airport users. It was shown from results that the relative importance of these service quality dimensions was heterogeneously perceived by passengers of airlines and airports which are the major air service providers.

Copious studies on the dimensions of service quality have given credence to the notion that service quality is a multidimensional concept. For example, Gronroos (1990) stated that quality should not be measured by a single dimension and further proposed three dimensions: technical, functional and image quality. Despite the consensus on the multidimensionality of the service quality, its dimensionality varies across studies due to the context specific nature of service quality. In spite of the conformity of agreement on the multidimensionality of service quality, its application in the air transportation has achieved mixed results. Some studies support the application of expectation-perception of SERVQUAL, and other studies support the service performance (SERVPERF) measure.

Galloway & Wearn (1998) in their study showed that expectation has no contribution to the predictive capabilities in their survey; which results to the adoption of other alternative measurements that is different from SERVQUAL gap analysis, such as service performance, the importance-performance gap analysis and modifications of service quality adjusted to the specific context. Service quality is identified to be a context-specific construct. There is need to factor in different dimensions of service quality when dealing with specific situation of the industry with regards to service quality measurement (Lagrosen 2001). Despite the fact that SERVQUAL proposed by Parasuraman *et al.* (1988) was tune to broad-spectrum of service quality dimensions, the five dimensions of service quality may not be enough or well-encompassing to sufficiently measure the quality of services within the air transport sector. As a consequence, there is need to complement, modify and adjust the five dimensions of service quality proposed by Parasuraman *et al.* (1998) to the specific situation of air transport context.

In summary, criticisms surrounding SERVQUAL model provides that the assessment of quality and cannot be adopted in all service sectors because it will not address industry specific issues like air transportation. In the air transport industry, critics identified that SERVQUAL model is not suitable for measuring service quality because it does not factor in the specific dimensions of air transport in service quality (Park, Robertson & Wu, 2004). Also, it does not consider the ‘*Moment of Truth*’ as the customer directly interacts with reservation staff, boarding, airlines cabin crew, luggage handling and others (Archana & Subha, 2012; Saha & Theingi, 2009; Nadiri *et al.*, 2008; Prayag, 2007).

In air transportation, airline quality (AIRQUAL) was developed by Ekiz, Hussain & Bavik (2006), it is a comprehensive model of service quality (SERVQUAL). AIRQUAL was

adapted from SERVQUAL model to measure service quality of airlines in the Turkish Republic of Northern Cyprus (TRNC) and was later validated by Nadiri *et al* (2008) to measure perceived service quality in Cyprus. However, it was contended by Nadiri *et al.* (2008) that AIRQUAL model should be adopted in diverse cultural settings. On this note, the application of AIRQUAL was embraced and cemented such that the belief that service quality measurement is country, culture and context specific. According to Ekiz, Hussain & Bavik (2006), AIRQUAL majorly consist of five airline specific dimensions. Among the studies conducted on AIRQUAL measurement of quality are shown in Table 1. Furthermore, some have deployed critical analysis in assessing service quality measurement apart from AIRQUAL measurement.

In this study, the framework of air service quality is measured in terms of services provided in each class of tickets (first class, business class and economy class) in the Nigerian air transport sector.

#### ***Impact of service quality on passengers' willingness to repurchase, value-for-money and passenger's satisfaction***

In recent times, evaluation of service quality is carried out in most research by employing various approaches such as service quality gap, customer satisfaction, customer loyalty, willingness-to-repurchase, and others. Customer satisfaction is a metric used to assess the quality of service (Buaphiban & Truong, 2017; Burton, Sheather and Roberts, 2016). Satisfaction is the benefit acquired by consumers (Sun *et al.*, 2011). The assessment is conducted from the angle of service perception which relates mostly to emotions (Wang, 2014; Yu & Li, 2012).

Based on the measurement of customer satisfaction in the aviation industry, Badama (2015) examined the service quality level of Mongolian airlines and concluded that the satisfaction level of ticketing service and the satisfaction level of ground service affect consumers' airline service experience, which in turn affects customers' loyalty to the airline. Sun (2018) revealed a relationship between varied passenger travel patterns and related variables such as service quality, customer satisfaction, customer value, and propensity to patronize in future. To evaluate service quality, the service quality gap evaluation model is primarily based on the difference between the expected and experienced service quality of consumers (Grönroos, 1984), which may be quantified using the Service Quality scale (Sun *et al.*, 2011), with five qualities of reliability, assurance, tangibility, empathy, and responsiveness (Chen, 2008; Li & Xiong, 2014).

According to Balcombe, Fraser & Harris (2009) and Borhan *et al.* (2017), a service is an activity or a set of activities that take place in contact between customers and service staff and/or systems of service providers and are supplied as solutions to customers' issues.

Increased air passenger traffic has increased demand for the service quality provided by airlines (Oghojafor *et al.*, 2016). To thrive in such intensely competitive circumstances, the airline industry has turned to high-quality service delivery as a marketing approach (Grönroos, 1984). As a result, airline operators should develop their methods to meet service expectations as well as service quality characteristics that are most important to air customers to maximize passenger satisfaction and willingness-to-repurchase (Akamavi *et al.*, 2015; Anderson, Narus & Van Rossum, 2018; Badama, 2015; Leong *et al.*, 2015).

**Table 1: Assessment of Air service quality measurement with techniques**

Author(s)	Year	Country	Sample Size	Unit of Measurement	Method of Analysis
Fareena <i>et al.</i>	2000	US and Europe	1956	Passengers travelling between US and Europe	T-Test
Park <i>et al.</i>	2004	South Korea	592	Korean international passengers	SEM
Jin-Woo <i>et al.</i>	2005	Australia	501	Australian international passenger at T3 airport	SEM
Nadiri <i>et al.</i>	2008	Cyprus	583	North Cyprus national airline passenger	SEM
Clemes <i>et al.</i>	2008	New Zealand	428	International flights Passengers	Multiple Regression T-Test, ANOVA
Saha & Theingi	2009	Thailand	1,212	Passengers of low-cost carriers (LCCs) in Thailand	SEM
Marta & DeCastro	2011	Portugal	11,558	Long haul passengers and medium haul passengers	Multiple Regression Analysis
Hwa-Kyung	2013	Asia	181	Passengers of a major international airline in the Asian region	SPSS, Factor Analysis
Juliet	2013	Uganda	303	International passengers in Entebbe International Airport	Chi square and Regression Analysis
Güres <i>et al.</i>	2014	Turkey	821	Passengers in four Turkish airports	SEM
Faizan <i>et al.</i>	2015	Pakistan	498	Passengers of Pakistan international airlines	SEM
Rahim <i>et al.</i>	2015	UAE	253	Passengers of a Dubai airlines	SEM
Sergejs & Ksenija	2015	Latvia	937	International passengers at RIGA International Airport (Latvia)	Factor Analysis
Rahim	2016	Nigeria	800	Domestic passengers in Lagos Airport	Pearson Correlation and Exploratory Factor Analysis
Reza <i>et al.</i>	2016	Germany	203	Passengers in Munich Airport	CFA, Multiple Correlation
Sandada & Matibiri	2016	South Africa	148	Passengers in Harare International airport	SEM
Samuel	2017	Nigeria	302,869	Domestic passengers in Murtala Muhammed Airport, Lagos	Multiple Regression Analysis
Maria <i>et al.</i>	2018	Italy	3,313	Passengers of Lamezia Terme Airport	Ordered Logit Model
Muhammad <i>et al.</i>	2018	Malaysia	460	Malaysian Airlines Passengers travelled	PLS-SEM
Efthymiou <i>et al.</i>	2019	London	160	Passengers of British Airways at London Heathrow Airport	Chi Square and Correlation
Hyun-Jeong, & Hak Seon	2019	Skytrax Survey	9,632	Passengers in Singapore, Qatar, All Nippon, Emirates, EVA, Cathay Pacific, Lufthansa, Hainan, Garuda Indonesia, and Thai Airlines	Linear regression
Kumar & Kumar	2019	India	323	Passengers of Low Cost Airlines	Factor Analysis and Multiple Regression Analysis
Özlem, Mahmut & Sahap	2019	Skytrax Survey	1096	Business Passengers	Logistic Regression Analysis
Adeniran <i>et al.</i>	2020	Nigeria	514	Domestic passengers in Lagos airport	Factor Analysis

Source: Authors' compilation



Furthermore, service quality is critical to aviation's competitive advantages through increasing customer willingness-to-repurchase, gaining market share, and generating profits (Ozment & Morash, 1994). According to Hapsari (2017), service quality is one of the most researched indicators and pertinent drivers of consumer value-for-money (Yang *et al.*, 2012) and willingness-to-repurchase for airlines (Leong *et al.*, 2015). Based on the discussions, the following null hypotheses were proposed:

*H<sub>01</sub>: Service quality has no significant impact on passengers' willingness to repurchase*

*H<sub>02</sub>: Service quality has no significant impact on value-for-money.*

*H<sub>03</sub>: Service quality has no significant impact on passengers' satisfaction.*

#### **Relationship between passenger's satisfaction, value-for-money and willingness-to-repurchase**

According to Arnoldina & Viktorija (2014) and Chonody *et al.* (2018), relationship between satisfaction and value-for-money constructs have traditionally been defined as an overall construct based on previous interactions and perceptions of the consumer on different service providers. Previous theoretical viewpoints on such relationships in client-vendor exchanges have resulted in the development of measures to assess the quality of interactions and transactions among the users and service providers (Azman *et al.*, 2017; Geraldine, 2013). Satisfaction and value-for-money are the two most prominent factors used to contribute to the relationship quality assessment (Athanassapoulos and Iliakopoulos, 2016; Walsh *et al.*, 2010). Satisfaction denotes an assessment of the product's purchase and/or consumption experience (Giao *et al.*, 2020). Thus, passenger satisfaction is based on their particular experiences in terms of their requirements and expectations (Oliver, 2010). Previous studies by Gures, Arslan & Tun (2014), Leong *et al.* (2015) and Yang *et al.* (2012) have shown that passenger satisfaction can be influenced by service quality and value-for-money.

Furthermore, in the study of Hellier *et al.* (2003), the level of satisfaction felt by passengers after receiving a service influences their willingness-to-repurchase a product or service was identified. Passengers' willingness-to-repurchase was seen as a process in which a person purchases products or services from the same vendors again. Colin, Yahua & Jeff (2022) conducted a study on the nexus between airline service quality, customer satisfaction and repurchase intention, using the perspective of Laotian air passengers, and found a positive relationship between the three constructs. Similar studies were conducted by Chilembwe (2014), Choi *et al.* (2017), Cristobal, Flavian & Guinaliu (2017), and Cubillo, Sanchez & Cervino (2018). Furthermore, it was revealed that willingness-to-repurchase a certain product or service in future is a function of positive post-consumption experiences overtime (Akamavi *et al.*, 2015; Da Silva *et al.*, 2017; Durvasula, 2017). Some researchers discovered a favourable relationship between passenger satisfaction and willingness-to-repurchase (Eliasaph, Farida & Balarabe, 2016; Leong *et al.*, 2015; Vuong *et al.*, 2020). Based on the discussions, the following null hypotheses were proposed:

*H<sub>04</sub>: Value-for-money has no significant impact on passenger satisfaction.*

*H<sub>05</sub>: Passengers' satisfaction has no significant impact on passengers' willingness-to-repurchase.*

*H<sub>06</sub>: Value-for-money has no significant impact on passengers' willingness-to-repurchase.*

### Measurement

As shown in the conceptual model (see Figure 2), value-for-money was represented with reasonable airfare for service and justification for price paid which were developed by Forgas *et al.* (2010) and modified for this study; service quality was represented with airline services for economy class ticket, airline services for business class ticket, and airline services for first class ticket; willingness-to-repurchase was represented with willingness-to-repurchase first class ticket, willingness-to-repurchase business class ticket, and willingness-to-repurchase economy class ticket which were developed by Akamavi *et al.* (2015) and modified for this study; passengers' satisfaction was represented with adherence to COVID-19 safety rules, ground services, cabin services, and on-board services which were developed by Leong *et al.* (2015) and modified for this study. All constructs were measured on Five-point Likert scale.

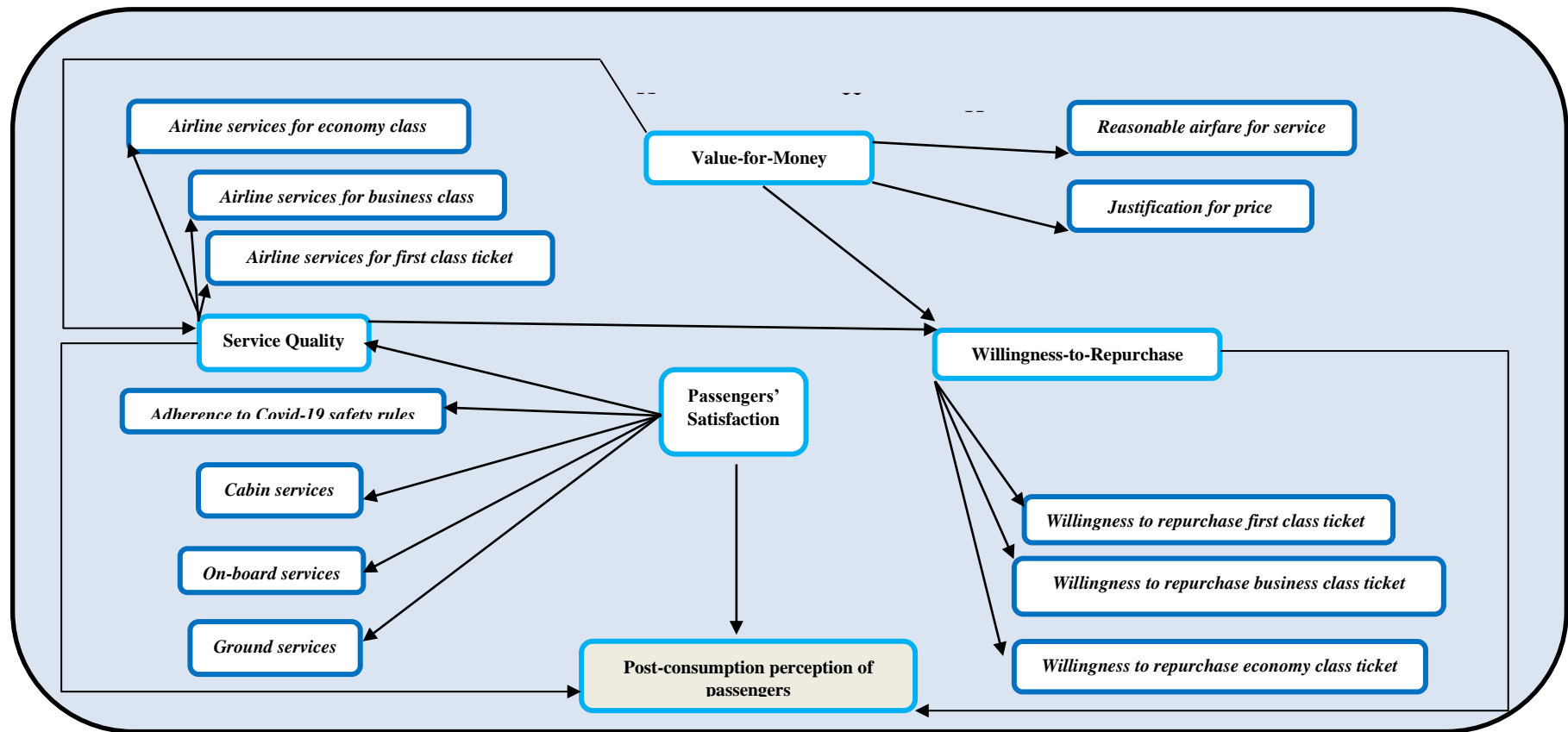


Figure 2: Conceptual model

### **3. Methodology**

#### *Sampling technique and sampling size*

This study deployed multistage sampling procedure (random sampling of airlines in the terminals, and convenience sampling of passengers through the airlines). Electronic questionnaire through Google form was designed and the link was shared to the passengers. The primary data were obtained concurrently from arrival passengers at the two major domestic airports in Lagos and Abuja using an electronic questionnaire through a survey.

In the situation whereby the population is unknown, large or infinite, Zikmund (2013) proposed sample size formula which is determined by different error allowances. To have more sample for this study, the chosen error allowance of 0.04 was deployed to establish the sample size as shown in the equation below:

The formulae for achieving sample size  $n = \frac{Z^2}{4E^2}$

where;

$n$  = sample size;

$Z$  =  $Z$  score for 96% confidence interval is 2.05;

$E$  = Error allowance (0.04)

When inserted into the formula, sample size was approximately 657. Comrey & Lee (2018) provided that the sample size of hundred is poor; a sample size of two hundred is fair; a sample size of three hundred is good; a sample size of five hundred is very good. In this study, the sample size of six hundred and fifty-seven (657) is adequate for reporting. The study targeted arrival passengers in Murtala Muhammed International Airport (MMIA), Lagos, and Nnamdi Azikwe International (NAIA), Abuja. The data was administered between 1<sup>st</sup> to 31<sup>st</sup> August 2021. It is expedient to note that the fear of contacting COVID-19 and it measures will influence the perception of passengers because of the fragile and international nature of air transport business.

It is pertinent to note that for the purpose of capturing willingness-to-repurchase and satisfaction (which are post consumption variables), the respondents are those that have more than one year air travel experience and have patronized the airline more than once. An electronic form of questionnaire was administered to the arriving passengers through the airline customer service representatives. The link of electronic questionnaire was shared with passengers. Out of the 657 responses received, 407 responses were fully completed. From the 407 responses collected, 335 questionnaires (82.31%) were valid for data analysis based on the fact that they have patronized the airline more than once and have more than

one year travel experience. The details of the completed questionnaires received were shown in Table 2 below.

**Table 2: Response rate**

MMIA	NAIA
Domestic	Domestic
208	199
<b>Total: 407</b>	

Source: Authors' Computation (2022)

The completed questionnaire was 407 (208 for MMIA and 199 for NAIA).

The distribution of the sample (see Table 3), there, the majority of respondents were male (53.13%), and were between 26-45 years. These ages were referred to as the economic stimulating age. Most of the respondents (51.05%) were married, and were self-employed and professional (43.88%; 35.22%). This implies that the majority of the people that can afford to travel by air are those in the self-employed and professionals.

**Table 3. Sample distribution**

Items		Frequency	Per cent
Gender	Female	157	46.87
	Male	178	53.13
Marital status	Married	171	51.05
	Single	164	48.95
Age	< 26 years old	63	18.81
	26-35 years old	113	33.73
	36-45 years old	127	37.91
	>45 years old	32	9.55
Occupation	Student	48	14.33
	Self-employed	147	43.88
	Professional	118	35.22
	Retired	22	6.57
Monthly income	Below ₦100,000	12	3.58
	₦100,000 - ₦300,000	128	38.21
	₦301,000-₦600,000	93	27.76
	₦601,000 - ₦1,000,000	79	23.58
	Above ₦1,000,000	23	6.87
Class of ticket	Economy class	233	69.55
	Business class	102	30.45

Source: Authors' work

The airline services were categorized into three classes (Economy class, Business class and First class). Each class determines the package of services that were offered by the airline to the passengers when onboard; it is also among the criteria that determine the amount of airfare. From the analysis shown in Table 3, it was revealed that while there

were no first-class passengers among the respondents, the majority of the respondents (69.55%) purchased economy class ticket, and 30.45% purchased business class ticket.

#### 4. Result

The measurement model connects the variables with their latent variables. The validity and reliability of the multi-item measures were evaluated before doing the SEM estimate (Chang, 2012; Vuong & Suntrayuth, 2020). Following the study of Giao & Vng (2019), which emphasized that the composite reliability values in a model should be 0.7 or more, each variable was examined and plotted to validate reliability (Chen & Chang, 2017). Table 4 clearly shows that all of the variables employed in this study were trustworthy since they had Composite Reliability and Cronbach's Alpha values greater than 0.7. As a result, all results are within the permitted range, implying high dependability. Furthermore, convergent validity is the amount of variation that exists when two or more items agree while assessing related constructs, and it is determined using the Average Variance Extracted (AVE). When the AVE exceeds 0.50, convergent validity is said to be dependable. Table 4 indicated that AVE values ranged from 0.532 to 0.831. As a result, all of the survey instrument's items are now deemed convergent validity.

The correlation matrix can also be used to establish discriminant validity. Since a construct's variance with its associated indicators is greater than its variance with any other construct, the square root of a construct's AVE score should be greater than the squared correlation with any other construct (Vuong & Giao, 2020). Table 4 shows the correlation matrices for the constructions with diagonal values. The square root of the AVE values for each construct was greater than the squared correlation with any other construct. As a consequence, the notions' discriminant validity has been proven.

**Table 4. Internal consistency, convergent, and discriminant validity among constructs**

Constructs	Cronbach's Alpha	Average Variance Extracted (AVE)	WtR	PS	VfM	SQ
WtR	0.887	0.814	(0.885)	0.632	0.582	0.521
PS	0.912	0.831		(0.918)	0.619	0.537
VfM	0.857	0.747			(0.846)	0.576
SQ	0.823	0.532				(0.727)

Notes: WtR= Willingness-to-Repurchase, PS= Passenger Satisfaction, SQ= Service Quality, VfM= Value-for-money; Square roots of average variance extracted (AVE) of latent variables are shown in the parentheses.

Due to the fact that the survey was conducted in two different airports, there is a need to determine whether all the samples are the same. Hence, one-way ANOVA was used to determine whether there is any statistically significant differences between the means of

constructs between groups with different income levels and travel experience of passengers as shown in Table 5. The highlighted values denote statistical significance ( $p$ -value  $< 0.05$ ) and do not support the null hypothesis ( $H_0: \mu_1 = \mu_2 = \mu_3$ ). This implies that there is homogeneity in the samples.

**Table 5. One-way ANOVA tests for constructs between groups with different income levels, travel experience of passengers**

M-I	VfM	PSQ	PS	WtR
Above ₦1,000,000 (n = 23)	3.57	3.15	3.65	3.13
₦601,000 - ₦1,000,000 (n = 79)	3.79	3.63	3.81	3.55
₦301,000 - ₦600,000 (n = 93)	3.64	3.95	3.64	3.81
₦100,000 - ₦300,000 (n = 128)	3.47	3.92	3.12	3.63
Below ₦100,000 (n = 12)	3.25	3.42	3.23	3.45
F-statistics	3.057	1.439	2.936	1.387
p-value	0.024	0.154	0.038	0.181
A-TE				
>2 years (n = 291)	3.71	3.81	3.74	3.87
2 years (n = 198)	3.54	3.77	3.58	3.61
F-statistics	3.393	2.931	1.215	3.329
p-value	0.027	0.014	0.352	0.013

Source: IBM SPSS AMOS 24

Note: VfM = value-for-money; PSQ = perceived service quality; PS = passenger satisfaction; WtR = willingness-to-repurchase; M-I = monthly income; A-TE = air travel experience.

### **Structural Equation Model**

For this study, a preliminary structural equation encompassing all of the survey items was created, and the early model's goodness of fit was assessed using confirmatory factor analysis. Checking the model fit and evaluating the hypotheses comprise the structural model analysis. The findings demonstrate that all of the goodness of fit metrics were within their acceptable ranges:  $\chi^2 = 486.351$  ( $p = 0.000$ ); GFI = 0.903; CFI = 0.961; NFI = 0.923;  $\chi^2/df = 2.573$ ; RMSEA = 0.064 (see Table 6), because they meet the overall fitness level recommendation: GFI  $> 0.90$ ; CFI  $> 0.95$ ; NFI  $> 0.90$ ;  $\chi^2/df < 3$ ; RMSEA  $< 0.08$  (Bentler, 1990; Bentler & Bonett, 1980; Tucker & Lewis, 1973).

**Table 6. Model's goodness of fit index**

All	Model's Goodness of Fit Index					
	$\chi^2$	RMSEA	GFI	CFI	NFI	$\chi^2/df$
	495.240	0.064	0.903	0.961	0.923	2.573

Source: IBM SPSS AMOS 24

The findings revealed that the research model fits well. The results of the hypotheses tests are summarized in Table 7.

Hypothesis 1: The null hypothesis which states that service quality has no significant impact on passengers' willingness-to-repurchase is hereby rejected based on the  $p$ -value:  $0.013 < 0.05$  and beta coefficient: 0.113. Hence, service quality has a significant impact on willingness-to-repurchase domestic airline services in Nigeria (Table 7). According to the findings, the higher the level of quality service, it is more likely that the passengers will be willing to repurchase domestic flight tickets.

Hypothesis 2: The null hypothesis which states that service quality has no significant impact on value-for-money is hereby rejected based on the  $p$ -value:  $0.000 < 0.05$  and beta coefficient: 0.577. Hence, service quality has a significant impact on passengers' value-for-money as perceived by domestic airline passengers in Nigeria (Table 7). The findings revealed that the higher the level of quality service being delivered, it is more likely that the passengers would have a positive justification for the air fare paid on the domestic air trip.

Hypothesis 3: The null hypothesis which states that service quality has no significant impact on passenger satisfaction is hereby rejected based on the  $p$ -value:  $0.015 < 0.05$  and the beta coefficient: 0.245. Hence, service quality has a significant impact on passenger satisfaction (Table 7). The study found that with the increasing level of service quality, it is more likely that the passengers would be satisfied with the services rendered by domestic airline in Nigeria.

Hypothesis 4: The null hypothesis which states that value-for-money has no significant impact on passenger satisfaction is hereby rejected based on the  $p$ -value:  $0.000 < 0.05$  and beta coefficient: 0.463. Hence, value-for-money has a significant impact on passenger satisfaction (Table 7). According to the findings, the higher the level of justification of value received for airfare paid, it is more likely that the passengers would be satisfied with the services rendered by the domestic airline in Nigeria.

Hypothesis 5: The null hypothesis which states that passenger satisfaction has no significant impact on passengers' willingness-to-repurchase is hereby rejected based on the  $p$ -value:  $0.000 < 0.05$  and beta coefficient: 0.337. Hence, passengers' satisfaction has a significant impact on passengers' willingness-to-repurchase (Table 7). The results indicate

that the increasing level of satisfaction will enhance the more willingness-to-repurchase domestic airline tickets in future.

Hypothesis 6: The null hypothesis which states that value-for-money has no significant impact on passengers' willingness-to-repurchase is hereby rejected based on the  $p$ -value:  $0.032 < 0.05$  and the beta coefficient: 0.168. Hence value-for-money has a significant impact on passengers' willingness-to-repurchase (Table 7). According to the findings, the higher the level of justification of value received for airfare paid, the passengers will be willing to repurchase domestic airline tickets in future. **Table 7. Results of hypotheses**

Hypothesis	Relationship	Path Coefficient	Standard Deviation	T-Statistics	$p$ -value	Decision on Null Hypothesis
H0 <sub>1</sub>	SQ → WTR	0.115	0.038	2.235	0.013	Reject H0 <sub>1</sub>
H0 <sub>2</sub>	SQ → VfM	0.577	0.046	15.752	0.000	Reject H0 <sub>2</sub>
H0 <sub>3</sub>	SQ → PS	0.245	0.059	4.331	0.015	Reject H0 <sub>3</sub>
H0 <sub>4</sub>	VfM → PS	0.463	0.055	7.105	0.000	Reject H0 <sub>4</sub>
H0 <sub>5</sub>	PS → WTR	0.337	0.041	6.651	0.000	Reject H0 <sub>5</sub>
H0 <sub>6</sub>	VfM → WTR	0.168	0.058	3.113	0.032	Reject H0 <sub>6</sub>

Source: IBM SPSS AMOS 24

## 5. Conclusions and recommendations

The study was conducted to reveal how passengers' satisfaction, value-for-money and willingness-to-repurchase were impacted by service quality in the context of domestic airlines in Nigeria. Thus, the nexus between service quality and willingness-to-repurchase in the domestic airline industry in Nigeria via the mediation functions of relationship quality (passengers' satisfaction and value-for-money) were measured. It was revealed that willingness-to-repurchase was impacted by the quality of services provided by domestic airlines in Nigeria. Besides, this study also indicated that service quality could improve the level of passenger satisfaction and their perception on the value-for-money, which could enhance more than one-time consumption that is captured with willingness-to-repurchase. On this note, the following recommendations were suggested:

- The questionnaire for the study was designed using services of traditional ticket; this is a major contribution to knowledge, and its adoption will be suitable for use by the managers of domestic airlines in Nigeria when evaluating passengers on airline service delivery towards achieving more than one-time consumption.
- The study found a significant impact between passengers' willingness-to-repurchase and service quality based on the economy and business class tickets. This implies that improvement of each class will assist airlines in addressing pertinent challenges that require urgent attention for improvement. Examples are



increasing the quality of seat pitch, provision of additional baggage spaces, cleanliness of the airline lounge, among all.

Since the study was carried out during the COVID-19 pandemic, the passengers' perception may be influenced by COVID-19 measures. Therefore, the results of future studies that will be conducted during the post-COVID-19 may have slight difference from this present result because most of the COVID-19 measures put in place by government has been relaxed. This study is relevant because the recommendations could be adopted whether there is infectious disease outbreak or not.

Nonetheless, there are some limitations of this study that should be noted in future research:

- This study focused only on willingness-to-repurchase as it is enhanced by service quality. Hence, there could be other relevant constructs that could be measured. In future studies, more factors that seems to impact willingness-to-repurchase may be included.
- This study was conducted only in Nigeria and among domestic airlines and passengers. Hence, the results mainly reflected the passenger behaviours that fly in Nigeria. Similar study can be conducted in two or more African countries to achieve a continental sample.

### **List of abbreviations**

AVE: Average Variance Extracted

BASAs: Bilateral Air Service Agreements

PS: Passenger Satisfaction

VfM: Value-for-money

SEM: Structural Equation Model

SERVQUAL: Service Quality

SQ: Service Quality

WTR: Willingness-to-Repurchase

### **Consent for publication**

N/A

### **Availability of data and materials**

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request, but cannot be made publicly available in order not to go against the declaration of confidentiality made to the participants.

### **Competing interest**

The author declares that there is no competing interest.

### **Funding**

N/A

### **Authors' contribution**

AOA designed the manuscript; MSS supervised and proofread the manuscript; IN: supervised and proofread the manuscript.

All authors have read and approved the manuscript

### **Acknowledgements**

We thank the Editor and Reviewers for their insightful contributions to the improvement of this article.

### **References**

- Adam, L., & John, M. L. (2011). Passenger Service Quality Expectations as Perceived by Long Haul Airline Managers in South Africa. *African Journal of Business Management*, 5(29), 11662-11675. DOI: 10.5897/AJBM11.1741.
- Adeniran, A. O., Stephens, M. S., & Akinsehinwa, F. O. (2020). Factor Analysis of Passengers' Satisfaction at Murtala Muhammed Airport (MMA2). *Aeronautics and Aerospace Open Access Journal*, 4(1):13–24. DOI: 10.15406/aoaj.2020.04.00101
- Adeola, M. M., & Adebisi, S. O. (2014). Service Quality Perceived Value and Customers' satisfaction as Determinants of Airline Choice in Nigeria. *International Letter of Social and Humanistic Sciences*, 20, 66-80.
- Akamavi, R. K., Mohamed, E., Pellmann, K., & Xu, Y. (2015). Key determinants of passenger loyalty in the low-cost airline business. *Tourism Management*, 46, 528-545.
- Arnoldina, P., & Viktorija, A. (2014). Evaluation of Airport Service Quality. *Procedia – Social and Behavioural Sciences*, 110, 398-409 (Elsevier)

- Anderson, J. C., Narus, J. A., & Van Rossum, W. (2018). Customer Value Propositions in Business Markets. *Harvard Business Review*, 84(3), 91-9.
- Athanassapoulos, A. D., & Iliakopoulos, A. (2016). Modeling Customers' satisfaction in Telecommunications: Assessing the Effects of Multiple Transaction Points on the Perceived Overall Performance of the Provider. *Production and Operations Management*, 12(2), 224-45.
- Azman, I., Iiyani, R. R., Rabaah, T., & Norazryana, M. D. (2017). Relationship between Service Quality and Behavioural Intentions: The Mediating Effect of Customers' satisfaction. *Etikonomi*, 16(2), 125-144.
- Badama, K. (2015). Research on Customer Satisfaction of Mongolian Airlines. M.D. Thesis, Beijing Jiaotong University.
- Balcombe, K., Fraser, I., & Harris, L. (2009). Consumer Willingness to Pay for In-flight Service and Comfort Levels: A Choice Experiment. *Journal of Air Transport Management*, 15(5), 221–226.
- Bellizzia, M. G., Ebolia, L., Forcinitia, C., & Mazzulla, G. (2018). Air Transport Passengers' Satisfaction: an Ordered Logit Model. *Transportation Research Procedia*, 33, 147–154.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychology Bulletin*, 107, 238-246.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588-606.
- Bezerra, G. C. L., & Gomes, C. F. (2016). Measuring Airport Service Quality: A Multidimensional Approach. *Journal of Air Transport Management*, 53, 85-93.
- Borhan, M. N., Ibrahim, A. N. H., Miskeen, M. A. A., Rahmat, R. A. O. K., & Alhodairi, A. M. (2017). Predicting Car Drivers' Intention to Use Low Cost Airlines for Intercity Travel in Libya. *Journal of Air Transport Management*, 65, 88-98.
- Buaphiban, T., & Truong, D. (2017). Evaluation of Passengers' Buying Behaviours toward Low Cost Carriers in SouthEast Asia. *Journal of Air Transport Management*, 59, 124–133.
- Burton, S., Sheather, S., & Roberts, J. (2016). The Effect of Actual and Perceived Performance on Satisfaction and Behavioural Intentions. *Journal of Service Research*, 5(4), 292-302.

Chang, Y. C. (2012). Cabin safety behavioral intentions of passengers with reduced mobility. *Journal of Air Transport Management*, 25, 64–66.

Chen, C. F. (2008). Investigating Structural Relationships between Service Quality, Perceived Value, Satisfaction, and Behavioral Intentions for Air Passengers: Evidence from Taiwan. *Transportation Research Part A: Policy and Practice*, 42, 709-717. <https://doi.org/10.1016/j.tra.2008.01.007>

Chen, I.-S. (2016). A Combined MCDM Model Based on Dematel and ANP for the Selection of Airline Service Quality Improvement Criteria: A Study Based on the Taiwanese Airline Industry. *Journal of Air Transport Management*, 57, 7-18. <https://doi.org/10.1016/j.jairtraman.2016.07.004>

Chen, F., & Chang, Y. (2017). Examining airline service quality from a process perspective. *Journal of Air Transport Management*, 11, 79–87.

Chilembwe, J. M. (2014). Evaluation of Service Quality, Value and Satisfaction of Air Transportation in Malawi: Case Study of Air Malawi. *International Journal of Social Sciences and Entrepreneurship*, 1 (11), 236-266.

Choi, K., Cho, W., Lee, S., Lee, H., & Kim, C. (2017). The Relationship among Quality, Value, Satisfaction and Behavioural Intention in Health Care Provider Choice: A South Korean Study. *Journal of Business Research*, 57(8), 913-21.

Chonody, J. M., Gabb, J., Killian, M., & Dunk-West, P. (2018). Measuring Relationship Quality in an International Study: Exploratory and Confirmatory Factor Validity. *Research on Social Work Practice*, 28(8), 920-930. doi:10.1177/1049731516631120

Clemes, M. D., Gan, C., Kao, T., & Choong, M. (2008). An empirical analysis of customer satisfaction in international air travel. *Innovative Marketing*, 4(2), 49-62.

Colin, C. H. L., Yahua, Z., & Jeff, G. (2022). Airline Service Quality, Customer Satisfaction, and Repurchase Intentions: Laotian Air Passengers' Perspective. *Case Studies on Transport Policy*, 10(2), 741-750. <https://doi.org/10.1016/j.cstp.2022.02.002>.

Comrey, L. A., & Lee, H. B. (2018). *A First Course in Factor Analysis*, 2<sup>nd</sup> ed. Hillside, NJ: Lawrence Erlbaum Associates.

Cristobal, E., Flavian, C., & Guinaliu, M. (2017). Perceived E-Service Quality (PeSQ): Measurement Validation and Effects on Consumer Satisfaction and Website Loyalty. *Managing Service Quality*, 17(3), 317-40.

Cubillo, J. M., Sanchez, J., & Cervino, J. (2018). International Students' Decision Making Process. *International Journal of Educational Management*, 20(2), 101-115.

Cunningham, L. F., Young, C. E., & Lee, M. (2002). Cross-Cultural Perspectives of Service Quality and Risk in Air Transportation. *Journal of Air Transportation*, 7, 3-26. <https://ntrs.nasa.gov/citations/20020041936>

Da Silva, M. L., Silvana, L. V., Dalton, F., Pedro, A. B., Eugenio, A., Díaz, M., & Peter, V. (2017). Design and Validation of an Aircraft Seat Comfort Scale using Item. *Applied Ergonomics* 62: 216-226

Durvasula, S. (2017). Forging Relationships with Services: The Antecedents that have an Impact on Behavioural Outcomes in the Life Insurance Industry. *Journal of Financial Services Marketing*, 8(4), 314-326.

Efthymiou, M., Njoya, E. T., Lo, P. L., Papatheodorou, A., & Randall, D. (2019). The Impact of Delays on Customers' Satisfaction: an Empirical Analysis of the British Airways on Time Performance at Heathrow Airport. *Journal of Aerospace Technology Management*, 11: e0219, 1-13

Ekiz, H. E., Hussain, K., & Bavik, A. (2006). Perceptions of Service Quality in North Cyprus National Airline, Tourism and Hospitality Industry - New Trends in Tourism and Hospitality Management, Proceedings of 18th Biennial International Conference, Croatia: Faculty of Tourism and Hospitality Management, Opatija, May 3-5, 03-05, 778-790.

Eliasaph, I., Farida, B., & Balarabe, J. (2016). Consumer Satisfaction and Repurchase Intentions. *Developing Country Studies*, 6(2), 96-100.

Eric, M. (2017). What are the Different Classes on an Airplane? *Sheffield School of Aeronautics*. Published: August 10, 2017.

Faizan, A., Bidit, L. D., & Raffaele, F. (2015). An assessment of service quality and resulting customer satisfaction in Pakistan International Airlines. *International Journal of Quality and Reliability Management*, 32(5), 486-502

Forgas, S., Moliner, M. A., Sánchez, J., & Palau, R. (2010). Antecedents of airline passenger loyalty: Low cost versus traditional airlines. *Journal of Air Transport Management*, 16(4), 229-233.

Galloway, R. L. (1998). Quality Perceptions of Internal and External Customers: A Case Study in Educational Administration. *The TQM Magazine*, 10(1), 20-26.

Geraldine, O. (2013). Effects of Airline Service Quality on Airline Image and Passengers Loyalty: Findings from Arik Air Nigeria Passengers. *Journal of Hospitality Management and Tourism*, 4(2), 19-28.

- Giao, H. N. K., Vuong, B. N., & Quan, T. N. (2020). The influence of website quality on consumer's e-loyalty through the mediating role of e-trust and e-satisfaction: An evidence from online shopping in Vietnam. *UncertainSupply Chain Management*, 8. doi:10.5257/j.uscm.2019.11.004
- Giese, J. L., & Cote, J. A. (2000). Defining Consumer Satisfaction. *Academy of Marketing Science Review*, 1, 1-24.
- Gronroos, C. (1990). From Marketing Mix to Relationship Marketing: Towards a Paradigm Shift in Marketing. *Management Decision*, 32(2), 4-20.
- Grönroos, C. (1984). A Service Quality Model and Its Marketing Implications. *European Journal of Marketing*, 18, 36-44. <https://doi.org/10.1108/EUM0000000004784>
- Güres, N., Arslan, S., & Tun, S.Y. (2014). Customer Expectation, Satisfaction and Loyalty Relationship in Turkish Airline Industry. *International Journal of Marketing Studies*, 6(1), 66-74.
- Hao, Y., & Wu, Y. P. (2009). A Servqual Improvement Model for Air Passenger Service. *Journal of Shanghai University of Engineering and Technology*, 23, 249-253.
- Hapsari, R. (2017). The impact of service quality, customer engagement and selected marketing constructs on airline passenger loyalty. *International Journal of Quality and Service Sciences*, 9(1), 21-40.
- Hellier, P. K., Geursen, G. M., Carr, R. A., & Rickard, J. A. (2003). Customer repurchase intention: A general structural equation model. *European Journal of Marketing*, 37(11), 1762-1800.
- Hwa-Kyung, K. (2013). Service Quality with Satisfaction and Loyalty in the Airline Industry. *International Journal of Tourism Sciences*, 13(3), 501-521
- Hyun-Jeong, B., & Hak-Seon, K. (2019). Understanding customer experience and satisfaction through Airline passengers' online review. *Journal of Sustainability*, 11(4066), 1-17
- Juliet, N. (2013). The Influence of Airline Service Quality on Passengers' satisfaction and Loyalty: The Case of Uganda Airline Industry. *The TQM Journal*, 25(5), 520-532.
- Kashyap, R., & David, C. B. (2000). A Structural Analysis of Value, Quality, and Price Perceptions of Business and Leisure Travelers. *Journal of Travel Research*, 39: 45-51.

- Kumar, A., & Kumar, S. (2019). Impact of Perceived Airlines Service Quality on Passengers' satisfaction: A Study of Low Cost Airlines Operating in India. *International Journal of Research and Analytical Reviews*, 6(1), 674-681
- Lagrosen, S. (2001). Strengthening the Weakest Link of TQM-from Customer Focus to Customer Understanding. *The TQM Magazine*, 13(5), 348-354.
- Leong, L. Y., Hew, T. S., Lee, V. H., & Ooi, K. B. (2015). An SEM-artificial-neural-network analysis of the relationships between SERVPERF, customer satisfaction and loyalty among low-cost and full-service airlines. *Expert Systems with Applications*, 42(19), 6620-6634.
- Li, D. J., & Xiong, S. X. (2014). Influence Dimensions of Hotel Customers' Perceived Service Quality. *Statistics and Decision Making*, 8, 185-188.
- Lu, Z., Lei, P. H., & Han, R. L. (2017). *Aviation Service Science*. Higher Education Press.
- Ma, Y. L. (2021). Research on Air Passenger Service Quality Management Behavior under Non-Cooperative Game of Airport Airlines. *Science and Technology Innovation*, 5, 33-34.
- Maria, G. B., Laura, E., Carmen, F., & Gabriella, M. (2018). Air Transport Passengers' Satisfaction: An Ordered Logit Model. *Transportation Research Procedia*, 33, 147–154
- Marta, I., & DeCastro, D. (2011). The Influence of Service Quality and Satisfaction in Consumer Behaviour Intention: An Empirical Study of a Charter Airline. *Technical University of Lisbon*. Master Program in Marketing, Pp. 1-50
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model of Organizational Trust. *The Academy of Management Review*, 20(3), 709-734.
- Ming-kei, C., & Yui Yip L. (2016). Travelers' Perception on Airport Satisfaction. *Journal of Business and Economic Policy*, 3(2), 55-60.
- Mugenda, O. M., & Mugenda, A. G. (2013). *Research Methods: Quantitative and Qualitative Approaches*. Acts Press, Nairobi.
- Muhammad, S. F., Maimoona, S., Alain, F., Norizan, J., & Kartinah, A. (2018). Impact of Service Quality on Customer satisfaction in Malasia Airlines: A PLS-SEM approach. *Journal of Air Transport Management*, 67, 169-180
- Nadiri, H., Hussain, K., Ekiz, E. H., & Erdogan, S., (2008). An Investigation on the Factors Influencing Passengers' Loyalty in the North Cyprus National Airline. *Total Quality Management Journal*, 20(3), 1-7

- Oghojafor Ben, A., Ladipo Patrick Kunle, A., & Rahim Ajao, G. (2016). Airline Service Quality Dimensions and Customer Loyalty: Empirical Evidence from Air Passengers in Lagos State. *Czech Journal of Tourism*, 5(2), 155-171.
- Oliver, R. L. (2010). *Satisfaction: A Behavioral Perspective on the Consumer* (2nd Ed.). New York: Routledge.
- Özlem, A., Mahmut, B., & Sahap, A. (2019). The Role of In Flight Service Quality on Value for Money in Business Class: A Logit Model on the Airline Industry. *Journal of Administrative Science*, 9(26), 1-15.
- Ozment, J., & Morash, E. A. (1994). The augmented service offering for perceived and actual service quality. *Journal of the Academy of Marketing Science*, 22(4), 352-363.
- Parasuraman, A., Zeithaml, V. A., & Berry, L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Retailing*, 64(1), 12-40.
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1998). Alternative Scales for Measuring Service Quality: A Comparative Assessment Based on Psychometric and Diagnostic Criteria. *Journal of Retailing*, 70(3), 201-30.
- Park, J. W., Robertson, R., & Wu, C. L., (2004). The Effect of Airline Service Quality on Passengers' Behavioural Intentions: A Korean Case Study. *Journal of Air Transport Management*, 10, 435-439.
- Peter, B., Amedeo, O., & Cynthia, B. (2009). *The Global Airline Industry*. John Wiley & Sons, Ltd. ISBN: 978-0-470-74077-4
- Rahim, A. G. (2016). Perceived Service Quality and Customer Loyalty: The Mediating Effect of Passenger Satisfaction in the Nigerian Airline Industry. *International Journal of Management and Economics*, 52, 94-117.
- Saha, G., & Theingi, S. (2009). Service Quality, Satisfaction, and Behavioural Intentions. *Managing Service Quality: An International Journal*, 19(3), 350-372. <https://doi.org/10.1108/09604520910955348>
- Samuel, S. E. (2017). Appraisal of Passengers' satisfaction with Air Transportation Services at the Domestic Terminals of Murtala Muhammed Airport, Lagos. *American Journal of Social Science Research*, 3(5), 25-34
- Sandada, M. & Matibiri, B. (2016). An Investigation into the Impact of Service Quality, Frequent Flier Programs and Safety Perception on Satisfaction and Customer Loyalty in



the Airline Industry in Southern Africa. *South East European Journal of Economics and Business*, 6(5), 34-56 .

Schmidt, J., & Bijmolt, T. H. A. (2020). Accurately Measuring Willingness-to-Pay for Consumer Goods: A Meta-Analysis of the Hypothetical Bias. *Journal of the Academy of Marketing Science*, 48(3), 499-518. <https://doi.org/10.1007/s11747-019-00666-6>

Sergejs, P., & Ksenija, I. (2015). Factor Analysis of Passengers' Satisfaction at RIGA International Airport. *Journal of Economics and Business*, 27, 46-52.

Sun, Y., Du, J. G., & Li, W. Z. (2011). a Study on Service Quality and Customer Satisfaction and Loyalty Based on Online Shopping. *Statistics and Decision Making*, 1, 95-97.

Thomas, K. O. (2014). Users' Perceptions of Service Quality in Murtala Muhammed International Airport (MMA1), Lagos, Nigeria. *Journal of Marketing and Consumer Research - An Open Access International Journal*, 3, 48-53.

Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1-10.

Vuong, B. N., & Giao, H. N. K. (2020). The impact of perceived brand globalness on consumers' purchase intention and the moderating role of consumer ethnocentrism: An evidence from Vietnam. *Journal of International Consumer Marketing*, 32(1), 47-68. doi:<https://doi.org/10.1080/08961530.2019.1619115>

Vuong, B. N., Hieu, V. T., & Trang, N. T. T. (2020). An empirical analysis of mobile banking adoption in Vietnam. *Gestão e Sociedade*, 14 (37), 3365-3393. doi:<https://doi.org/10.21171/ges.v14i37.3078>

Vuong, B. N., & Suntrayuth, S. (2020). The impact of human resource management practices on employee engagement and moderating role of gender and marital status: An evidence from the Vietnamese banking industry. *Management Science Letters*, 10(7), 1633–1648. doi:<https://doi.org/10.5267/j.msl.2019.12.003>

Walsh, G., Hennig-Thurau, T., Sassenberg, K., & Bornemann, D. (2010). Does relationship quality matter in e-services? A comparison of online and offline retailing. *Journal of Retailing and Consumer Services*, 17(2), 130-142. doi:<https://doi.org/10.1016/j.jretconser.2009.11.003>

Wang, X. (2014). Research on Improving Customer Satisfaction in Shandong Airlines. M.D. Thesis, Shandong University.

Yang, K.-C., Hsieh, T. C., Li, H., & Yang, C. (2012). Assessing how service quality, airline image and customer value affect the intentions of passengers regarding low-cost carriers. *Journal of Air Transport Management*, 20, 52-53.

Yu, W. Y., & Li, J. X. (2012). An Empirical Study on the Relationship between Consumer Sentiment and Service Quality, Customer Satisfaction and Repetitive Purchase Intention in the Airline Service Industry. *Economic and Management Research*, 7, 111-120.

Zhang, G. J. (2019). A Comparison of Domestic and International Airline Service Quality Management. *Management Observation*, 30, 43-45.

Zhuo, S. J. (2015). Research on Tourism Service Quality Supervision Based on Tourism Complaints. M.D. Thesis, Hunan Normal University.

Zikmund, W. G. (2013). *Exploring Marketing Research*, 8<sup>th</sup> Edition . Thompson Learning/ Southwestern, Cincinnati, OH.

*Evaluating the Significant Drivers of Domestic Airline Failures in Nigeria: an Analytical Evidence*

Okwudili Ben Sidiq<sup>1</sup>, Mobolaji S. Stephens<sup>2</sup>, Chijioke U. Akpudo<sup>2</sup>, and Funto O. Kanyio<sup>2</sup>

Bamidele Olumilua University of Education,  
Science and Technology Ikere-Ekiti<sup>1</sup>, and

Department of Logistics and Transport Technology, Federal University of Technology,  
Akure<sup>2</sup>

<https://orcid.org/0000-0003-0912-3683>

**Abstract**

*The failure rate of domestic airlines in Nigeria suggests a proactive action to investigate the causal factors of Airline operations failure in the country. The study sourced secondary data to peep into the causal factors as extracted from the record of the Nigeria Civil Aviation Authority (NCAA). There were several factors identified multiple regression was employed step-wise to remove variables with less statistical significance till the most significant variables were achieved. Logistic multiple regression analysis was used to analyze the data. The study reveals the following variables such as inability to meet financial obligations, poor patronage, air-crash incidents, poor management, and poor load factor as the most significant factors. The analysis also revealed that "inability to meet financial obligations" emerged as the most influential factor, with a large positive coefficient (7.92) and a highly statistically significant p-value (0.0002). This implies that a company's failure to meet financial obligations significantly increases the probability of airline failure. Airlines should prioritize financial profitability and effective financial management practices to mitigate the risk of failure in the highly competitive and challenging aviation industry.*

**Keywords:** *Financial obligations; poor patronage; Aircarsh incidents, Poor management and poor load factors*

**1. Introduction**

The historical trajectory of air travel in Nigeria dates back to the 1925 landing of an aircraft in Kano from Egypt, which has shaped the aviation sector's role in the global and Nigerian economies. Contributions from taxes, technological investments, and facilitation of foreign direct investment have fostered increased demand for air travel services, thereby generating substantial revenue and contributing significantly to the gross domestic product (GDP) (Gbadamosi & Adekunle, 2018; Ladele, 2012; Stephens, Ikeogu, Stephens, & Ukpere, 2014; Nigerian Bureau of Statistics, 2019; Sidiq, 2019), Sidiq et al 2021. However, this positive trajectory has been marred by the collapse of many domestic airlines in Nigeria, which has been attributed to several factors, (Uhuego, Daradara, Jubril, & Okafor, 2019). This paper aims to establish the significant drivers of airline failures over time in Nigeria. Past studies worked on general factors of airline failure, this work attempts to provide clues to the most significant variable causing airline failure.

The consequences and externalities of airline failures are multifaceted. When an airline fails, it comes with repercussions such as the reduction in available seat kilometers (ASK) which often leads to increased ticket prices, potentially compromising safety measures and negatively impacting passengers' quality of living standards (IATA, 2019; Potterie & Bruno, 2005). Moreover, the reduction in demand for ancillary services can contribute to unemployment, further affecting the overall standard of living. The repercussions extend to tourism, making travel more challenging for passengers trying to reach their destinations (Shobande & Akinbomi, 2020).

Failure in Business is frequently attributed to organizations' tendency to maintain the status quo and their inability to draw lessons from past mistakes (Baumard & Starbuck, 2005), (Edmondson, 2011). Academics of vast perspectives have deferred on what constitutes organizational failure over time. For example, some argue that it can be defined as the closing of the business (Schwarze, Bouckennooghe, & Vakola, 2021), the transfer of ownership of the business (Everet & Watson, 1998), or both. A business may cease operations when the owner chooses to step down and sell their assets to a willing buyer. A constraint of the aforementioned perspective is that it confines failures to rates of admission and departure (Amankwah-Amoah, 2016) (Everet & Watson, 1998). After the proprietor retires, many businesses frequently stop operating.

According to, Cameron, Sutton, & Whetton, (1988) and Hager, Galaskiewicz, & Bielefeld, (1996), organizational failure is the state in which a business ends operations and loses its identity as a result of its inability to respond and adapt to changes in the external environment promptly. In summary, firm failure is the actual end of the firm upon going out of business, or the entire dissolution of the organization (Vansteenkiste & Mark, 2008). The aforementioned criteria will serve as a guide towards assessing the significant drivers of airline performance and determine the significant factors that cause domestic airlines to fail in Nigeria

An intricate example of a corporate organization that has been plagued with persistent collapse is the airline industry, which consists of several entities including airlines, airports, maintenance centres, and travel agents that collaborate to offer seamless services to customers. Airports handle facilities, security, and ground services; airlines handle the scheduling of flights, crew management, fleet maintenance, ticket sales, and customer support services. The industry structure demonstrates how different Systems work together to provide passengers with a comprehensive service. When an airline is unable to continue operating because of financial insolvency or other operational inefficiencies, it is considered to have failed. It has been determined that a combination of internal and external factors can cause a firm to fail or succeed, (Amankwah-Amoah, 2016).

Records from the aviation authority underscore the severity of the issue, revealing that ten registered airlines that emerged during the full deregulation period (1991-2001) had failed. Despite the birth of new airlines, the number of active domestic passenger carriers

remained disproportionately low in 2019, considering Nigeria's vast population of about 200 million persons and a potential passenger for the foreseeable future of the country (Daramola & Tunde, 2019).

The heightened rate of airline failures raises serious concerns, as emphasized by Adekola, (2007), the understanding of both the causes and effects of airline failures becomes imperative for sustainable development and growth in the Nigerian airline industry. The basic question begging for answers is:

1. what are the general factors causing airline failure
2. what are the most significant factors of airline failure

## **2. Review of Literature**

### **Theoretical Review**

**Integrative Framework Theory:** The question of whether internal or external causes, play a key role in a firm's failure has been the subject of numerous research on organizational failure in the past. Research on organizational failure, both theoretical and empirical, indicates that these determinants are very differentiated from one another (Karmel & Adrian, 2004). Industrial-organizational theorists assert that external factors that may be outside of managers' control are to blame for industries' failures (Eruemegbe, 2015.) (Cameron, Sutton, & Whetton, 1988) . The proponents believe that unfavourable environmental factors can lead to organizational failure; they suggest that failure is a result of "natural selection," in which unfit firms are "thrown out" and "die." This implies that factors in the surrounding environment that allow new entrants can cause a firm's demise if it is unable to cope with the factor causing change (Amankwah-Amoah, 2016 Many new entrants have changed the airline business climate when the airline sector liberalized globally, making it more competitive, which has led to the demise and in some cases the rise of others. The IO theory can be summed up as follows: internal factors determine whether an organization succeeds or fails. Among these internal variables include inadequate management, an unsuitable financial balance, excessive trading, inadequate cash management, and inadequate accounting. (Morton , 2017) On the other hand, organization studies theory holds that external circumstances are what lead to organizational failure; according to them, managers' actions in a changing environment ultimately determine whether a corporation succeeds or fails (Barker & Duhaime, 1997), conducted a study on state-owned airlines and concluded that management restrictions and frequent leadership changes were some of the reasons behind the airlines' demise. A revised framework for analysing the causes of business failures or demise is called integrated framework theory, and it was proposed by Kamal Mellahi and Adrian Wilkinson in 2004. According to the harmonized framework, a firm's performance and ultimate downfall or destruction are largely influenced by both internal and external forces. Aspects of management and product-market alignment, such as inadequate

training, insufficient funding, excessive workforce, inadequate fleet maintenance, employee performance, branding, and marketing services, are examples of internal issues. The external factors include global competition, government policies, lax regulations, various taxes, competition and liberalization, and the economy (interest rates and inflation). This idea backs up the findings of (Kamel Mellahi P. Jackson Leigh Sparks, 2002), who stated that the interaction of organizational dynamics and contextual factors must be taken into account in any explanation of organizational failure. This theory applies to this study since it examines a variety of factors that lead to airline failures in Nigeria. The external factors include global competition, government policies, lax regulations, various taxes, competition and liberalization, and the economy (interest rates and inflation). This idea backs up the findings of (Kamel Mellahi P. Jackson Leigh Sparks, 2002), who stated that the interaction of organizational dynamics and contextual factors must be taken into account in any explanation of organizational failure. This theory is relevant to this study as it analyses a mix of the factors that are responsible for airline failures in Nigeria. It will slightly differ by looking at most significant factors in airline performance leading to failure of airlines. In the late 1970s and early 1980s, it became clear that the strict government regulation of the airline industry was no longer sustainable in Nigeria. Factors such as mismanagement, difficulties meeting passenger demand, routine flight delays, and cancellations prompted a re-evaluation of policies. The desire for accelerated development and the alignment with global trends in deregulation led to a landmark policy change. The government shifted from a conservative stance to allow private sector participation, resulting in the deregulation of the industry. This policy change led to unrestricted competition among operators, with 25 private airlines initially licensed. Three domestic operators—Okada Airlines, Kabo Air Travels, and Gas Air—were upgraded to scheduled operators, with Kabo and Okada later permitted to operate international routes. In 1995, the Aviation Development Company (ADC) and Bellview Airlines were granted permission to operate international routes.

Deregulation ended the era of a single carrier, but the entry of new operators brought challenges. Safety standards became a crucial focus due to the capital-intensive nature of the airline industry. Despite cautionary references to the Nigeria Airways trajectory, private investors ventured in, facing risks and financial challenges. Many operators struggled with maintaining aircraft due to expensive engineering checks, leading to numerous failures and fleet reductions.

By the early 1990s, eleven domestic carriers had a combined fleet reduction of seventy-five percent. Calls for mergers and acquisitions as a solution prompted scepticism due to funding challenges among operators. As of 2005, 177 airlines were granted operational licenses by the Nigerian Civil Aviation Authority (NCAA), but only 39 remained active. Notable airlines included Aero Contractor, Afrijet, Albarka, Okada, Chanchangi, Bellview, IRS, Fresh, Dasab, Sosoliso, ADC, Network Aviation Service, Kabo, Green

Africa EAS, Overland, and Air Peace Airlines (Diepriye & Ndi-Okereke, 1997). Below is the selected airlines that failed over time.

***0-5 Years: Discovery Air***

Discovery Air was founded in 2013, started operations in 2014, flying domestic routes. Privately owned by Babatunde Babalola with backing from First Development Water Discovery. Operated 3 B737-300s, faced challenges with its AOC revoked in 2015 due to unresolved concerns such as financial struggles, alleged debt, and mismanagement actions led to operational difficulties (Oyewole, 2014).

***6-10 Years: Dasab, Fresh Air, Albarka Air***

**i Dasab Airline (2001-2007):**

Operated domestic flights, failed to meet the 2007 capital requirement by NCAA. AOC was revoked along with six other airlines (Ndubuisi, 2004).

**ii Fresh Air (1999-2007):**

Passenger and cargo airlines failed to meet the 2007 recapitalization target set by the NCAA. Operated various services, including trader flights and aerial photography (Reuter, 2021).

**iii Albarka Air (1999-2007):**

The joint venture founded in 1999, based in Abuja, operated domestic flights. AOC was revoked for not meeting the capital requirement (Ndubuisi, 2004). 11-21+ Years: IRS Airlines, Sosoliso, Nigerian Airways

***11 to 21+ years: IRS Airlines, Sosoliso, Nigerian Airways***

**i IRS Airlines (2002-2014):**

Privately owned, grounded in 2013 due to aircraft hydraulics issues. Planned to resume operations, faced an accident in Niger Republic, leading to suspension and debts (Oyewole, 2014).

**ii Sosoliso Airline (1994-2006):**

Tragic accident in 2005 led to suspension, unable to meet 25% capitalization introduced by NCAA in 2006. Operated domestic flights with a fleet of McDonnell Douglas aircraft (Oyewole, 2014).

**iii Nigerian Airways (1961-2003):**

Founded in 1961, wholly owned by the Nigerian government. Once a major player in African aviation, faced demise due to massive debt, mismanagement, and corruption (Adeoye, 2022; Ogbeidi, 2006). Interesting all the aforementioned airlines failed due to one reason or the other, that's why this paper seeks to examine the causal factors of airlines failure in Nigeria.

### 3. Methodology

Data for the studies was collected from secondary sources. The sources of data were from the Nigeria Civil Aviation Authority and the Corporate Affairs Commission of Nigeria. The model specification is as stated below;

The standard equation for logistics multiple regression analysis is given by:

$$y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_nx_n + e \dots\dots\dots \text{Equation 1}$$

where,  $y$  is a dependent variable i.e. failures of airline

$b_0$  is the intercept;  $b_1, b_2, b_3$  and  $b_n$  are the coefficients of the variables;  $x_1, x_2, x_3$  and  $x_n$  are the independent variables

$e$  is error term.

Note, there were several factors identified from literature that are causing are lines to fail multiple regression was adopted by using a step-by-step approach, otherwise called stepwise multiple regression to remove factors with less statistical significance till we end up getting the most significant independent factors. This was done using the backward elimination method as all the identified factors will be included in the starting iteration till we have our desired model. Below is a list of identified factors

- i. High operational cost;
- ii. Lack of harmony between the aviation policy of the country and sub-regional policies;
- iii. Inadequate provision of power;
- iv. Secure airport terminal (robbery, theft, injury and others);
- v. Scarcity of forex;
- vi. Provisions in employment contract;
- vii. Misalignment of policies among parastatals and ministries;
- viii. Age of fleets;
- ix. Incompetent management and poor business model;
- x. Commission for travel agents;
- xi. Administrative and overhead costs;
- xii. Corruption and unethical practices;
- xiii. Lack of perimeter fencing of airports;
- xiv. Absence of competitive reward system;
- xv. Health security due to coronavirus (COVID-19) and other diseases;
- xvi. Poor emergency response procedures;
- xvii. Low level of implementation of safety measures;
- xviii. Coordination among various security agencies at airports;
- xix. Excessive control and interference by supervising ministry;
- xx. Accident rate;
- xxi. Poor Management-labour relationship;
- xxii. Rising inflation;



- xxiii. Secure road to airport (robbery, theft, injury and others);
- xxiv. Poor Airport project planning skill;
- xxv. Emission of noise, toxic wastes, and greenhouse gases;
- xxvi. Supervision and enforcement of traffic rules;
- xxvii. Cost of aviation fuel (Jet A-1);
- xxviii. Stowaway incidences;
- xxix. Lack of Government's political will to implement formulated policies;
- xxx. Weakening of the naira against the dollar;
- xxxi. Shortage of skilled personnel (skill gap);
- xxxii. Technology and Airport Information System;
- xxxiii. Drugs trafficking using airport as routes;
- xxxiv. Centralization of decision making by supervising ministry;
- xxxv. Poor maintenance culture;
- xxxvi. Inadequate number and small fleet sizes of aircrafts;
- xxxvii. Standard runway and terminal facilities;
- xxxviii. Misalignment between policies and the requirements of the sector;
- xxxix. Debt burden;
  - xl. Unfavourable policies;
  - xli. Lack of transparency and accountability;
  - xlvi. Poor implementation of policy;
  - xlvi. Inadequate training and personnel development;
  - xlv. Charges and taxes to the government; and
  - xlv. Inadequate funding by government
  - xlvi. Load factor
  - xlvi. Profitability
  - xlvi. Breakeven
  - xlix. Service Quality
    - 1. Over supply

The above was reduced via the multiple regression which adopted a stepwise logit model to these five factors; inability to meet financial obligations, poor patronage, air-crash incidents, poor management and poor load factor.

#### **4. Result and Discussions**

The causes of failure of airlines were observed from the records of NCAA and the CAC used by the study to be: inability to meet financial obligations, poor patronage, air-crash incidents, poor management and poor load factor. These causes are in agreement with existing literature [Adeoye & Musa (2019), Uhuego, Daradara, Jubril, & Okafor (2019), Amankwah-Amoah &

Yaw, 2010, Amechi, Ibe, Ejem, & Okeudo, 2022, and Ojebode (2022)] and they are seen to be those that can be controlled internally and those that cannot be controlled by the airlines. From the logistics multiple regression analysis, to determine the most causal factor of the failure of the airlines, we considered the coefficients of the independent variables in the regression equation.

In a logistic regression model, the coefficients represent the change in the log odds of the dependent variable (in this case, Airline failure) associated with a one-unit change in the corresponding independent variable. The larger the coefficient (in absolute value), the more significant the impact on the probability of failure and this is confirmed by the *p-value* at a 5 % mark of significance so that as the *p-value* reduces or tends toward zero or below it we say that the factor is very significant as a causal factor. Based on this “in ability to meet financial obligations”, with the largest coefficient (7.919682814) and a *p-value* of 0.000236632 is the most significant causal factor (see Table 1). The *p-values* confirm the statistical significance of the coefficients, a low *p-value* (typically less than 0.05) suggests that the variable has a significant impact on the outcome. Worthy of note are the signs of the coefficients (positive or negative), a positive coefficient indicates an increase in the probability of failure when the independent variable increases, while a negative coefficient suggests a decrease in the probability of failure. "Inability to meet financial obligations" and "Poor patronage" have positive coefficients, while the others have negative coefficients. Given these considerations, "Inability to meet financial obligations" with a large positive coefficient and high statistical significance seems to be the most causal factor of failure in this model. This means that a company's inability to meet its financial obligations significantly increases the probability of failure.

Table 1: Causes of failure in the Nigerian Airline Industry

Regression Statistics								
Multiple R	0.600621909							
R Square	0.360746677							
Adjusted R Square	0.321224307							
Standard Error	10.55834631							
Observations	95							
ANOVA								
	Df	SS	MS	F	Significance F			
Regression	5	5661.919096	1132.383819	10.15785128	1.01504E-07			
Residual	90	10033.0809	111.4786767					
Total	95	15695						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	9.215303004	2.588448478	3.560164741	0.000597398	4.072111014	14.35849499	4.072111014	14.35849499
Inability to meet financial obligations	7.919682814	2.06777926	3.830042677	0.000236632	3.811678402	12.02768723	3.811678402	12.02768723
Poor patronage	2.604885962	2.004397869	1.299585278	0.19706212	-1.377200254	6.586972177	-1.377200254	6.586972177
Air-crash incident	2.336062082	1.882027795	1.241247387	0.217739848	-1.402914623	6.075038787	-1.402914623	6.075038787
Poor management	0.594581945	1.959264886	0.303471955	0.762230644	-3.297839722	4.487003612	-3.297839722	4.487003612
Poor load factor	0.000322167	2.029813911	0.000158718	0.999873713	-4.032257452	4.032901786	-4.032257452	4.032901786

Source: Field work 2023

## **5. Conclusion**

The general factors of airline failure have been identified above, as well as the significant factors via a logistic regression analysis which was conducted to determine the most significant causal factors contributing to airline failure. The study considered variables such as; inability to meet financial obligations, poor patronage, air-crash incidents, poor management, and poor load factor. The analysis revealed that "inability to meet financial obligations" emerged as the most influential factor, with a large positive coefficient (7.92) and a highly statistically significant p-value (0.0002) This supports the findings of (Morton , 2017) and (Karmel & Adrian, 2004) who identify it as an internal factor in is work. This implies that a company's failure to meet financial obligations significantly increases the probability of airline failure. Airlines should prioritize financial stability and effective financial management practices to mitigate the risk of failure in the highly competitive and challenging aviation industry. The following airline such as Bellview, Sosoliso, Albarka, ADC, IRS, Fresh, and Dasab failed due to recapitalization issues in 2006 lending credence to the findings of this study.

Conclusively, It's important to identify and tackle these causal factors to mitigate the incidences of airline failure in Nigeria.

## **6. Recommendation:**

Airlines should be granted financial bail to keep the industry solvent thereby averting incidences of failure as was the case of most airlines that failed in Nigeria.

Profitability as a measure of the high load factor, that guarantees the sustainability of the industry should be the target.

## **References**

- Adekola, S. (2007, JUNE 03). "Task ahead of committee on aviation". *African newspaper plc*, p. 7.
- Adeniran, A. O., & Stephens, M. S. (2023). Assessments of Basic Airline. *Insights into Regional Development.*, 5(2), 38-59.
- Adeniran, A. O., Stephens, M. S., & Akinfenwa, F. O. (2020). Factor Analysis of Passengers' Satisfaction at Murtala Muhammed Airport (MMA2). . *Aeronautics and Aerospace Open Access Journal*, , 13–24.
- Adeoye, A. (2022, December 16). Nigeria to relaunch national airline two decades after predecessor collapse. *Financial Times*.
- Adeoye, A. B., & Musa, A. (2019). An evaluation of the failure pattern of defunct airlines in Nigeria. *Pacific Journal of Science and Technology*, 20(2), 112-122.
- Aishwarya, F. (2020). *Convergence and Divergence of Theory of Constraint(s) and Lean Manufacturing in Construction Projects*. . Belfast: : Queens University.

- Amankwah -Amoah, J. (2016). An integrative process model of organisational failure. *Journal of Business Research*, 3388-3397.
- Amankwah-Amoah, J., & Yaw, D. A. (2010). The Protracted Collapse of Ghana Airways:Lessons in Organizational Failure. *Group & Organization Management*, 636-665.
- Amechi, C. O., Ibe, C. C., Ejem, E. A., & Okeudo, G. N. (2022). Empirical Study of Parameters of Airlines Sustainability in Nigeria Domestic Network. *Journal of transportation Technology*, 12, 357-368.
- Artinger, S., & Powell , T. C. (2016). . Entrepreneurial failure: Statistical and psychological explanations. *Strategic management journal*, 1047-1064.
- Barker, V. L., & Duhaime, I. M. (1997). . Strategic Change in the Turnaround Process: Theory and Empirical Evidence. . *Strategic Management Journal*, , 13-38.
- Baumard, P., & Starbuck, W. H. (2005). Learning from Failures; "Why it May not happen. " *Long Range planning*, ,Pp 281-298.
- Cameron, K. A., Sutton, R. I., & Whetton, D. A. (1988). *Readings in organizational decline: Frameworks, research, and prescriptions*. Cambridge: MA: Ballinger. Cambridge MA: Ballinger.
- Chike, U. G., & Stephens, M. S. (2021). Customers' Satisfaction with Level of Service in Murtala Muhammed International Airport, Lagos, Nigeria. *International Journal of Research in Industrial Engineering*,, 10(1), 35-45.
- Daramola, A., & Tunde, F. (2019). *Aviation and its Management Global Challenges and Opportunities*. London: IntechOpen.
- Diepriye, C. D., & Ndi-Okereke, O. (1997). 'Air Transportin Nigeria: Strategies for the Twenty First Century. *Nigerian Stock Exchange Bulletin*, pp. 3-4.
- Edmondson, A. C. (2011, April). Strategies for Learning from Failure. *Harvard Business Review Home*.
- Eruemegbe, G. O. (2015.). Impact of business environment on organization performance in nigeria a study of union bank of nigeria. *European Scientific Journa*,, 478-494.
- Everet, J., & Watson, J. (1998). Small Business Failure and External Risk Factors. *Small business economics*, , pp1-90.
- Gbadamosi, K. T., & Adekunle, E. A. (2018). Economic Implication of the absence of national carrier in the Nigerian aviation industry. *American Journal of Multi-disciplinary Scientific Research*.
- Hager, M., Galaskiewicz, J., & Bielefed, W. (1996). Tales From the Grave: Organizations' Accounts of Their Own Demise. *Sage journals*, ., pp 975-994.
- IATA. (2019, january 1). Air passenger market analysis. *economic report*, pp. 23-34.
- IATA. (2019). *Air Passenger Market Analysis*. URL: <https://www.iata.org/en/iata-repository/publications/economic-reports/air-passenger-monthly-analysis--->.

- Jelkins , A., & Mckelvie, A. (2016). What is entrepreneurial failure? Implications for future research. *Research journal*, 176-188.
- Karmel, M., & Adrian, W. (2004). Kamel Mellahi and Adrian Wilkinson. (2004). Organizational failure:. Volume 5/6 Issue 1, vol 56(1), pp21-41. *International Journal of Management Reviews*, 56(1), pp. 21–41.
- Ladele, M. (2012). "What are impacts of FDI Inflow on economic Growth of emerging economics"(Alook at BRICS). Hull: University of Hulls.
- Morrison, S., & Winston, C. (2008). The Evolution of the Airline Industry. *The journal of Economic Perspective*, 75-96.
- Morton , C. (2017, OCTOBER 21). *virtualkollage.com*. Retrieved from *virtualkollage.com*: *virtualkollage.com*
- Ndubuisi, F. (2004, December 14). <https://allAfrica.com/stories/2004>. Retrieved from *allAfrica.com*: <https://allAfrica.com/stories>
- Nigerian Bureau of Statistics. (2019). *Annual Report*. Abuja: Nigerian Bureau of Statistics.
- Ogbeidi, M. M. (2006). The aviation industry in Nigeria. *Lagos Historical review*, 133-147.
- Ojebode, E. (2022). *Causes of Airline Failure:A study of Defunct African Airlines*. london: Haaga-Helia University of Applied Sciences.
- Oyewole, F. (2014, December 12). Babalola debunks Discovery Air N2 billion debt mess. *Encomium*.
- Potterie, A. M., & Bruno, V. D. (2005). The economic role of the aviation Industry in Belgium. *Brussels economic review*, 393-418.
- Reuter. (2021). *UPDATE 1-Air Namibia goes into voluntary liquidation*.
- Schwarze , G., Bouckennooghe, D., & Vakola, M. (2021). Organizational change failure: Framing the process of failing. Human relation., *Human relation.*, 159-179.
- Shobande, O. A., & Akinbomi, M. D. (2020). Competition and dynamics in Nigeria aviation industry:A gap theoretical approach. *future business journal*, 235-239.
- Sidiq, O. B. (2019). *Analysis of Air Travel Demand in Nigeria*. Akure: Federal University of Technology Akure.
- Sidiq, O. B., Stephens, M. S., & Ukpere, W. I. (2021). Significant Variables Currently nfluencing Air Travelers' Preference for Domestic Airlines in Nigeria. *Tourism and Travelling*, 31, 16-24.
- Stephens, M. S. (2009). *Structure of Air Transport in Nigeria*. Owerri: Federal University of Technology, Owerri.
- Stephens, M. S., Ikeogu, V., Stephens, O. B., & Ukpere, W. I. (2014). Empirical Analysis of the Contribution of the Aviation Industry to the Nigerian Economy. *Mediterranean Journal of Social Sciences*, 485-492.
- Tuğçe, Z., Vayvaya, S. G., & Noyan, Ş. (2014, September 15). Theory of Constraints: A Literature Review. *Procedia - Social and Behavioral Sciences*, 150, 930-936. doi:10.1016/j.sbspro.2014.09.104

- Uhuego, R. O., Daradara, S. B., Jubril, M. S., & Okafor, E. J. (2019). *Causes of failure of domestics airlines in Nigeria aviation markets*. Zaria: Nigerian Institute of Transport Technology.
- Ukpere, W. I., & Stephens, M. S. (2011). Determinants of airline choice making: the Nigerian perspective. *African Journal of Business Management*, 5414-5432,.
- Witteloostuijn, A. (1998). Bridging Behavioral and Economic Theories of Decline:. *MNSC*, 501-519.

**Developing Strategies for Managing Electoral Logistics in Nigeria**  
**Ibraheem Forson Abdul-Azeez<sup>1</sup>, Samuel G. Odewumi<sup>1</sup>, Charles O. Asenime<sup>1</sup>, and Babatunde O. Kumolu-Johnson<sup>2</sup>**  
**Department of Transport Management<sup>1</sup>, and Department of Business Administration<sup>2</sup>,  
Lagos State University, Ojo**

**Abstract**

*The role of logistics in free, fair, and credible elections cannot be overemphasized given the perennial problems of election delay, postponement, and rescheduling in Nigeria due to the late arrival of materials and personnel, causing social, economic, and financial losses to the citizens and the country. Therefore, it is pertinent to investigate this electoral logistics challenge that has become existential in our electoral process and develop strategies to improve the system and promote election credibility, inclusiveness, and good governance. Consequently, this paper examined the electoral logistics in Nigeria and proposed some strategies to improve the existing logistics system of the Independent Electoral Commission (INEC). This conceptual and exploratory study captures the thoughts, experiences, and observations of selected ad hoc staff, political party leaders, private transport companies, and senior officials of the Independent National Electoral Commission (INEC) in Lagos through face-to-face and focused group discussions.*

**Keywords:** Logistics, Election, Transportation, Electoral logistics, Nigeria

**1.0 Introduction**

Elections are the cornerstone of democracy and pivotal to the quality of a country's governance and democratic development. They are viable tools for ensuring citizens' participation in choosing their leaders and having the legitimacy to represent them. Elections have become a major mechanism to entrench democratic government with a profound effect on a country's future political life. Elections are complex undertakings that involve many processes, components, and enormous resources. For instance, in 2019, the general elections in Nigeria involved 84 million voters; 814,453 electoral officers; 119,973 polling units in 8,809 wards; 91 political parties; 23,213 candidates vying for 1,558 positions; and the cost of N189 billion. Coordination of all these components constitutes a significant challenge to the delivery, organization, and conduct of free, fair, and credible elections. Jega (2012) noted that conducting elections that are free, fair, peaceful, and credible in Nigeria given its size, population, terrain, and other challenges is a tough assignment.

Since the return to democracy in 1999, poor logistics deployment has been a perennial problem during elections in Nigeria, which has caused several delays over the years (Omotola & Nyuykonge, 2015). Elections have been postponed, rescheduled, and suspended in many instances due to the late arrival of materials and personnel, causing social, economic, and financial loss to the citizens and the country with far-reaching consequences on the integrity of the elections and the citizens' confidence on the electoral management body - Independent National Electoral Commission (INEC) - abilities. Unfortunately, Logistics is one area where Nigeria has little capacity due to the dearth of necessary logistics infrastructure, human capital, and appropriate processes and procedures. This was evidenced in the 2018 World Bank's Logistics Performance Index (LPI), which placed Nigeria in the 110th position in the world with an LPI score of 2.53. In Africa, Nigeria was ranked 16th, with South Africa (3.38), Cote d'Ivoire (3.08), Rwanda (2.97), Egypt (2.82), and Kenya (2.81) recognized as top performers (World Bank, 2018).

**Commented [U1]:** The abstract is not well articulated. Kindly readdress.

**Commented [U2]:** Change to "it is"

**Commented [U3]:** source

**Commented [U4]:** source?

**Commented [U5]:** Why?

**Commented [U6]:** Source



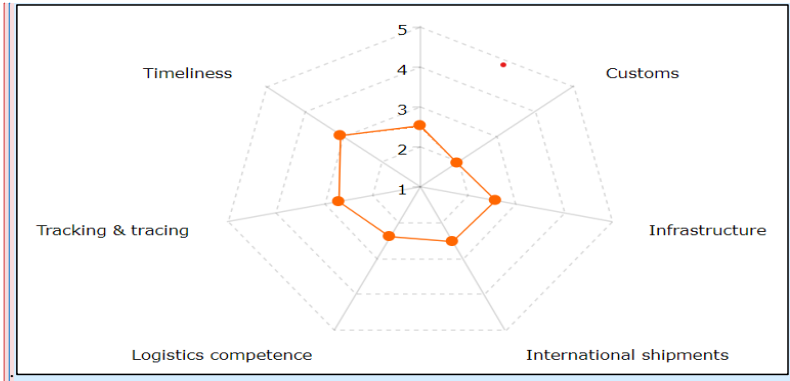


Figure what?  
Source: Country Score Card: Nigeria 2018 | Logistics Performance Index (worldbank.org)

These Logistics problems have become a daunting task to the Independent National Electoral Commission (INEC) over the years, as shown in the late distribution and retrieval of election materials, difficulty in movement of electoral officers and security personnel, inadequate logistical support to independent observers, and improper storage and tracking of election materials, among others. The Youth Initiative for Advocacy, Growth, and Advancement (YIAGA), Africa (an NGO), in their preliminary findings from the 2019 Presidential and National Assembly Elections, observed that at least 110 critical incidents were recorded early on election day which primarily related to the deployment of election materials and personnel. Therefore, it is pertinent to investigate this electoral logistics challenge that has become existential in our electoral process and operations, to promote election credibility, inclusiveness, and good governance.

Studies on electoral logistics and supply chain in Nigeria are scarce, as many previous studies on electoral systems focused more on electoral processes, political meddling and logistics, violence, and corruption (Omotola & Nyuykong, 2015; Hassan & Yusuf, 2015; Iwuoha et al., 2021). For a vast geographical entity like Nigeria with some rugged terrain and hard-to-reach areas, developing efficient and effective logistics strategies and processes for deploying and retrieving materials and personnel is crucial. Therefore, this underscores the need for this research, which examines electoral logistics in Nigeria, to develop strategies for its sustainability. In specific terms, the objectives are to:

- examine the components of the electoral logistics system in Nigeria;
- Study the existing distribution structure of electoral materials in Nigeria;
- Review past and existing logistics challenges affecting the electoral system in Nigeria.
- propose strategies that can be used to improve electoral logistics in Nigeria.

The research is unique because it is case-specific and deals with a subject area that has brought many irregularities to electioneering in Nigeria. It will improve the existing logistics and supply chain system of INEC by highlighting new ways of getting electoral materials from order processing to the destination. It will generate new ideas and information on “how to do it best” in electoral logistics management.

2.0 Literature Review

2.1 Overview of Electoral Process in Nigeria

The electoral process is a complex undertaking that requires enormous logistical, operational, and strategic planning, given the country's massive voting population and the number of election locations across challenging topography and tough terrain (INEC, 2020a). The commission noted that for the country to experience free, fair, peaceful, and credible elections, logistical and other issues affecting the electoral system must be addressed. These include inadequate infrastructural facilities, cumbersome procurement

Commented [U7]: This should be removed because it has no link with previous paragraph. Move to literature provided if it has a place to stay.

Commented [MS8]: What figure is this? Name it and state if it is for example Figure 1: Ehevheh.

Commented [U9]: Remove

Commented [U10]: Source

Commented [U11]: italicize

Commented [U12]: remove and replace with “ It is on the foregoing, that this study tends to examine electoral logistics in Nigeria with a view of developing strategies for its sustainability while the specific objectives are to:

Commented [U13]: change to assess the

Commented [U14]: remove. The background to the study should be revisited because it lacks sufficient references to support the claim as presented by the author. The mode of writing is too journalist in nature. The problem to be addressed is not explicitly stated as connected with the focus of the study.

process, sorting, packaging problems, difficulty in distributing personnel and materials, problems with reverse logistics, and desperation to win the election by the political actors.

The electoral system in Nigeria has been managed under different election management bodies since pre-independence in 1959. These bodies include the Electoral Commission of Nigeria (ECN) from 1959-1964, Federal Electoral Commission (FEC) from 1964-1966, Federal Electoral Commission (FEDECO) from 1979-1983, National Electoral Commission (NEC) from 1987-1993, National Electoral Commission of Nigeria (NECON) from 1996-1998, and Independent National Electoral Commission (INEC) which was established in 1998 (Momah, 2021).

Since its creation in 1998, INEC has organized six electoral transitions between 1999 and 2019, making it the longest Electoral Management Body (EMB) in the history of Nigeria. The commission has offices in all the 36 states of the federation and the Federal Capital Territory (FCT) with the mandate to conduct elections for various political offices in Nigeria as stipulated in the Third Schedule of the 1999 constitution of the Federal Republic of Nigeria (as amended) and the Electoral Act of 2010 (as amended). The constitution also empowers the commission to register political parties, provide rules and regulations for them, monitor their finances and campaigns, promote voter and civic education, register eligible voters, and prepare, revise, update, and maintain the voter register. The commission has a national chairman, 12 national commissioners, 37 Resident Electoral Commissioners in the 36 states and FCT, 774 Electoral Officers in each Local Government Areas (LGA), and more than 16,000 permanent staff.

In 2019, the commission conducted an election for the President's office with 73 candidates on the ballot paper. Governorship and House of Assembly elections were also organized in 29 states. A total of 1,066 candidates contested for 29 vacant governorship seats, and 14,580 candidates contested for 991 seats in the States' Houses of Assembly. The National Assembly elections comprising Senate and House of Representatives involved 6,584 candidates – 1904 contested for 109 available Senate seats and 4,680 candidates contested for 360 seats in the House of Representatives. At FCT, 105 candidates contested for Six chairmanship positions, and 701 contested for 62 councillorship positions. Ninety political parties participated in the election with over 84 million registered voters that spread across 176,996 voting locations. The sum of N189 billion (\$487.6 million) was approved for the conduct of the election.

Some of the key activities involved in the conduct of an election include the issuance of notice of election, political parties' primaries and campaigns, the nomination of candidates, publication of the official voters' register and list of nominated candidates, voting, counting, and announcement of results. All these activities have stipulated legal, constitutional, and operational frameworks to ensure effective coordination and credibility of the electoral process.

## 2.2 Electoral Logistics

Council of Supply Chain Management Professionals (CSCMP) defines logistics as “*part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements.*” Concerning the above definition, election logistics can be explained as a process, actions, and plans to ensure an efficient and effective flow of election materials, equipment, and personnel for the successful conduct of elections. It forms part of the electoral process that plans, implements, and controls the effective forward (distribution/delivery) and backward (reverse) logistics and storage of electoral materials and other related activities to ensure smooth and timely delivery to polling units. Green (2017) affirmed that efficient logistics practices play a crucial role in developing healthy democracy through free, fair, and credible elections.

Iwuoha et al. (2021) observes that “*election logistics deals with the whole gamut of planning, techniques, organization, implementation system, and control of the complex and interdependent tasks of the movement, transportation and distribution flow of election materials and officials from one location to the other during*

the election.” The authors identified three critical steps that must be followed for an adequate and effective electoral logistic plan. The first step deals with identifying all the complex tasks involved in the electoral process and devising or putting up a structure to handle them, including unforeseen situations. The second step involves breaking these complex tasks into manageable components and assigning them to appropriate personnel who can handle them effectively. The third step entails developing a sustainable security plan and protective measures for electoral materials and officials throughout the distribution chain. Efficient and effective logistics and supply chain activities for elections require detailed planning that covers order processing, procurement, storage and warehousing, distribution and delivery, sorting, packaging, transportation, security, and comprehensive tracking for both distributions and returns chain (Ace Project, 2021). All these activities are germane to the success of any election and could be seen as a foundation for credible, free, and fair elections.

At the heart of every election are the materials needed for organizing elections which vary from basic stationery to voters’ lists. These materials must be managed responsibly to ensure that all the stakeholders have confidence in the election process. INEC classifies electoral materials into sensitive and non-sensitive. Sensitive materials include validation or security seals, ballot paper, voter lists, ballot paper stamps, indelible ink or indelible marker pen, and ballot box seals. Non-sensitive materials include stationeries, voting compartments or booths, the ballot box, envelopes, scissors, dry cell batteries, election bags, posters, twine rope, masking rope stamp pads, apron vests, stickers, etc.

### 2.3 Key Components of Electoral Logistics

**Procurement** forms a critical link in logistics and supply chain systems with an overwhelming influence on the success of any organization (Rushton et al., 2014). Procurement finds suitable suppliers, negotiates terms and conditions, organizes delivery, arranges insurance and payment, and does everything needed to get materials into the organization (Afanasyeva, 2009). In the electoral process, ensuring that there are sufficient supplies of electoral materials in the required quantity in the right place and at the right time is pivotal to credible elections.

**Storage, Warehousing, and Inventory.** These activities move materials into storage and take care of them until they are needed. Modern logistics and supply chains recognize warehouses as major components involved in various sourcing, production, and distribution stages. Electoral materials are usually produced weeks or months before the election, and these materials need suitable and conducive storage and warehousing facilities to enhance the quality of the electoral process. Warehouses facilitate the movement of electoral materials throughout the logistics chain and ensure that the materials are adequately secured, well-ventilated, and damp-proof. It also ensures that the arrangement of the materials is systematically done to allow for quick access and dispatch. After the election, the materials needed to be sorted appropriately to know which one to destroy, re-use, or keep under strict security (Ace Project, 2021). Inventory management covers elements such as stock control, obsolescence, and replenishment. Other activities include sorting electoral materials into various locations and bringing them together as a unit load (sortation and consolidation) for onward deployment to different locations.

**Transport** is an essential activity in electoral logistics as it is often constituting the largest variable cost (Langley, et al., 2009). Transport involves moving all the electoral materials and equipment from the vendor/manufacturer/producer through the logistics chain to the final points of usage (polling units) and backward movement (reverse logistics). It is the glue (Coyle, et al., 2011) that holds all other electoral logistics activities together. According to Ace Project (2021), there are three major areas where transport needs are concentrated in electoral logistics:

- i. delivery of voting materials and equipment from vendors to central storage for onward sorting, packaging, and delivery to polling units.
- ii. delivery of other voting materials, equipment, and personnel to polling units.

iii. the return of materials equipment and staff from polling units

Therefore, it is necessary to assess the transport system in the areas of road conditions and accessibility, alternative modes of transport, vehicle capacity and reliability, warehousing facilities, international shipping/transport cost and requirements, custom clearance requirements, and emergency transport facilities (Ace project, 2021).

**Information Flow and Control.** Information flow is essential to the proper functioning of logistics operations. All the stakeholders in the system need relevant information to make timely, accurate, and effective operational decisions. Information sharing is critical to election logistics operation because it provides insights and visibility into the activities of all the actors in the electoral process. It also helps build confidence in the electoral process through accurate, relevant, and timely information sharing with the voters and the political parties. Accessible information provides EMBs with the needed knowledge to make situational assessments and develop appropriate responses (Langley, et al., 2009).

### 3.0 Methodology

This study, which is conceptual, exploratory, and descriptive, captures the thoughts, experience, and observation of selected ad hoc staff, political party leaders, private transport companies, and senior officials of the Independent National Electoral Commission (INEC) in Lagos through face-to-face and focused group discussions. This was augmented by the researchers' observations and experiences of the electoral process as ad hoc staff of the commission during previous elections. Published peer-reviewed literature, textbooks, case studies, and INEC reports and reviews of the 2019 elections were used. This method avails the researchers of the opportunity to understand the electoral logistics system thoroughly and deeply.

## 4.0 Discussion

### 4.1 Existing Logistics and Distribution Structure for Electoral Materials

This section looks at the existing logistics structure for election materials based on the INEC framework for the 2019 elections as contained in its 2017-2021 Strategic Action Plan (SAP). Iwuoha, et al., (2021) explained that the document recognized major logistics concerns, proposed specific actions within a timeframe, and outlined a national distribution plan for election materials.

Election logistics preparation starts from procurement. This procurement process usually commences with review meetings at all commission levels and an audit of the commission stores to establish the quality and quantity of the existing and reusable materials (INEC, 2020a, 2020b). This is subsequently followed by submitting the list of the materials requirements for the elections by various Units, Departments, and Directorates at the National, State, and Local Government levels for due diligence, evaluation, and approval. After that, the Procurement Department comes up with a comprehensive Procurement Plan and Timeline with a special focus on the minimum period stipulated in the Public Procurement Act (PPA) 2007 (INEC 2020a).

As stated earlier, electoral materials are divided into two: sensitive and non-sensitive materials. These materials have different procurement and acquisition processes as stipulated in the Public Procurement Act (2007) and other extant regulations. In line with the provisions of PPA 2007, non-sensitive materials, works and services were sourced through open competitive bidding. The process involves the invitation of prequalified companies to submit bid documents, analysis of the documents, consideration, and approval, award of contracts, and sign-off. This is followed by the materials' delivery to zonal warehouses of the commission and subsequently to INEC state headquarters and local government offices (INEC, 2017). All these activities were carried out within 208 days during the 2019 general election.

The procurement of sensitive materials follows restricted and direct methods in line with PPA 2007. The process will request for application for the printing of sensitive materials, followed by assessing the submitted application through a selective tendering method and inspection of the shortlisted companies' facilities locally and internationally. Other activities include Request for Quotation (RFQ), bids evaluation

**Commented [U15]:** The literature review session is poorly written and does not give any empirical study to evaluate the study in order to determine the gap to be filled.

**Commented [U16]:** The methodology should be rewrite in a clear statement. Method to be adopted for achieving the stated objectives of the study should be explicitly discuss in a logical order.

and report by Tenders Board, presidential approval to procure, final printing and delivery to Central Bank of Nigeria (CBN) headquarters, and subsequently to CBN state and INEC local government offices. These activities took 356 days during the 2019 general elections.

Adequate arrangement for transportation is crucial to the distribution and delivery of election materials (sensitive and non-sensitive) and staff on election day. Some of the transportation strategies adopted by the commission to resolve election logistics challenges include the delivery and storage of sensitive voting materials procured internationally at the CBN. In contrast, non-sensitive materials were sent to zonal stores and states for subsequent delivery to Registration Area Camp and polling units to facilitate seamless voting on election day (INEC, 2017). Other strategies adopted include developing a standard transportation template for materials and personnel movement and arranging smooth reverse logistics (INEC 2020b).

In preparation for the 2019 general elections, the commission constituted a Committee on Electoral logistics with membership from the Nigeria Airforce, Nigerian Army, Central Bank of Nigeria, and private transportation companies to ensure efficient delivery of election materials and personnel to different designated locations, especially on election day when the polling units are expected to open by 8 am prompt (EU-SDGN, 2018). A conference on electoral logistics was also organized to discuss how to ensure seamless deployment and timely delivery of election materials and personnel. According to the Commission, one of the recommendations of the Electoral Logistics Committee led to the review of the existing Memorandum of Understanding (MOU) with the National Union of Road Transport Workers (NURTW) and signed another set of MOUs with the Road Transport Employers Association of Nigeria (RTEAN), and National Association of Road Transport Owners for the provision of vehicles to transport election materials nationwide. These MOUs were signed because they control a massive fleet of vehicles and possess the capacity to deliver election logistics because of their understanding of local geographical terrain and road network. The roadworthiness of the vehicles was certified by the men of the Federal Road Safety Commission (FRSC) and equipped with a vehicle tracking device to monitor their movements.

Iwuoha et al. (2021) noted that the involvement of NURTW and other transport unions in the electoral logistics provided the politician with the opportunity to meddle with the process and compromise the integrity of the election. The authors also observed that INEC did not prepare adequately for return logistics which undermined the safety and security of the election materials and officials during their transportation back to the commission office.

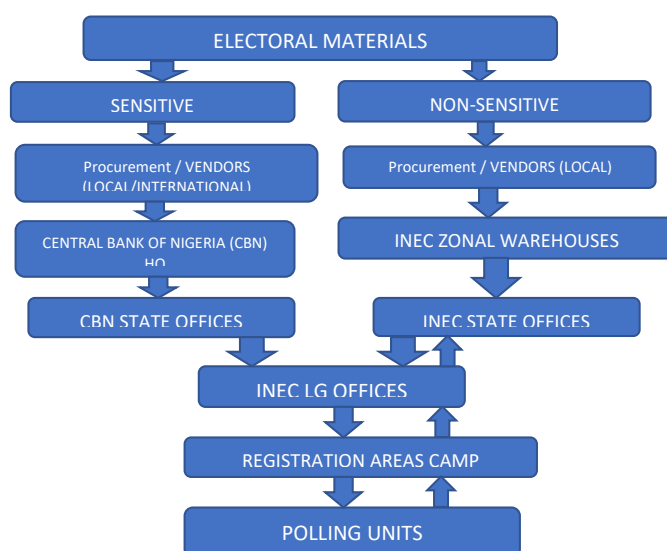
Packaging and distribution of election materials are usually carried out based on State, LGA, and headquarters and by the delimitation data and the requirements of each electoral constituency nationwide. The provision of adequate storage facilities was seen as an essential activity that can enhance the quality of the electoral process.

#### **4.2 Electoral Logistics Challenges in Nigeria.**

Despite the robust logistics preparations by the Commission, the following issues were still identified as logistics challenges affecting the electoral system in Nigeria:

- i. Delay in procurement process due to late budgetary approval and release of funds. According to PPA 2007, there must be a guarantee of funds availability before a contract could be awarded. Consequently, the Commission must wait for the election budget approval before awarding contracts for the materials.
- ii. Myriads of petitions from political parties on pre-election matters, acrimonious nature of party primaries, conflicting orders from the judiciary, and refusal of parties to follow constitutional provisions affect the procurement schedule of sensitive materials. Before the general election in 2019, INEC was involved in more than 396 pre-election cases (This Day, 3 December 2018).
- iii. Short production period for sensitive election materials. The provisions of the Electoral Act of 2010 (as amended), which require political parties to submit the list of candidates 60 days before the date of election and 45 days for substitution of candidates, have made it difficult for the

- Commission to conclude production, inspection, transportation, distribution, and delivery of election materials to 176,996 voting locations nationwide (INEC 2020a).
- iv. Poor quality control in the procurement process. This caused a supply of low-quality materials, especially consumables (e.g., pens, ink, cello tape, and twine rope).
  - v. Inadequate and deplorable conditions of the storage and warehousing facilities for the electoral materials at the zonal, state, and local government levels.
  - vi. Inefficient inventory control and stock-keeping practice of available and reusable materials can pressure the procurement process.
  - vii. Distribution delays caused by a mix-up of some sensitive materials during sorting, consolidation, packaging, and labelling by the vendors. This caused delivery to the wrong destination and subsequent delay or rescheduling of elections.
  - viii. Inappropriate location of zonal warehouses using the existing geo-political zones hinders the prompt delivery of election materials.
  - ix. Deliberate obstruction and subversion of due process by various political actors and stakeholders across the logistics chain.
  - x. Lack of technical and resource capability in logistics planning by the Commission and non-engagement of critical stakeholders, especially experts and professionals in transport, logistics, and supply chain in designing the electoral logistics framework.
  - xi. Political interference in the transport industry. This has a profound effect on electoral logistics because the delivery and return of voting materials and personnel are placed in the hands of local transport unions. Many of them are highly partisan.
  - xii. Lack of quality national infrastructure to support the huge logistics involved in the electoral process. According to the Commission, this was evidenced in the airport's ground handling facilities and road conditions and network.
  - xiii. Problems with reverse logistics especially in the areas of transportation and storage of sensitive and usable materials. This undermined the electoral integrity.
  - xiv. Inadequate logistics capacity to handle the movement of electoral personnel and materials nationwide. For instance, up to 900,000 vehicles were required nationwide for the 2019 general elections.
  - xv. Poor security planning for the movement of electoral materials and personnel to and from the polling units.
  - xvi. The restrictive, complicated, and cumbersome nature of the Public Procurement Act 2007 without provisions and consideration for special agencies like INEC.
  - xvii. Lack of internal communication mechanism for adequate, reliable, and timely information flow across the Commission's office at all levels compounds the logistics challenges.
  - xviii. The large number of political parties that participated in the 2019 elections increased the quantities of electoral materials in general.



**Fig 1: Electoral Logistics and Distribution Structure (Developed from INEC Report and Review of 2019 General Election.**

### 5.0 Sustainable Strategies for Improving Electoral Logistics in Nigeria

Some of the proposed strategies include:

- i. Amendment of the Electoral Act and the 1999 Constitution of the Federal Republic of Nigeria to address the time shortage between submission and replacement of candidates should be addressed. Election materials should get to INEC state offices at least 30 days before the election for proper inspection, audit, accountability, and timely deployment.
- ii. Public Procurement Act 2007 should be reviewed to accommodate special status for the Commission to facilitate the procurement process.
- iii. The zonal stores should be upgraded to full-fledged warehouses, and adequate facilities and equipment should be provided. The existing geo-political zones should not be used to create zonal stores; instead, the proximity of states and other geographical considerations should be adopted.
- iv. Decentralization of the procurement of non-sensitive materials or consumables would reduce pressure on the procurement process.
- v. Development and institutionalization of a training program in logistics planning and management, procurement process, and distribution management online or physically to enhance the capacity of both ad hoc and permanent staff of the Commission in charge of logistics operations.
- vi. Enforcement of quality control in the procurement process to ensure value for money from procured goods and services.
- vii. Deployment of technology in the election logistic activities and operations should be highly encouraged. The activities may include warehousing management, inventory system, distribution system, and ballot tracking.

- viii. Development of adequate national and state security plan to cover forward and reverse election logistics.
- ix. Memorandum of Understandings (MOUs) signed with the transport unions should be reviewed to accommodate sanctions and penalties for defaulters and vehicle standardization. Other transport unions should be allowed to participate in encouraging healthy competition and improved service delivery.
- x. Improvement of the existing logistics infrastructure nationwide should be pursued aggressively by the government to promote inclusiveness and credible elections.
- xi. Regulation of the registration of political parties through proper scrutiny of new requests for registration

**Commented [U17]:** This is search from literature and does not reflect findings from primary source. As such its need to be referenced accordingly.

### 5.1 Conclusion

This paper examined the electoral logistics in Nigeria and proposed some strategies to improve the existing logistics system of the Independent Electoral Commission (INEC). This conceptual and exploratory study captures the thoughts, experiences, and observations of selected ad hoc staff, political party leaders, private transport companies, and senior officials of the Independent National Electoral Commission (INEC) in Lagos through face-to-face and focused group discussions. This approach limits the generalizability of the findings; therefore, future research can study this with a quantitative approach to provide empirically robust results.

**Commented [U18]:** The main focus of the research has not been addressed. The author needs to readdress the research to achieve the stated objective because there is no evidence of where any of the objectives claim to be addressed by the research has been achieved. As such the conclusion and recommendation s is void.

### Reference

- Afanasyeva, V. (2009). Supply Chain of Shtokman field development project. Available at: [https://nordopen.nord.no/nord-xmlui/bitstream/handle/11250/140620/Afanasyeva\\_V.pdf?sequence=1&isAllowed=y](https://nordopen.nord.no/nord-xmlui/bitstream/handle/11250/140620/Afanasyeva_V.pdf?sequence=1&isAllowed=y)
- Ace Project (2021). Topic Areas — Election Management. Available at: <https://aceproject.org/ace-en/topics>
- Coyle, J. J., Novack, R. A., Gibson, J. B., & Bardi, J. E. (2011). *Transportation – A supply chain Perspective*. 7<sup>th</sup> Edition. South-Western Cengage Learning
- Electoral Act (2010). As amended. Available at: <https://www.inecnigeria.org/downloads-all/electoral-act-2010/> (Accessed on 21 June 2021)
- European Union Support to Democratic Governance in Nigeria (EU-SDGN) (2018). conference on logistics for the 2019 general elections. Available at <http://democracy-support.eu/nigeria/posts/conference-on-logistics-for-the-2019-general-elections> (Accessed on 20 June 2021)
- Public Procurement Act (2007). Available at: <https://www.bpp.gov.ng/wp-content/uploads/2019/01/Public-Procurement-Act-2007pdf.pdf> (Accessed on 23 June 2021)
- Green, W. (2017). Snap elections are all about Logistics. Available at <https://www.cips.org/supply-management/news/2017/June/snap-elections-are-all-about-logistics>. (Accessed on 20 June 2021).
- Hassan, I. & Yusuf, S. (2015). Electoral Integrity. Case Study: Nigeria. Retrieved from: <https://www.eisa.org.za/pdf/nigcasestudy.pdf> (Retrieved 18 November 2020).
- INEC (2017). INEC Strategic plan 2017-2021. Available at <https://www.inecnigeria.org/wp-content/uploads/2019/02/INEC-STRATEGIC-PLAN-2017-2021.pdf>. Retrieved 28 June 2021.
- INEC (2020a). Report of the 2019 General Election Retrieved from: <https://www.inecnigeria.org/wp-content/uploads/2020/11/report-of-the-2019-general-election.pdf>.
- INEC (2020b). Review of the 2019 General elections report of the commission's

**Commented [U19]:** Not in the body of the work

**Commented [U20]:** Not in the body of the work



- retreats and stakeholder engagement. Retrieved from <https://www.inecnigeria.org/wp-content/uploads/2020/11/review-of-the-2019-general-election-report-of-the-commissions-retreats-and-stakeholders-engagements-28th-may-12th-july-2019.pdf>.
- Iwuoha, V. C., Anichebe, O., Obi, K. C., Alumona, I. M., Ojimba, A. C., & Obiorji, J. N. (2021). Election Logistics and Political Meddling: Rethinking the Use of 'Town Service' Buses in Transporting Election Materials in Nigeria. *Social Science and Public Policy*. <https://doi.org/10.1007/s12115-021-00577-9>
- Jega, A. M. (2012). Improving Elections in Nigeria: Lessons from 2011 and looking to 2015. Retrieved from: <https://www.chathamhouse.org/sites/default/files/public/Research/Africa/040712summary.pdf>. (Accessed on 25<sup>th</sup> November 2020).
- Langley, C. J., Coyle, J. J., Gibson, B. J., Novack, R. A., & Bardi, E. J. (2009). *Managing Supply Chains – A Logistics Approach*. Cengage Learning
- Momah, P. O. (2021). Electoral Commissions and the Conduct of Elections in Nigeria: The Role of INEC. Available at [https://codesria.org/IMG/pdf/3-elections\\_and\\_governance\\_in\\_nigeria\\_momah.pdf](https://codesria.org/IMG/pdf/3-elections_and_governance_in_nigeria_momah.pdf)
- Omotola, J. S. & Nyuykonge, C. (2015). Nigeria's 2015 general elections: Challenges and Opportunities. Retrieved from: <https://www.accord.org.za/publication/nigeria-2015-general-elections/> (Accessed on 16 November 2020).
- Rushton, A., Croucher, P. & Baker, P. (2014). *The Handbook of Logistics and Distribution*. 5<sup>th</sup> edition. Kogan Page.
- ThisDay Live (2018). INEC: Conflicting Court Orders May Affect Procurement of Sensitive Materials. 3 December 2021. Available at: <https://www.thisdaylive.com/index.php/2018/12/03/inec-conflicting-court-orders-may-affect-procurement-of-sensitive-materials/>. Accessed 29 June 2021.
- World Bank (2018). Logistics Performance Index, Country Score Card: Nigeria. Available at: <https://lpi.worldbank.org/international/scorecard/radar/254/C/NGA/2018>. Accessed 24 June 2021.

Commented [U21]: Not in the body of the work

Commented [U22]:

Commented [U23R22]: Not in the body of the work

***Perceived Satisfaction with Quality of Travel Modes for Tourism Activities in Lagos State,  
Nigeria***

**Umar Obafemi Salisu<sup>1</sup>, Samuel G. Odewumi<sup>2</sup>, Forson Ibrahim Abdul-Azeez<sup>2</sup>**

Department of Urban and Regional Planning, Olabisi Onabanjo University, Ago-Iwoye<sup>1</sup>,

School of Transport and Logistics, Lagos State University, Ojo<sup>2</sup>

ORCID: 0000-0003-1630-3420

ORCID: 0000-0001-7262-0362

ORCID: 0000-0002-6279-0445

**Abstract:**

*Lagos State, Nigeria, which has always enticed international and local visitors with its diverse prime tourist attractions, continues grappling with transit operational difficulties. Meanwhile, there is a dearth of empirical studies on tourists' satisfaction with service quality dimensions of travel modes in literature. This study examined tourists' satisfaction with the quality of travel modes for tourism activities in Lagos State. This study, anchored on the perceived satisfaction theory, adopted a survey research design and a multistage sampling technique to collect information from 2,250 tourists chosen across different tourist sites in Lagos State. The primary data analysis methods were the weighted index analysis and binary logistics regression model. Significant findings revealed that most respondents (above 60%) were male within the active age group of 18–53 years and committed between 10 and 20% of their annual income to tourism. Public travel modes emerge as the most used choice for navigating leisure sites, while among the myriad factors influencing their travel mode selection, the choice of destination (3.9898) and the safety of travel mode (3.7080) stand as paramount determinants. This study revealed the unsatisfactory service quality of travel modes for tourism activities in Lagos State. Reliability, trust, and empathy were rated poor and unsatisfactory of the five service quality dimensions assessed, casting a shadow over the travel experience. The result of the BLR model revealed that the service quality of travel modes statistically influences overall satisfaction with travel mode ( $\chi^2 = 586.893$ ,  $p = 0.000$ ). This study concludes that Lagos's tourism potential remains hampered by poor travel experiences. It recommends, among others, a holistic overhaul of the service quality of travel modes and improving dedicated transport infrastructure and safety measures to elevate the tourism experience.*

**Keywords:** Lagos State, Service Quality Attributes, Tourist Satisfaction, Travel Modes, Tourism Activities

**1. Introduction**

Cities and every other community worldwide rely on transportation systems to perform mobility and accessibility functions such as moving materials for manufacturing goods, distributing finished goods to consumers, locating and connecting places of work, market, business activities, leisure, religion, medical activities, and home. Interaction among geographical locations, spatial units, and spatial activities would be impossible without

transport systems (Hibbs, 2000; Badejo, 2014; Salisu, 2019). This is why Oyesiku (2010; 2021) and Badejo (2014) noted that the transport system is the live wire of every society and its economic sector, as it not only facilitates meaningful spatial development but also links and makes functional all socioeconomic and environmental activities for practical livability and sustainability of man and the environment (Hibbs, 2000; Salisu, 2017).

A transport system is the combination of essential elements that include the infrastructure, the vehicle (modes) and the human personnel, all of which function and interact together to produce demand for travel and a supply of transport services to address the demand across the geographical space. Bimal (2014) observed that the transport infrastructure, which is a network or fixed installation of objects described as the facilities that permit and constrain the flow of traffic, the human personnel see to the administration of the transport operations, while the modes, which is the combination of the vehicle and engine, are the precondition for achieving successful transport system operation. Transport modes, or travel modes, offer the unit of carriage and propulsion for product movement (people, goods, animals, and information), shipment storage, distribution, and logistics in space.

Oyesiku (2021) observed that adequate travel mode is critical to the development and functionality of transport infrastructure and operations, irrespective of the robustness, level of development, planning and technological design. Page (2009) and Truong and Shimizu (2017) opined that travel mode is not only a requisite for transport development and sustainability but also an essential element that develops and makes possible all socio-economic activities, including tourism, functioning efficiently. This is why Sorupia (2005) and Ndikom (2008) noted that tourism activities are impossible without travel modes. Nonetheless, travel modes such as buses, private cars, trains, aircraft, ferries, motorcycles, and ships are necessary for both intrinsic (means of accessing and leaving tourist destinations once the tour is over) and extrinsic (means of luxury, adventurous, and nostalgic tourist transport) tourism activities (Sorupia, 2005; Page, 2009).

According to the World Tourism Organization, tourism has since time immemorial been a catalyst for economic diversification, infrastructural advancement, and technological innovation for national development and sustainability, as observed in developed countries like Spain, Greece, the United States of America, Singapore, the United Kingdom, the United Arab Emirate, etc. Truong and Shimizu (2017) opined that tourism contributed 9.8% of the global Gross Domestic Product (GDP) and over 9.4% of the global employment rate. In other words, the World Trade Organization (WTO) observed in 2005 that well-organized aircraft, ships, and rail transit have increased international tourist arrivals. In contrast, buses, chartered transit, ferries, and paratransit means have facilitated tourists' ease of movement and navigation among attractions, lodging facilities, commercial services, and adventurous and nostalgic activities at various destination cities worldwide. Salisu, Odewumi and Abdul-Azeez (2022) opined that travel mode drives tourism demand by serving as a crucial connector between tourists and their desired destinations, facilitates ease of mobility of tourists to explore destinations and shapes tourists' overall enjoyment and experiences at destinations.

Hedric-Wong and Choong (2014) and Litman (2008) affirmed that the tourism industry depends on well-developed and efficient travel modes to attract and accommodate tourists. As a result, travel modes have remained critical to international and domestic tourism's development, functionality, and sustainability.

Despite the importance of travel modes to tourism development and sustainability, they become a catalyst for dismal tourism performance, misrepresentation of tourism image, poor tourism experience, low tourism patronage and revenue, and intent to revisit destinations if they are insufficiently provided, characterised by poor service quality attributes, and poorly integrated (Salisu *et al.*, 2022). While communities in the global north keep promoting tourism potentials with the improved service quality of travel modes for tourism (Flausch, 2015; Rodrigue, 2013; LaMondia et al., 2009; Page, 2009), there is little attention on the quality of travel mode for tourists' ease of mobility in the global south. The consequences of this have been reflected in the continued transit operational challenges faced by the tourists while competing with locals to address their mobility demand in destination areas of most countries in the global south, including Lagos State, Nigeria, where transport supply is inadequate and complicated.

Meanwhile, there is a dearth of empirical knowledge from both transport and tourism researchers on the service quality dimensions of travel modes and tourists' satisfaction levels towards understanding the tourists' mobility issues and the service quality dimensions affecting tourists' satisfaction. Previous related research in literature has focused on passengers' satisfaction with public transport services concentrating only on the locals without consideration of the tourists (Wojuade & Badiora, 2017; Obasanjo & Martina, 2015; Chandrakumara, 2014; Ali, 2014) and studies that consider tourists travel characteristics of bus transport services without consideration for other travel modes (Nwachukwu et al., 2019; Bajadaa & Titheridgea, 2017; Flausch, 2015; Kim & Lee, 2011). Addressing this research gap, this study applied the perceived satisfaction theory to develop an integrated Travel Mode Service Quality Index (TMSQI) towards understanding tourists' satisfaction with travel modes service quality dimensions for improved tourism experience in Lagos State and similar destination settings across the globe.

Lagos State is blessed with enormous tourism potential spread across numerous historical monuments, beaches, unique annual festivals and media events, cultural centres and museums with robust travel mode choices, including ferries, buses, minibuses, ride-hailing services, rail, chartered flights, motorcycles, bicycles, etc., all of which are relevant and adopted by tourists for the accomplishment of tourism activities in the state. Unfortunately, despite the availability of all these travel modes and the ongoing efforts of governments, particularly at the state level, to improve the quality of travel modes and transit operations, travel activity situations remain unpredictable and characterised by a variety of challenges, particularly longer commuting times, congestion, and accessibility difficulties (Salisu, 2019). This has been established as a significant problem for the observed fluctuation in tourism patronage and the poor rank of Lagos in the global destination cities index (Salisu *et al.*, 2022).

In the quest to understand the tourists' mobility needs, the service quality of available travel modes, the dimensions of the travel mode service that require improvement, and how the service quality dimensions affect perceived satisfaction necessitated this study. Hence, this study examined tourist perceptions and satisfaction with the quality of travel modes for tourism activities in Lagos State, Nigeria. To achieve this aim, the following objectives guided the study: The study examined tourist profiles and the travel characteristics of tourists in Lagos State; the factors influencing travel mode choice for tourism activities in Lagos State; the tourist satisfaction with the service quality of travel modes for tourism activities in the study area; and the statistical influence of the quality of travel modes on the overall satisfaction with travel modes for tourism activities in Lagos State, Nigeria.

### **Theoretical Review: The Expectancy-Disconfirmation Theory**

The Expectancy-Disconfirmation Theory is a theory used to explain customer satisfaction by examining the relationship between expectations, perceived performance, and satisfaction. According to Oliver (1980), satisfaction is influenced by the discrepancy between customers' expectations and their perceptions of the actual performance of a product or service. If performance meets or exceeds expectations, customers are satisfied; if it falls short, dissatisfaction may occur. The focus of the theory is on understanding the cognitive process of customers as they evaluate their experiences. At the same time, its significance lies in providing a framework for businesses and researchers to assess and manage customer satisfaction by addressing the gaps between expectations and perceived performance.

The Expectancy-Disconfirmation Theory, which was notably developed by Richard L. Oliver in 1980, has found its extensive application in understanding customer satisfaction across various industries. It has been utilised to study consumer behaviour, service quality, and marketing strategies. The theory has been adapted and extended in different contexts to explore factors influencing satisfaction, loyalty, and post-purchase behaviour (Salisu, 2022). The Expectancy-Disconfirmation Theory is highly relevant in the context of tourism and travel behaviour. Tourists form expectations about their travel experiences, including modes of transport, based on previous experiences and services rendered by the travel modes. By applying this theory, researchers and practitioners can gain insights into how tourists evaluate their travel experiences and what factors contribute to their satisfaction or dissatisfaction with travel modes.

In the quest to extensively apply the Expectancy-Disconfirmation Theory in the context of travel modes in Lagos State, the SERVQUAL model and the Customer Satisfaction Index (CSI), which are complementary tools, were used in developing a Travel Mode Service Quality Index (TMSQI). The SERVQUAL model focuses on service quality dimensions, providing a systematic approach to measure and improve service quality. On the other hand, the Customer Satisfaction Index (CSI) is a metric that quantifies overall satisfaction based on customer feedback. In other words, the developed TMSQI use SERVQUAL dimensions (reliability, responsiveness, assurance, empathy, tangibles) to assess different aspects of travel services and employs the CSI to aggregate these dimensions into a comprehensive index,

reflecting overall satisfaction with travel modes for tourism activities by the sampled tourists in the study area.

## **2. Research Methodology**

### **2.1 Study Area**

Lagos state, which is the most populous state in Nigeria, estimated at a population figure of 15,388,00 (National Bureau of Statistics 2022), is in the southwestern part of Nigeria on the Atlantic Coast in the Gulf of Guinea and west of Niger & River Delta at longitude 3<sup>0</sup>45E and latitude 6<sup>0</sup>35N. This state is bounded in the east and north by Ogun state, in the west by the Republic of Benin, and in the south by the Atlantic Ocean, which gives several opportunities for tourism and water transport potential. Lagos state was classified into five (5) regional divisions: Ikeja, Ikorodu, Lagos Island, Epe and Badagry, with twenty (20) local government areas (LGA) and 57 local council development areas (LCDA) in 2003. Specifically, Lagos state is characterised by six (6) transport modes, namely road, water (inland water and maritime), air, rail, pipeline, and cable transport (still under construction), with several travel means including Bus Rapid Transit and noticeable transport infrastructure. Regarding tourism potential, Lagos State is home to several attractions, such as historical monuments, beaches, museums, and cultural and annual festivals, with a total score of more than 150 (Lagos State Government, 2022).

### **2.2 Research Design**

This study adopted a survey research design in which tourists' opinions were obtained to achieve the research objectives based on questionnaire administration.

### **2.3 Study Population and Sample Size**

The tourist population of notable attractions is mainly patronised by international and domestic tourists, which amounts to 90 in Lagos state from the study area's population. Forty-five (45), equivalent to 50% of the tourist attractions, were selected across the regional division of the study area as the sample frame. A total of two thousand two hundred and fifty (2,250) tourists as respondents participated in this study as a sample unit.

### **2.4 Sampling Procedure and Techniques**

This study adopted a multistage sampling technique to administer the research questionnaire. In the first stage, stratified sampling was used to identify the ninety (90) tourists drawn to Lagos State's five (5) regional divisions, which included Ikeja, Ikorodu, Lagos Island, Badagry, and Epe. All the tourist attractions were assigned numerical numbering to allow for possible random selection. In the second stage, simple random sampling was used to select fifty percent (50%) of the delineated tourist attractions in each regional division. Aggregately, 45 tourist attractions were randomly picked for the study. In the third stage, a convenient sampling technique was used to sample the tourists at the selected tourist attractions. The opinions of the available people on visit at each selected tourist attraction were sampled to confirm those who were tourists or excursionists. Those on excursion (less than 24 hours) were excluded and did not participate in the study. However, bootstrapping, a machine was

used to transform sampled data by estimating the sampling distribution using a random sampling method and measuring the accuracy of sample estimates.

## **2.5 Questionnaire Design and Reliability Test**

The questionnaire was segmented into four sections, with sections A, B, C, and D in line with the study objectives. The questionnaire design took the form of close-ended questions. The study used Cronbach Alpha for the reliability test, and the scale values used for sections C and D were 0.86 and 0.88, respectively. The content validity of the research questionnaire was confirmed by engaging twelve professionals from academia and industry.

## **2.6 Data Type and Method for Data Collection**

The study employed both primary and secondary data. The data for this study was collected between June and August 2022 in Lagos state. The questionnaire administration was conducted with the support of 12 research assistants spread across the five regional divisions of Lagos state.

## **2.7 Method of Data Presentation and Analysis**

This study adopted both descriptive and inferential statistics to present and analyze the data collected from the field. Descriptive statistics were used to present the findings of objectives one to four using simple frequency and percentage distribution tables, cross-tabulation analysis, and index analysis. The index analysis that relies on the summation of weighted value SWV, relative mean index RMI, and mean index value MIV was employed on the five-point Likert's scale and a four-point Likert's scale with the Customer Satisfaction Index (CSI) forms of gradation value consisting of Strongly Dissatisfied =1, Dissatisfied = 2, Satisfied =3, and Strongly Satisfied =4 for the four-point Likert's scale.

The inferential statistical technique of the Binary Logistics Regression model (BLR) was used to test the research hypothesis, which states whether the quality of travel modes statistically influences the overall satisfaction with travel modes for tourism activities in Lagos State, Nigeria. The justification for using Binary Logistic Regression (BLR) is to predict and model the probability or likelihood of a binary outcome (satisfied or dissatisfied) based on relevant predictor variables measured. However, the study identified 28 service quality parameters that could influence tourists' satisfaction with travel modes for tourism activities from the literature (Parasuraman et al., 1998; Litman, 2008; Murambi & Bwisa, 2014; Noor et al., 2014; Transport for London, 2015). The study adopted the statistical package for social sciences (SPSS) IBM version 25 for data computation and analysis.

## **3. Results and Discussion**

This sub-chapter presents the results and discussion in line with the study objectives.

### **3.1 Tourist Profile**

Understanding the socio-economic status (SES) of tourists is essential as it helps in understanding the behaviour and dispositions of the sampled tourists within the context of

Lagos State, Nigeria. Table 1 (*see Appendix 1*) presents the SES of the sample tourists, where findings on the gender, age group, educational level, employment status, marital status, average monthly income, and annual percentage of income committed to tourism were presented. The findings on the gender of the sampled tourists showed that the majority, about 60%, were male, while slightly above 40% were female. By implication, the male gender is more involved in tourism activities than their female counterparts in Lagos state, Nigeria. These findings are in tandem with those of Madu and Madu (2002).

Of the age groups of the respondents, the age group between 18 and 35 years accounted for more than one-third (38.5%), which was the largest. This was followed by the age group between 36 and 53, representing 28.4% of the respondents. Those aged 54 and 70 accounted for less than a quarter (18.3%), while those over 70 accounted for one-tenth (10.4%) of the respondents. The remaining 3.3% were those of the age group below 18 years and represented the least. A vivid observation of Table 1 of age distribution showed that the dominant age group of the respondents is between 18 and 53 years, which indicates the most economically active group that represents significant actors within the society.

Respondents' educational attainment is one of the most critical socio-economic characteristics that affect individual attitudes, perceptions, and understanding of phenomena. Hence, it is considered a significant attribute that influences tourism demands. Table 1 also revealed the educational level of respondents. A more significant proportion, about half of the respondents (44.7%), were either university or polytechnic graduates, the equivalent of a first degree. This is followed by those who obtained the senior secondary school certificate, representing more than a quarter (26.6%). Those who obtained a higher degree of post-graduate diploma, Master's, or PhD accounted for 22.8%, less than a quarter of the total respondents, while the primary school leaving certificate and its equivalent was less than one-tenth (4.4%). The remaining 1.4% of the respondents had no formal education and accounted for the most minor group. The findings on the level of educational attainment of the sampled tourists in Lagos state indicated a high level of literacy for the respondents. This reflects the excellent literacy situation of tourists, and these findings corroborate the findings of Madu and Madu (2002), Sanmargarja and Tawee (2015), and Ouariti and Jebrane (2020) that tourists are the most educated.

Furthermore, individual income plays a vital role in shaping socio-economic conditions and thus affects the decision to embark on tourism activities. The structure of the average monthly income of the tourists in Lagos State showed a more significant proportion, and the majority, representing about half (43.5%) of the respondents, earned above ₦200,000 monthly. This is followed by those who earn between ₦150,001 and ₦200,000, which accounted for less than one-third (29.9%) of the respondents. Those who earned between ₦100,001 and ₦150,000 accounted for less than a quarter of the total respondents, 13.4% and 9.1%, respectively. Those who earned less than ₦50,000 accounted for less than one-tenth (4.1%) and represented the least dominant. By implication, these findings show that most respondents earn far above the national minimum wage of ₦30,000 per month in Nigeria and can afford to engage in tourism



activities. These findings corroborate the findings of Madu and Madu (2002), Sanmargaraja and Tawee (2015), Kovacic and Milosevic (2016), Jian et al. (2017), Kantawateer et al. (2017), Adeleke and Ayantoyinbo (2019) by noting that tourism activities require financial buoyance and only those who are economically active and affluent mainly engage in tourism.

Table 1 also shows the percentage of income committed by the respondents to tourism. A majority of almost half of the respondents (43.7%) committed between 10% and 20% of their annual income to tourism activities. This was followed by those who committed less than 10% and between 21% and 30%, which accounted for more than one-third (36.4%) of the respondents and more than one-tenth (13.4%), respectively. Those who committed more than 30% of their annual income to tourism accounted for less than one-tenth (6.5%) of the respondents and represented the least dominant committed income structure.

### **3.3 Travel Characteristics of Tourists**

It is essential to evaluate the travel characteristics of tourists to understand the vacation travellers' behaviour. Significantly, Table 2 (*see Appendix 2*) presents the results of the travel characteristics of the sampled tourists during their vacation to Lagos State. Table 2 presents the distribution of respondents on the form of transport for the tourism vacation in Lagos State. It showed the dominance of the mono mode, that is, using a single mode of transport to accomplish their vacation, representing 50.4%. This is closely followed by those who use intermodal transport, that is, using more than one means of transport, which accounted for more than one-third (35.1%) of the respondents. Those who visited using multimodal, which accounted for less than a quarter (14.6%), represented the least.

Table 2 also presents the distribution of respondents' length of stay for the vacation. Respondents who booked for two days, which accounted for more than one-third (36.70%), represented the majority. This is closely followed by those staying for three days and above, accounting for more than a quarter (33.7%) and less than a quarter (20.5%). The remaining percentage, which accounted for less than one-tenth (9.1%), are those staying for a day (one night), representing the smallest group. By implication, sample respondents have at least an overnight stay at or around the attraction during the vacation, thus confirming their true nature of being tourists and not excursionists.

Furthermore, Table 2 presents the distribution of the distance covered by the respondents from home to the destination. Interestingly, the most dominant group was those who travelled and covered over 80 km from home to the destination, which accounted for more than one-third (38.2%). This is closely followed by those who cover between 61 and 80km, 41 and 60km, and 20 and 40km, which accounted for less than a quarter of the total, 21.4%, 19.8%, and 11.7%, respectively. Those who spent less than 20 km from their home to the destination accounted for less than one-tenth (8.9%) and represented the most minor dominance.

The results of the distribution of respondents on major travel means used to access tourist destinations are presented in Table 2. The findings showed that those who travelled by private

car or SUV, which accounted for more than one-third of the respondents (39.5%), represented the most dominant travel means. This is followed by those who travelled by bus, ride-hailing, ferry/boat, mini-bus, and power bike/motorcycle, which accounted for less than a quarter of 16.9%, 15.6%, 12.5%, 11.8%, and 3.7%, respectively. It is interesting to note that no tourists travelled by BRT or trains to access their destinations. By implication, the BRT and train facilities are not linked to significant tourist attractions that tourists mostly visit. Although private cars are the most used travel mode, most tourists use public travel mode compared to private vehicles. These findings negate the findings of Madu and Madu (2002), Adeleke and Ayantoyinbo (2019), and LaMondia, Snell and Bhat (2009).

### **3.4 The Factors Influencing the Travel Modal Choice for Tourism Activities**

It is worth knowing that various factors influence individuals' travel modes or modal choices for tourism activities. Specifically, the findings on the factors that influence the modal choice of tourists in Lagos State are presented in Table 3 (*see Appendix 3*) below using the Likert's scale measurement, which was graded based on five (5) points captured as: Not at all Influential = 1, Slightly Influential = 2, Somewhat Influential = 3, Influential = 4, and Extremely Influential = 5. Given this, respondents were asked to assess the factors influencing their travel mode for tourism activities in Lagos state, and their responses were analysed.

From Table 3 presented, ten (10) factors were analysed using Weighted Index Analysis in line with equations 1 and 2 presented in the methodology. The analysis produced a relative mean index of 30.076 and a mean index of 3.0077 (Table 3). A close review of Table 3 shows that seven factors out of the ten (10) evaluated have a Relative Mean Index (RMI) more significant than the MIV. According to the findings, the majority of the factors, more than two-thirds (70%), are good fits to influence respondents' modal choice for tourism activities along and within the destinations, while the remaining less than one-third are less influential factors.

Specifically, findings presented in Table 3 revealed that the choice of destination (3.9898), safety and security of travel mode (3.7080), and comfort and convenience of travel mode (3.5573) ranked as the top three most influential factors among the ten (10) evaluated factors influencing modal choice for tourism activities. This is closely followed by travel mode availability (3.3924), length and nature of journey (3.3676), access to travel information (3.3924), and travel mode affordability (3.2760). In other words, the level of information available on tourism activities (2.0036), speed of travel mode (2.0000), and the organisation of travel mode and trip characteristics were the least influential factors affecting the decision on modal choice for tourism activities. By implication, the choice of the travel mode for tourist activities in Lagos State is greatly influenced by the choice of the destination in terms of where and how the destination or attractions activities are prepared, planned, and situated. These findings corroborate the study carried out in developed cities of the European continent, as revealed by Litman (2008), LaMondia et al. (2009), and UNWTO (2018). The safety and security level of the travel mode, the comfort and convenience of the travel mode are also crucial factors that influence the modal choice for tourism activities, availability of the mode,

the length and nature of the journey, the accessibility to travel information, as well as the affordability of the travel mode.

### **3.5 Tourist Satisfaction with Service Quality of Travel Modes for Tourism Activities**

#### **3.5.1 Travel Mode Service Quality**

The importance of evaluating the quality of service of travel modes is to understand the ability and the delivery of the existing modal choice to satisfy and exceed customers' "tourist" expectations while on vacation. In the quest to achieve this and to understand areas of the service quality of the travel modes that require improvement towards sustaining tourism activities in Lagos State, the service quality of travel modes for tourism activities was examined based on the perception of tourists using a Travel Mode Service Quality Index (TMSQI). The parameters used to develop the TMSQI were adopted and modified from the existing literature (Parasuraman et al., 1998; Litman, 2008; Murambi & Bwisa, 2014; Transport for London, 2015). Table 4 (*see Appendix 3*) presents the findings on the service quality of travel modes for tourism activities (TMSQI) in Lagos State using the Likert's Scale measurement, which was graded based on four (4) points captured as strongly disagree = 1, strongly disagree = 2, agree = 3, and strongly agree = 4. Twenty-eight (28) variables across five (5) dimensions [Tangibility (6), reliability (6), responsiveness (5), trust (5), and empathy (6)] were analysed using Weighted Index analysis by equations 1 and 2 in the methodology. The analysis produced a weighted sum of 65.2550 and a mean index value (MIV) of 2.3305 for the TMSQI (Table 4)

Findings on the tangibility dimension revealed that 5 out of 6 (90%) parameters in the TMSQI ranked above the MIV. It further revealed that most sampled tourists ranked travel modes with sufficient and comfortable seating (3.2818) first, while travel modes with up-to-date facilities (1.9831) were the lowest quality of service of travel modes under tangibility. By implication, all travel modes are equipped with comfortable seating, but the facilities, including the seats and information, are not updated. Findings on the reliability dimension revealed that 2 out of 6 (one-third) ranked above the MIV. It further revealed that travel modes are dependable and do not break down (2.6280), are timely, and follow the route plan and schedules (1.4862) as the first and last service quality variables under the reliability of travel modes, respectively. By implication, travel modes do not break down and are dependable, but they have poor transit time and route planning.

Next to this are the responsiveness dimension findings, which revealed that 3 out of 5 (60%) variables in the TMSQI ranked above the Mean Index Value MIV. Findings revealed that most respondents ranked terminal maintenance and support facilities in good condition for effective service delivery (2.5471) as the first and travel modes providing ease of ticketing and seat allotment (1.9076) as the minor service quality variables under responsiveness. From these findings, it can be deduced that the travel modes have good and well-maintained terminals, but ticketing and seating within the terminal are still poor. Findings on the trust dimension revealed that 2 out of 5 (more than one-third) of the variables as a measure of TMSQI ranked above the MIV. Findings also revealed that most tourist-ranked travel modes

are not overcrowded enough to make the trip unpleasant (3.4044). Travel modes provide up-to-date information on travel and traffic situations (1.6729) as the first and most minor variable service quality under trust. By implication, it can be deduced that travel modes in the study area are not overcrowded but do not have updated travel and traffic information under the trust dimension.

Findings on the empathy dimension revealed that 1 out of 5 (less than a quarter) variables in the TMSQI ranked above the MIV. Table 4 further revealed that most tourists ranked travel modes according to frequency of service on various routes (3.3680) and travel modes with entertainment facilities (1.915) as the 1<sup>st</sup> and most minor service quality variables and empathy. From the findings, it can be deduced that although travel modes maintain a frequency of service on various transit routes, they do not have enough entertainment facilities, such as television and radio, to make trips pleasurable.

A vivid observation of Table 4 on the assessment of the TMSQI revealed that a half-equivalent to 50% of the total evaluated parameters (28) ranked above the MIV of 2.3305. The findings show that the travel modes available for tourism activities in Lagos state are: not overcrowded to make trips unpleasant (3.4044); maintain the frequency of service on various routes (3.3680); maintain sufficient and comfortable seating (3.2818); drivers appear friendly, neat, and intelligent (2.9262); accessible to all categories of tourists (2.8516); drivers behaviour install safety and confidence in passengers (2.6844); dependable and does not breakdown (2.6280); spacious, safe, and comfortable (2.5862); terminals' maintenance and supportive facilities are in good condition for effective service delivery (2.5471); modal services are always available (2.5342); an appropriate number of stops with shield (2.4636); service providers and drivers are trained and responsive (2.4520); vehicles' condition is good, neat, with an odourless interior (2.4298); and with facilities that are always readily available for use (2.3618), both of which scored above the MIV and ranked 1st-14th).

Furthermore, it is interesting to note that the quality of service of the existing travel modes for tourism activities in the study area is of poor service quality and unsatisfactory as three (3) out of the five (5) evaluated service quality dimensions (reliability, trust, and empathy), an equivalent 60%, are rated as unsatisfactory. In contrast, the remaining 40% are rated satisfactory, tangibility and responsiveness of travel mode. Hence, the service quality of these modes does not meet the expectations of tourists. The reason for the increasing use of personal cars and vehicles for tourism activities in Lagos state is not far-fetched from the findings. To achieve sustainable tourism activities, there is a need to improve the quality of services offered by travel modes.

### **3.5.2. Overall Satisfaction with Travel Modes for Tourism Activities**

Further investigations were carried out to establish tourists' overall satisfaction with the existing quality of travel modes in the study area, and the results are presented in Table 5 (*see Appendix 3*). Findings on the distribution of overall satisfaction with travel modes revealed that the majority (about 60%) of the respondents were dissatisfied with the overall quality of

travel modes aiding tourism activities in Lagos State, while the remaining percentage was slightly above 40% (42.2%) were satisfied with the overall quality of travel modes in the study area (Table 5). The reasons for the observed results in the study area are not farfetched, from the unavailability of dedicated vehicles and lanes for tourism activities to prevent traffic congestion, unpredictable travel times and routine operations, lack of information on travel and traffic situations, poor security measures; and poor and ineffective complaints handling procedures at terminals and while on transit. Improving the quality of services identified in the TMSQI would increase overall tourist satisfaction with the travel modes for tourism activities in Lagos State.

### 3.6 Statistical Effect of the Quality of Travel Modes on the Overall Satisfaction with the Quality of the Travel Modes for Tourism Activities in Lagos State

In a bid to test the postulated hypothetical statement, which is examined to understand the statistical relationship between the service quality of travel mode and the overall satisfaction with the quality of travel mode for tourism activities in Lagos State, Nigeria, further investigations were conducted using Binary Logistics Regression (BLR) model. The logit regression analysis, which measures and defines the relationship between the dependent variable and independent variables, establishes and explains the extent of the relationship between a binary outcome dependent and a group of predictors or independent variables; in other words, the BLR model was used to establish the extent to which the tourists' overall satisfaction with the quality of the travel modes for tourism activities is explained by the quality of travel modes for tourism activities.

The dependent variable, which is the variable to be predicted, is the tourists' overall satisfaction with travel modes for tourism activities. They were dichotomously recorded and transformed into dummy or binary variables of 0 and 1 (from the four-point Likert's scale as very dissatisfied/dissatisfied = 0 and satisfied/very satisfied = 1). These independent/predictor variables (the service quality of travel mode), which are twenty-eight (28) variables captured under five (5) dimensions (tangibility, reliability, responsiveness, trust, and empathy), were also transformed into dichotomous binary digits of 0 and 1 (strongly disagree/disagree = 0 and agree/strongly agree = 1). In other words, using the variable defined above, the logit regression equation or these two hypothetical statements are expressed as  $\text{Logit}(y) = \text{Lo}\left\{\frac{P}{1-P}\right\} = \beta_0 +$

$$\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \beta_{28}$$

where the Logit (y) is the binary outcome-dependent variable indicating failure or success of the overall tourists' satisfaction with the quality of travel mode for tourism active is  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \dots, \beta_{28}$  are the parameters of the model  $X_1, X_2, X_3, X_4, X_5, \dots, X_{28}$  are the predictors or P = is the probability of failure or success of the independent variable.

It is worth knowing that the model through the chi-square results presented in Table 6 (*see Appendix 4*) was used to test and explain the overall significance of the predictors' variable in the BLR analysis. Significantly, the results show a chi-square value of 586.893, which reaches

significant ( $P = 0.000$ ) at a 0.05 alpha level. It is crystal clear that the dependent variable (overall tourist satisfaction with the quality of travel modes for tourism activities) is statistically significant and predicted by the predictor variables. There is a statistically significant relationship between overall tourist satisfaction with the quality of travel mode for tourism activities and the service quality of the travel mode in the study area. Hence, these findings established that the overall satisfaction with the quality of travel modes for tourism activities in Lagos State is statistically significantly explained by the service quality of the travel modes. The decision on this hypothetical statement is to accept  $H_1$  (the alternative hypothesis) and reject  $H_0$  (the null hypothesis). As a result, as travel mode service quality improves, tourists will be more satisfied with the accessibility and mobility demands for tourism activities in the study area. Thus, the better the travel mode services, the greater the satisfaction with tourism activities, which affects the intention to revisit and recommend and the tourism image of Lagos State, Nigeria.

Furthermore, the findings through the model summary show the Cox & Snell and Nagelkerke R Square results in Table 6, which are sometimes referred to as pseudo R square values, and explain similar results of the R square and adjusted R square in multiple regression analysis to show the level of explained variation in the dependent variable. In other words, the Cox & Snell R square value shows 0.320, and the Nagelkerke  $R^2$  shows 0.409. Hence, from the model summary in Table 4.8, the explained variation in the dependent variable ranges from 32% and 41% of Cox & Snell  $R^2$  and Nagelkerke  $R^2$ , respectively, indicating a strong relationship between predictors and perdition, that is, there is a strong relationship between the service quality of travel mode and the overall satisfaction with the quality of travel mode for tourism activities.

Also, the results are presented under the classification in Table 6, which explains the modal prediction level. In other words, Table 6 presents the percentage of cases correctly classified and predicted by the model established from the dependent and variable assessed, i.e., the effectiveness of the predicted classification against the actual classification. Hence, the results from the classification table show that 592 are observed to be 1 (very satisfied/satisfied) and are correctly predicted as 1. 1,014 cases were observed to be 0 (very dissatisfied/dissatisfied) and correctly predicted as 0, while 289 cases that were observed to be 0, correctly predicted as 1, while 335 cases that were observed to be 1, correctly predicted as 0. In summary, the overall percentage of the cases correctly predicted by the model is 71.4, indicating that the model could classify 71% of all the cases correctly.

Furthermore, the results displayed under the variables in the equation table presented in Table 6 show the contribution of each independent variable to the models through the Wald Test in the Wald column. The Wald Test results explain the significant and non-significant predictor variables contributing to the model at an alpha level 0.05. From the results, 18 variables out of the twenty-eight (28) predictors contributed significantly to the model prediction, while the remaining ten predictors did not contribute significantly to the model prediction. By

implication, these findings reveal that a unit change in the overall satisfaction with travel modes is a function of improving the service quality of travel mode variables.

#### **4. Conclusion and Recommendations**

In conclusion, this study unequivocally affirms that the quality of service in travel modes is not only a critical factor but a fundamental precondition for sustaining tourism activities and ensuring tourists' satisfaction in Lagos State, Nigeria. The findings reveal that while tourists express relative satisfaction with the tangibility and responsiveness dimensions of travel mode services, there is a notable dissatisfaction with reliability, trust, and empathy, emphasizing the urgency for comprehensive improvements. The results of the hypothetical statement further assert that variables of the service quality of travel modes significantly predict overall satisfaction in tourism activities within the study area. However, this study underscores the pivotal role of adequate provision, planning, and management of tourist transport in achieving improved service quality of travel modes.

To achieve heightened tourist satisfaction and foster sustainable tourism activities in Lagos State, the study recommends a comprehensive approach, urging urgent action on technical measures to address existing service quality issues in travel modes. These recommendations encompass a holistic overhaul of travel mode services and continuous improvement in the provision of transport infrastructure to enhance the efficient service quality of travel modes. Additionally, efforts should be directed towards strengthening the implementation of transport and traffic policies and fostering collaboration between transport and tourism institutions in project development and execution. This collaborative approach is anticipated to enhance the quality of tourism activities.

Moreover, private participation in dedicated facilities support provision and management investments is recommended to improve the quality of travel mode services further. Finally, a specialized institutional framework for planning tourist transport (travel modes) is proposed, offering a comprehensive roadmap for sustainable tourism in Lagos State and beyond. The anticipated outcome of implementing these measures is an enhanced and satisfactory tourist travel experience in Lagos State, resulting in improved attractiveness to both domestic and international tourists. This positive transformation is expected to manifest in increased international arrivals, extended stays, foster tourists' intentions to visit and revisit destinations, an enhanced tourism image, and a substantial contribution to the state's GDP. Ultimately, by prioritizing and elevating the quality of travel modes, Lagos State has the potential to position itself as a sustainable and thriving destination for tourism.

##### **4.1 Contribution to Knowledge**

The significant contributions to knowledge emanating from this research can be summarized into three key dimensions. First, it addresses the dearth of empirical studies on tourists' satisfaction with the service quality dimensions of travel modes in Lagos State, thereby providing valuable insights into an understudied aspect of tourism in Nigeria. Second, the study identifies specific dimensions of service quality that are notably lacking, providing a

nuanced understanding of areas requiring urgent improvement. Lastly, by applying a hypothetical statement, the research emphasizes that service quality variables in travel modes significantly predict overall satisfaction, reinforcing the need for immediate and substantial investment in technical measures to rectify travel modes' performance challenges.

### **Acknowledgements:**

The authors acknowledged and appreciated the tourists who participated in the study, the research assistants, and the entire LASU School of Transport and Logistics staff and students.

### **References**

- Adeleke, B.O. & Ayantoyinbo, B. (2019). Correlate of transport and tourism infrastructure development in Nigeria. *International Journal of Advanced Research*, 7(2), 311–320.
- Badejo, B.A. (2014). Transporting the future today: portrait of Nigeria. *Inaugural lecture, Olabisi Onabanjo University, Ago-Iwoye, Ogun State*.
- Bimal, D. (2014). *Transport geography*. New Delhi: Venus Book Publisher and Distributors.
- Bramwell, B., & Lane, B. (2013). Getting from here to there: Systems change, behavioral change and sustainable tourism. *Journal of Sustainable Tourism*, 21(1), 1–4.
- Hibbs J. (2000). *An introduction to transport studies*. The Institute of Logistic and Transport (3<sup>rd</sup> ed.). London: Kogan Page Limited.
- Jian, H., Pan, H., Xiong, G. & Lin, X. (2017). The impacts of civil airport layout to Yunnan local tourism industry. *Transportation Research Procedia* 25, 77–91.
- Kantawateera, K., Naipinit, A, Sakolnakorn, T. P. N., & Kroeksakul, P. (2015). Tourist transportation problems and guidelines for developing the tourism industry in Khon Kaen, Thailand. *Asian Social Science*, 11(2), 89-95.
- Kovačić, M. & Milošević, T. (2016). Interdependence of transport and tourism. *Pomorski zbornik*, 52, 99-111.
- Lagos State Government (2022). *Lagos State official report*. Lagos State Government
- LaMondia, J., Snell, T., Bhat, C.R. (2009). *Traveler behavior and values analysis in the context of vacation destination and travel mode choices: European Union studies*. The 88<sup>th</sup> Annual Meeting of Transportation Research Board, Washington DC, USA.
- Litman, T. (2008). Valuing transit service quality improvement. *Journal of Public Transportation*, 11(2), 43-63.
- Madu, J.C. & Madu, S.N. (2002). Destination attributes affecting tourist readiness to recommend Lagos State (Nigeria) for tourism. *SAJEMS*, 5(3), 663-682.
- Murambi, D.N. & Bwisa, H.M. (2014). Service quality and customer satisfaction in public transport sector of Kenya: A survey of shuttle travelers in Kitale terminus. *International Journal of Academic Research in Business and Social Sciences*, 4(9):402-412.



- National Bureau of Statistics (2022). *Lagos State data report*. Federal Government of Nigeria.
- Ndikom, O.B (2008). *Element of transport management*. Lagos, Bunmico Publishers.
- Noor, H., Nasrudin, N. & Foo, J. (2014). Determinants of customer satisfactions of services quality: city bus services in Kota Kinabalu, Malaysia. *Procedia- Social and Behavioral Science*, 153: 595-605.
- Oliver, R. L. (1980). A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. *Journal of Marketing Research*, 17(4), 460-469.
- Oyesiku, K.O. (2010). Management of road transport system in Nigeria: The national security implications. *Guest Lecture Presented at the National Security Conference of the Alumni Association of Nigeria Defense College held at Nigeria Defense College, Abuja*.
- Oyesiku, K.O. (2021). *Transport and logistics in Nigeria*. Ibadan: HEBN Publishers.
- Page, S. (2009). *Transport and Tourism: Global Perspectives*. Harlow, Pearson Prentice Hall.
- Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1998). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 1-7.
- Rodrigue, J. P. (2013). International tourism and transport. Retrieved July 1, 2018, from <http://people.hofstra.edu/geotrans/eng/ch7en/appl7en/ch7a3en.html>
- Salisu, U. O. (2017). Analysis of transport administrators in sustaining transport development in Lagos, Ogun and Oyo State, Nigeria. *Journal of Research in National Development*, 15 (1), 191-203.
- Salisu, U. O., Akanmu, A. A., Sanni, S. M., Fasina, S. O., Ogunseye, N. O., Ogunsesan, A.S., & Olatunji, O. M. (2021). COVID-19 related socio-economic impacts and palliative care deliveries during lockdown in Nigeria: A case study. *International Journal of Logistics Research and Applications*, 1-31. DOI: 10.1080/13675567.2021.1939665
- Salisu, U.O. (2019). State of transport administrative structure in Lagos, Ogun and Oyo states, Nigeria. *Journal of Spatial and Organizational Dynamics*, VII (1), 68-85.
- Salisu, U.O. (2022). Analysis of transport infrastructure and sustainable tourism in Lagos State, Nigeria. Unpublished PhD theses (draft). Lagos: Lagos State University.
- Salisu, U.O. Odewumi, S.G., & Abdul-Azeez, F.I. (2022). Understanding the nexus between transport infrastructure and sustainable tourism development in Nigeria: A review of concepts. *Nigeria Journal of Logistics and Transport*, 1, 117-151.
- Sanmargaraja, S. & Ta Wee, S. (2015). Accessible transportation system for the disabled tourist in the national park of Johor State, Malaysia. *International Journal of Social Science and Humanity*, 5 (1), 15-21.
- Sorupia, E. (2005). Rethinking the role of transportation in tourism. *Proceedings of the Eastern Asia Society for Transportation Studies*, 5, 1767-1777.
- Transport for London (2015). Bus customer satisfaction. Available at <http://content.tfl.gov.uk/stp-20150715-part-1-item10-bus-customer-satsfaction.pdf>
- Truong, N.V. & Shimizu, T. (2017). The effect of transportation on tourism promotion: a Literature review on application of the Computable General Equilibrium (CGE) Model. *Transportation Research Procedia*, 25, 3096–3115.

United Nations World Tourism Organization (2018) Sustainable Development of tourism.  
Available at <http://setrunwto.org/content/about-us-51>

United Nations World Tourism Organization [UNWTO]. (2005). Sustainable development of tourism conceptual definition. Madrid: United Nations World Tourism Organization.

WTTC. 2015. Economic Impact of Travel & Tourism. Summary 2015 Annual Update. The Authority on World Travel & Tourism. Available at [http://www.wttc.org/research/economic\\_research/economic-impact-analysis/](http://www.wttc.org/research/economic_research/economic-impact-analysis/)

## APPENDIX 1

**Table 1: Tourists Profile (Socioeconomic Status)**

<b>Tourists Profile</b>	<b>Lagos Island</b>		<b>Ikorodu</b>		<b>Ikeja</b>		<b>Badagry</b>		<b>Epe</b>		<b>Grand Total</b>	
<b>Gender</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>
Female	435	19.3	42	1.9	195	8.7	108	4.8	133	5.9	913	40.6
Male	615	27.3	58	2.6	155	6.9	242	10.8	267	11.9	1337	59.4
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
<b>Age Group</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>
Less than 18 years	15	7.0	4	0.2	17	0.8	15	0.7	24	1.1	75	3.3
18-35 years	297	13.2	13	0.6	106	4.7	179	8.0	271	12.0	866	38.5
36-53 years	262	11.6	61	2.7	147	6.5	102	4.5	90	4.0	662	28.4
54-70 years	258	11.5	17	0.8	70	3.1	54	2.4	13	0.6	412	18.3
Above 70 years	218	9.7	5	0.2	10	0.4	0	0.0	2	0.1	235	10.4
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
<b>Educational Level</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>
No formal edu.	7	0.3	7	0.3	5	0.2	8	0.4	5	0.2	32	1.4
Primary	65	2.9	9	0.4	18	0.8	4	0.2	4	0.2	100	4.4
Secondary	295	13.1	11	0.5	76	3.4	103	4.6	114	5.1	599	26.6
First degree	373	16.6	20	0.9	176	7.8	194	8.6	242	10.8	1005	44.7
Higher degree	310	13.8	53	2.4	75	3.3	41	1.8	35	1.6	514	22.8
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
<b>Average Monthly Income</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>
Less than ₦50,000	41	1.8	29	1.3	2	0.1	9	0.4	12	0.5	93	4.1
₦50,000 - ₦100,000	154	6.8	11	0.5	27	1.2	9	0.4	4	0.2	205	9.1
₦100,001 - ₦150,000	104	4.6	7	0.3	75	3.3	58	2.6	58	2.6	302	13.4
₦150,001 - ₦200,000	269	12.0	26	1.2	114	5.1	113	5.0	150	6.7	672	29.9
Above ₦200,000	482	21.4	27	1.2	132	5.9	161	7.2	176	7.8	978	43.5
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
<b>Percentage of Income Committed to Tourism</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>	<b>Freq.</b>	<b>%</b>
Less than 10%	377	16.8	43	1.9	108	4.8	145	6.4	147	6.5	820	36.4
10% - 20%	511	22.7	38	1.7	121	5.4	153	6.8	160	7.1	983	43.7
21% - 30%	114	5.1	11	0.5	71	3.2	36	1.6	69	3.1	301	13.4
Above 30%	48	2.1	8	0.4	50	2.2	16	0.7	24	1.1	146	6.5
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0

## APPENDIX 2

**Table 2: Travel Characteristics of Tourists**

Tourists Profile	Lagos Island		Ikorodu		Ikeja		Badagry		Epe		Grand Total	
Length of Stay	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
1 day	70	3.1	17	0.8	69	3.1	36	1.6	13	0.6	205	9.1
2 days	530	23.6	46	2.0	117	5.2	80	3.6	52	2.3	825	36.7
3 days	337	15.0	27	1.2	87	3.9	134	6.0	173	7.7	758	33.7
Above 3 days	113	5.0	10	0.4	77	3.4	100	4.4	162	7.2	462	20.5
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
Distance Covered to Destination	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Less than 20km	33	1.5	10	0.4	5	0.2	101	4.5	51	2.3	200	8.9
20-40km	48	2.1	17	0.8	70	3.1	39	1.7	89	4.0	263	11.7
41-60km	121	5.4	7	0.3	119	5.3	68	3.0	131	5.8	446	19.8
61-80km	309	13.7	15	0.7	80	3.6	22	1.0	55	2.4	481	21.4
Above 80km	539	24.0	51	2.3	76	3.4	120	5.3	74	3.3	860	38.2
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
Form of Transport Used for the Visit	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Mono	431	19.2	14	0.6	231	10.3	220	9.8	237	10.5	1133	50.4
Intermodal	462	20.5	55	2.4	83	3.7	67	3.0	122	5.4	789	35.1
Multimodal	157	7.0	31	1.4	36	1.6	63	2.8	41	1.8	328	14.6
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
Major travel means Used to Access Destination	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Power bike/ motorcycle	67	3.0	0	0.0	14	0.6	1	0.0	1	0.0	83	3.7
Ferry/ boat	175	7.5	8	0.4	70	3.1	14	0.6	14	0.6	281	12.5
Car/SUV	354	15.7	90	4.0	140	6.2	151	6.7	154	6.8	889	39.5
Mini-bus	179	8.0	2	0.1	24	1.1	29	1.3	32	1.4	266	11.8
Bus (organized group)	102	4.5	0	0.0	65	2.9	85	3.8	129	5.7	381	16.9
Charter flight	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Ride hailing	173	7.7	0	0.0	37	1.6	70	3.1	70	3.1	350	15.6
Train (organized group)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bus Rapid Transit	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0

**Table 3: Factors Influencing the Travel Modal Choice for Tourism Activities**

Factor	No at all influential	Slightly influential	Somewhat influential	Very Influential	Extremely influential	TWV	RIM	MIV	MD	RK
Length and nature of journey	227	680	1011	4284	1375	7577	3.3676	30.0769/10 = 3.0077	0.36	5
Affordability of travel mode	222	950	2121	608	3470	7371	3.276		0.27	7
Organisation of travel mode and trip	1535	812	927	0	0	3274	1.4551		-1.55	10
Speed of mode	1072	880	1587	336	625	4500	2.0000		-1.01	9
Comfortability and convenient of the travel mode	384	892	483	200	6045	8004	3.5573		0.55	3
Access to information	443	272	1164	3232	2375	7486	3.3271		0.32	6
Availability of transport mode	466	436	588	2828	3315	7633	3.3924		0.38	4
Choice of destination	19	424	492	4932	3110	8977	3.9898		0.98	1
Level of information available	1346	686	405	236	1835	4508	2.0036		-1.00	8
Safety and security of transport mode	116	634	1956	752	4885	8343	3.7080		0.70	2

### APPENDIX 3

**Table 4: Service Quality of the Travel Mode**

Factor	SD	D	A	SA	TWV	RIM	MIV	MD	RK
<b>Tangibility:</b> Travel mode is accessible to all categories of tourists	556	292	1872	3696	6416	2.8516	65.2553/28 = 2.3305	0.52	1
Travel mode is spacious, safe and comfortable	801	94	2052	2872	5819	2.5862		0.26	8
Travel mode is in good condition, neat with odorless interior	910	94	2127	2336	5467	2.4298		0.10	13
Drivers appear friendly, neat and smart	442	172	2754	3216	6584	2.9262		0.60	4
Travel mode maintains sufficient and comfortable seating	34	18	4488	2844	7384	3.2818		0.95	3
Travel mode is with up-to-date facilities and information	1217	472	1245	1528	4462	1.9831		-0.35	19
<b>Reliability:</b> Travel mode is timely, follows up the route plan/schedule	1686	394	612	652	3344	1.4862		-0.84	28
Travel mode is dependable and does not breakdown	681	8	3108	2116	5913	2.6280		0.30	7
Travel mode fare charges are affordable	1339	76	1464	1540	4419	1.9640		-0.37	20
Service providers and drivers are trained and responsive	878	246	1809	2584	5517	2.4520		0.12	12
Complaints-handling procedure at terminal is time effective	1288	946	882	780	3896	1.7316		-0.60	26
Maintains timely and straight procedure for handling complaints	1277	726	930	1200	4133	1.8369		-0.49	24
<b>Responsiveness:</b> Travel mode service is always available	685	436	2421	2160	5702	2.5342		0.20	10
Travel mode service is timely and operational effective	980	520	1617	1884	5001	2.2227		-0.11	15
Travel mode provide ease of ticketing and seats	1269	604	891	1528	4292	1.9076		-0.42	22
Travel mode terminals maintenance and supportive facilities are in good condition for effective repair and service delivery	763	400	1740	2828	5731	2.5471		0.22	9
Travel mode has appropriate number of stops with shield	807	456	1740	2540	5543	2.4636		0.13	11
<b>Trust:</b> Travel mode maintains security measures against crimes	1114	986	1158	1028	4286	1.9049		-0.43	23
Drivers behavior install safety and confidence in passengers	585	432	2319	2704	6040	2.6844		0.35	6
Travel mode is not overcrowded to make trip unpleasable	22	160	3342	4136	7660	3.4044		1.07	1
Travel mode provide information on travel and traffic situation	1425	860	303	1176	3764	1.6729		-0.66	27
Travel mode maintains a special treat for vulnerable groups	1305	898	681	1076	3960	1.7600		-0.57	25
<b>Empathy:</b> Transit information is readily available and easily accessible	1043	582	1452	1728	4805	2.1356		-0.19	17
Passenger interest and satisfaction is prioritized	1006	616	2142	888	4652	2.0676		-0.26	18
Travel mode facilities are always readily for use	832	434	2268	1780	5314	2.3618		0.03	14
Travel mode maintain frequency of service on various routes	20	230	3396	3932	7578	3.3680		1.04	2
Travel mode is environmental friendly	1033	596	1416	1788	4833	2.1480		-0.18	16
Availability of entertainment facilities (radio, TV)	1148	826	1263	1072	4309	1.9151		-0.42	21

**Table 5: Overall Satisfaction with Travel Modes for Tourism Activities**

Overall Satisfaction with Travel Modes	Lagos Island		Ikorodu		Ikeja		Badagry		Epe		Grand Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Strongly Dissatisfied	376	16.7	27	1.2	68	3.0	153	6.8	208	9.2	832	37.0
Dissatisfied	161	7.2	32	1.4	41	1.8	120	5.3	116	5.2	470	20.9
Satisfied	367	16.3	28	1.2	187	8.3	73	3.2	71	3.2	726	32.3
Strongly Satisfied	146	6.5	13	0.6	54	2.4	4	0.2	5	0.2	222	9.9
Sub-total	1050	46.7	100	4.4	350	15.6	350	15.6	400	17.8	2250	100.0
Mean	4838											
Sum of Weighted Value	2.1502											

## APPENDIX 4

**Table 6: Effect of the Services Quality of Travel Modes on the Overall Satisfaction with Quality Travel Modes**

omnibus Tests of Model Coefficients							
Step 1		Chi-square	Df	Sig.			
	Step	586.893	28	.000			
	Block	586.893	28	.000			
	Model	586.893	28	.000			
Model Classification							
		Overall satisfaction with travel modes (Predicted)					
		Strongly Dissatisfied/Dissatisfied (0)	Satisfied/ Strongly Satisfied (1)	Percentage Correct			
Overall satisfaction with travel modes (Observed)	Strongly Dissatisfied/Dissatisfied (0)	1014	289	77.8			
	Satisfied/ Strongly Satisfied (1)	335	592	62.5			
Overall Percentage				71.4			
Model Summary							
Step	-2 Log likelihood		Cox & Snell R Square	Nagelkerke R Square			
1	2475.705 <sup>a</sup>		.320	.409			
a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.							
Variables in the Equation							
Step 1 <sup>a</sup>		B	S.E.	Wald	Df	Sig.	Exp(B)
	TANGACCESS1	.181	.116	2.436	1	.119	1.198
	TANGSPACIOUS2	.244	.135	3.263	1	.041	1.276
	TANGGOODCOND3	-.134	.138	.944	1	.331	.874
	TANGFRIEND4	-.705	.142	24.708	1	.000	.494
	TANGTRAVELMODEMA5	.464	.373	1.548	1	.213	1.590
	TANGFACI6	-.008	.123	.004	1	.950	.992
	RELTIMELY7	.533	.161	11.027	1	.001	1.704
	RELDEPEN8	-.662	.121	29.915	1	.000	.516
	RELFARE9	.060	.127	.227	1	.634	1.062
	RELSERVPROV10	.588	.121	23.686	1	.000	1.801
	RELHAND11	-.744	.142	27.389	1	.000	.475
	RELMANT12	.372	.186	3.994	1	.046	1.450
	RESPMODESERVICE13	1.012	.123	67.664	1	.000	2.752
	RESPTIMELY14	-1.080	.131	68.291	1	.000	.340
	RESPEASETICK15	.485	.133	13.277	1	.000	1.625
	RESPTERMINAL16	.304	.115	6.977	1	.008	1.356
	RESPOAPPRSTOPS17	.845	.132	41.040	1	.000	2.328
	TRUSTSECMEANS18	-.188	.129	2.119	1	.145	.829
	TRUSTBEHAV19	.576	.123	22.052	1	.000	1.778
	TRUSTOVERCOW20	.518	.304	2.895	1	.089	1.678
	TRUSTRAFFICSITU21	.633	.144	19.438	1	.000	1.884
	TRUSTSPECIALTREAT22	.847	.133	40.456	1	.000	2.334
	EMPTRANSITINFO23	.295	.139	4.527	1	.033	1.344
	EMPASSENGERINT24	-.196	.132	2.228	1	.136	.822
	EMPFACIL25	-.437	.117	14.005	1	.000	.646
	EMPFREQMODE26	-.333	.260	1.643	1	.200	.717
	EMPENVFRIENDL27	.058	.122	.231	1	.631	1.060
	EMPENTERTAIN28	.928	.123	56.775	1	.000	2.530
	Constant	-2.270	.558	16.524	1	.000	.103

*Driver Behaviour in Developing Countries: Evidence from Modelling Anger and Aggressive Performance of Nigerian Drivers on Inter-city Trips*

Innocent C. Ogwude,<sup>1</sup> Uche S. Ogwude<sup>2</sup> and Sikiru B. Balogun<sup>3</sup>

Department of Transport and Marine Logistics, Nigeria Maritime University,  
Okerenkoko<sup>1</sup>, Aston Business School, Aston University, Birmingham and Federal Road  
Safety Corps, Abuja.<sup>3</sup>

**Abstract**

*The study investigated driver behaviour in a developing country based on Nigerian data. It is assumed that angry and aggressive behaviours are revealed when drivers respond to various traffic situations. The drivers studied included shared-taxi, bus, truck, and impulsive drivers. Impulsive drivers were identified as a particular category of drivers to unravel the influence of the impulsivity of drivers. Drivers' angry and aggressive behaviours were captured from the replies reported when drivers faced a list of hypothetical traffic states prevalent on inter-city roads in Nigeria. The questionnaire used to elicit driver responses was adapted from Manchester's Driver Behaviour Questionnaire (DBQ). Initially, drivers were asked how frequently they would perform each behaviour on a 6-point scale. Exploratory factor analysis was used to establish the data's principal components and remove highly correlated variables from the data set. Using the SPSS command syntax, the response menu of the new data set was re-coded to generate a yes and no answer, yielding binary data and simulating a binomial distribution. The maximum likelihood logistic regression was then employed to estimate the odds ratios associated with the estimated models. The results show that the anger performance model is a good fit, while the aggression performance model is satisfactory. A probability model of driver behaviour was next derived using the sigmoid function. Overall, the study suggests that the probability of driver aggression was high, while the likelihood of driver anger was even higher. Impulsive drivers revealed higher aggression performance than others. The approach is novel in quantifying the behaviour of drivers of different categories. The findings are also helpful in policy-making to influence driver behaviours on inter-city roads in developing countries.*

**Keywords:** Driver behaviour, Developing countries, Nigeria, Factor analysis, Anger, Aggression, Odds Ratios, Probability models

**1. Introduction**

Road crash rates in developing countries are about 3-4 times higher than in Western Europe and North America. The severity of road crashes, measured in terms of the number of persons killed in every 100 crashes, has remained high over the years, representing a gloomy picture of transport usage. Over 80 per cent of all crashes can be attributed to human causes. The most important causes of road crashes usually identified in Nigeria relate to driver's errors, arousal state, and experience level. It seems evident that driver behaviour is the fundamental cause of road crashes in Nigeria. While no actual crashes may occur in all conflict situations, cases of near crashes are frequent (Ogwude, 1986; Uzundu *et al.*, 2019). This leaves the impression that road usage is very demanding and

stressful. There is much aggression on Nigerian roads, and many drivers are prone to anxieties of different kinds, including anger. Anger and aggression are variables one could relate to stressful driving that leads to road crashes prevalent on inter-city trips in Nigeria. Both behaviours represent a high state of arousal, showing aspects of negative emotions. In stressful environments, the emotional states of anger and aggression relate well to the personality traits of impulsiveness. The factor of impulsiveness, therefore, reveals a personality dimension, the influence of which could give rise to angry and aggressive behaviours during inter-city travels.

## 1.2 Objectives

This study aimed to investigate the impact of anger and aggression on driver behaviour, inferred from the stated response of drivers when they encounter various traffic conditions while making trips on Nigerian roads. For this purpose, three objectives were addressed, namely: (1) Estimate the level of anger implied when the driver's angry behaviour was performed (2) Estimate the implied level of aggression when the driver's aggressive behaviour was performed (3) Derive a probability model embodied in the estimated anger and aggression levels. 2.1 Literature Review: The study of driver behaviour has been approached from three angles, namely (a) the use of transactional models depicting the level of stress experienced by drivers (Mathews 2002, 2005), (b) the investigation of drivers' perceptions and self-reporting of their response to a range of driving environments (Sullman & Stephens, 2013) and (c) the behaviour of drivers on specific situations, either directly observed or simulated (Stephens & Groeger, 2008; Uzundu *et al.*, 2020). The study based on driver perceptions and self-reporting of their responses to various traffic situations is perhaps the most common approach. In this approach, drivers are presented with various traffic scenarios that are known to elicit responses, and they are asked to report their response to the situation, either from a previous experience or hypothetically. In studying driver behaviour and the impact of personality factors relating to driver emotional states, it is expected to adopt a Driver Behaviour Questionnaire (DBQ), such as the frequently employed Manchester version designed initially by Lawton *et al.* (1990). The Manchester DBQ consists of 50 items on specific driving behaviours that can be subdivided into driving mistakes, lapses, and violations. The DBQ has been used in different countries on various categories of drivers. Usually, identified lapses are divided into inattention and inexperience errors, and violations into aggressive or ordinary violations. Comparisons between the results of studies using the DBQ have been somewhat difficult because of differences in cultural settings and the methods employed (Parker *et al.*, 2002; Sullman *et al.*, 2005; Sullman & Stephens, 2013). The number of DBQ items used varied considerably between studies, as did the sampling strategies, target populations, and statistical analysis. Other variants of driver behaviour questionnaires

apart from the Manchester brand have also been used in the self-reporting studies of driver behaviour. These include the Driver Anger Scale (DAS) Questionnaire (Deffenbacher *et al.*, 1994; Deffenbacher *et al.*, 2016; Sullman & Stephens, 2013; Ambak *et al.* 2017); the Driver Habits Questionnaire (Owsley *et al.*, 1999) and the Dundee Stress State Questionnaire (Mathews *et al.* (2005). The DBQs have been used to study the influence of drivers' anger behaviours. A close link between road crashes and the aggressive behaviours of drivers has also been found. In some cases, drivers with high anger scales showed more anger for a longer duration, more aggressive behaviour, and more road crashes than drivers with lower levels of anger (Deffenbacher *et al.*, 2002, 2003). Research approaches based on self-reporting have also found that aggressive driving produced road rage and was also likely to provoke intentions to retaliate from other drivers (Dukes *et al.*, 2001; Alonso *et al.*, 2019). The factors described in the DBQ impact other facets of driver behaviours. These include anxiety, angry hostility, depression, self-consciousness and impulsiveness. The personal factor of impulsiveness has been shown to impact driving behaviours and safety on the road (Lawton, Parker *et al.*, 1997; Renner & Anderle, 2000). Eysenke and Eysenke (1978) addressed the influence of impulsiveness, venturesomeness, and empathy on drivers, using 63 questions requiring either yes or no answers. Owsley *et al.* (2003) suggested that drivers who reported high scores on DBQ violations were more likely to score highly on the effect of impulsiveness. This suggests the importance of personality dimensions in the study of driver behaviour, perhaps justifying the use of impulsivity of drivers in the arguments as well. In the literature, aggressive behaviours are often linked with impulsive personalities, as are the factors of anxiety, stress and anger. The present study complements existing literature by adapting the DBQ to study an aspect of driver behaviour in a developing country for the first time. Its central argument is that impulsiveness, anger and aggression combine to moderate the behaviour of drivers in the Nigerian context, where driving on the road is seen as stressful and demanding because of unfavourable traffic and road environments.

**3.0 Methodology** 3. 1 Driver Behaviour Survey A survey of drivers was carried out to obtain data for the study. The survey focused on professional drivers in the following categories:

- i. Taxi Drivers (drivers of shared passenger cars used as public transport)
- ii. Bus Drivers (drivers of conventional buses and minibuses used for public transport)
- iii. Truck Drivers (drivers of trucks, tankers and trailers)
- iv. Impulsive Drivers (drivers identified with impulsive behaviours from the surveys)



### 3.1.1 Direct Interviews with Questionnaires

The drivers were interviewed directly by trained survey assistants using questionnaires. The traffic situations addressed in the interviews were adapted from the Manchester Driver Behaviour Questionnaire (DBQ). Although DBQ was initially concerned with the study of lapses and violations of drivers, as earlier noted, it would seem evident that the lapses and violations of a driver in traffic situations could irritate other drivers, leading to the performance of anger or aggressive behaviours. The questionnaires were in four parts. The first part sought information on the drivers' background, while the second and third parts addressed drivers' anger and aggression performance. The questionnaires identified traffic states that evoked various responses from drivers who encountered them. For example, drivers were asked whether they would get angry if "someone makes an obscene gesture towards you", "when you are stuck in a traffic jam", and "when someone speeds up when you try to overtake them". The performance of aggression is provoked when the traffic state is caused by drivers imposing on others. For example, drivers abuse others who make them angry, "shoot headlights on other drivers", and "often chase offending drivers." The fourth part concerned identifying impulsive drivers. A drivers who admitted doing things on the spur of the moment, performing frequent lane changes, and showing impatience in traffic streams, was assumed to be impulsive for the purpose of this study.

### 3.1.2 Survey Stations and sample size

The survey of drivers took place at motor parks while the drivers of passenger vehicles were waiting for their full load of passengers before the commencement of inter-city trips. The truck drivers, on the other hand, were interviewed while on planned idle time at lorry parks in the course of their journeys. The survey stations selected were located in six capital cities across the six geopolitical zones of Nigeria, namely, Bauchi, Beni-city, Enugu, Kaduna, Lagos and Sokoto. Altogether, 500 questionnaires were administered, but 454 of them were correctly filled and collected. Eventually, 452 questionnaires were used due to two missing cases during data entry. 3.2 Exploratory factor Analysis Exploratory factor analysis was used to investigate the data structure and reduce the number of factors that were used in the estimation of the log -odds which are the basic arguments of this study. This served the purpose of streamlining the study by removing the highly correlated variables from the data set. The Principal Components Analysis (PCA) revealed ten key components of the traffic states encountered by drivers.

### 3.2.1 Principal Traffic States

Those principal components and 27 traffic states constituted the factors which provoked performance of angry and aggressive behaviours from drivers who encountered them. The principal components were interpreted as: 1- Confrontational driving 2- Aggressive

violation of traffic rules 3- Obstruction and inconvenience from other drivers 4- Resentment of discourtesy from other drivers 5- Being discourteous to other drivers 6- Impulsivity of driver 7- Effects of traffic intrusion 8- Impulsive dissonant driving 9-Effect of visual intrusion and 10-Traffic congestion effect. The factors embedded in the components accounted for about 60.2 percent of the total variance in the traffic states, with only 2.57 percent loss of information. The 27 traffic states constitute the argument of the study, and are reported in Table 2. They have been grouped under their associated components, with their corresponding factor loadings reported.

Table 1: The principal Components and Associated Traffic States

	Component	Associated traffic state
1	<b>Confronting driving</b>	
	Nearly hit a car in front of you	0.750
	Often overtake on inside lane or by right	0.678
	Often drive with headlight on	0.524
	Often face oncoming vehicle on express way	0.539
2	<b>Aggressive violation of traffic rules</b>	
	Often force self on other vehicles	0.689
	Often disregard speed limits	0.683
	Foten speed in residential areas	0.670
	Often try to beat traffic light	0.650
3	<b>Obstruction and inconvenience from other drivers</b>	
	Angry if night vehicle shoots light at mirror	0.731
	Angry if someone speeds and overtake	0.639
	Angry if opposing vehicle does not deem light	0.706
	Angry if someone wants you to overtake when it is not safe	0.516
4	<b>Discourtesy from other drivers</b>	
	Angry when horned to	0.731
	Angry when shouted upon	0.650
	Angry when obscene gestures are made to you	0.602
	Angry when stopped by police/FRSC	0.677
5	<b>Discourtesy to other drivers</b>	
	Often show annoyance with horn	0.559
6	<b>Impulsivity of driver</b>	
	Get impatient in a queue	0.768
	Do things on the spur of the moment	0.735
	Get impatient	0.735
7	<b>Traffic intrusion effects</b>	
	Angry when sand is poured on your vehicle	
8	<b>Impulsive dissonant driving</b>	
	Change lane in queue	0.663
	Overtake drier who frustrates you	0.560
9	<b>Visual intrusion effect</b>	
	Angry when driving behind smoky vehicle	0.858
10	<b>Traffic congestion effect</b>	
	Angry when stuck in traffic	0.783

Source: Field work 2023

### 3.3 Transformation of Data for Estimation of Odds Ratios

The odds that a driver would perform angry or aggressive behaviours were calculated following the earlier work reported in Owsleg *et al.* (2003). Using odds ratios to analyse drivers' behaviour was preferred to other approaches for two reasons. In the first place, it was considered that the results would be more appealing for transport planning and policy. Secondly, it was easy to transform the log- odds into a probability measure, the impact of which is easier to interpret than, for example, the alternative outputs resulting from analysis of variance (ANOVA) employed in some approaches (Alonso *et al.* 2019). To compute the odds ratios required the use of binary data in the estimation of a logistic regression model. The binary data was obtained by recoding the scaled data set using the SPSS program syntax for the transformation of data. It means that the driver's response to the 27 traffic states was translated onto binary scores, so a score of 1 was assigned when the driver reported angry or aggressive behaviour upon encountering a traffic situation. Otherwise, a score of 0 was assigned. In that way, the data used approximated a binomial distribution resulting from Bernoulli trials, thus enabling the computation of odds ratios (OR) used in the analysis. The mean and standard deviation of the variables used, that is, the traffic situations encountered, are reported in Appendix 1.

#### 3.3.1 Estimation method

The ORs reported in the study were estimated by the maximum likelihood logistic regression method, using the SPSS Software. This section outlines the essential features of the multiple logistic regression model based on Neter *et al.* (1996), pp. 591-94)). The multinomial regression model can be written as  $\beta_0 + \beta_1 x_1 \dots + \beta_{p-1} x_{p-1}$ . This formula is simplified using the matrix notation and the following three vectors:

$$\beta_{p \times 1} = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_{p+1} \end{bmatrix} \quad X_{p \times 1} = \begin{bmatrix} X_1 \\ X_2 \\ \vdots \\ X_{p+1} \end{bmatrix} \quad X_1 = \begin{bmatrix} X_{i1} \\ X_{i2} \\ \vdots \\ X_{ip-1} \end{bmatrix} \quad \text{Eqn. 1}$$

Employing the notations, Eqn. 2( a) and Eqn 2 (b) can be written as follows:

$$\beta X = \beta_0 + \beta_1 X_i \dots + \beta_{p-1} X_{p-1} \quad \text{Eqn. 2(a)}$$

$$\beta^* X = \beta_0 + \beta_1 X_{i1} \dots + \beta_{p-1} X_{p-1} \quad \text{Eqn. 2(b)}$$

The multinomial logistic response function can be given as follows

$$E(y) = \frac{\exp \beta' X}{1 + \exp \beta' X} \quad \text{Eqn. 3(a)}$$

That is:

$$E(y) = [1 + \exp^{-\beta' X}]^{-1} \quad \text{Eqn. 3(b)}$$

In general, the logit transformation can be represented by the formula

$$\pi^1 = \log_x \left( \frac{\pi}{1-\pi} \right) \quad \text{Eqn. 4}$$

This yields the logit response

$$-\pi' = \beta X \quad \text{Eqn. 5}$$

The multinomial logistic regression can therefore be stated as in Eqn. 6, for  $Y_i$  defined as independent Bernoulli random variables with expected values

$E(y_i) = \pi_i$ , where

$$E(y_i) = \pi_i = \frac{\exp(\beta' X_i)}{1 + \exp(\beta' X_i)} \quad \text{Eqn. 6}$$

To estimate the model, the maximum likelihood method is used to compute the multinomial response functions (Eqn. 3), the log-likelihood function of which is represented as in Eqn.7:

$$\log_e L(\beta = \sum_{i=1}^n y_i (\beta' X) - \sum_{i=1}^n \log_x [1 + \exp(\beta' X_i)]) \quad \text{Eqn. 7}$$

As already stated, the SPSS program was used for the estimation of the logistic regression model of this study which attempt was to capture the response of four categories of drivers to stated traffic situations described in Section 3.2. To summarise the argument, anger and aggression were posited as the outcomes of the drivers' responses to the stated traffic situations.

## 4.0 Results and Discussions

### 4.1 Background of Drivers Studied

The background of the drives studied is summarized in Table 1. The age distribution of the drivers shows that a few of them (2.2%) reported that they were less than 18 years old. The majority of the drivers were aged between 18-40 years, but the proportion of young adults (18-25 years ) was low (11.0%), partly accounting for the similarity in the percentage of drivers who reported a driving experience of between 2-5 years (16.7%).

About 47.4% of the drivers had driving experience of over 10 years, while the percentage of ageing drivers was not that high (9.7%).

Table 1: Background of the Drivers

Age distribution

Years	Number	Percentage
Less 18	10	2.2
18-25	51	11.0
26-40	217	47.8
41-50	132	29.1
Above 50	44	9.7

Driving experience

Years	Number	Percentage
Less 2	19	4.2
2-5	76	16.7
6-10	141	31.1
Above 10	215	47.4

Education

Years	Number	Percentage
No Education at all	22	4.8
Less than SSCE	230	50.7
SSCE/GCE	163	35.9
OND/NCE	29	6.4
HND/BSc/BA	8	1.8

Source: Field work 2023

The educational background reported suggests that only about 4.8% of the drivers had no formal education, while up to 49.3% of them had qualifications equivalent to the Secondary School Certificate level and above, with a high percentage (8.2%) reporting to have attended tertiary educational institutions. Taken altogether, the above information would suggest an impression of a relatively experienced and somewhat well-educated professional driver population on Nigerian roads. This is significant in that the percentage of novice driving which tends to be more prone to road crashes was relatively low, whereas a fairly good level of education would make drivers aware of the need for safe road usage. The other information on the drivers relate to gender. One female driver was recorded in the surveys (0.22%). This was quite unexpected in that professional driving on inter-city road environment used to be exclusively by male drivers.

#### 4.2 Estimated model of anger performance

The results of the estimates of the anger behaviour of the drivers are reported in Tables 3. They show the odds that a driver would perform anger behaviours. The estimated coefficients of three categories of the drivers, namely: taxi drivers, bus drivers, and truck drivers are highly significant. This is indicated by the associated standard errors of their

estimates reported as follows; taxi drivers (0.323), bus drivers (0.207), and truck drivers (0.309). The obtained standard errors of the estimates are impressive for the categories mentioned and satisfactory for the impulsive driver (0.426). To have an alternative view of the status of the standard errors reported, it is useful to translate the standard errors into their corresponding t-statistic by dividing the estimated coefficients by the associated standard errors. In this model, the t-values associated with the estimated coefficients of the individual drivers are as follows: taxi drivers (6.30), bus drivers (8.29), truck drivers (7.36) and impulsive drivers (1.14). The high t values confirm more clearly that the individual estimated coefficients are significant, encouraging acceptance of the model as a whole.

The associated Wald statistic values of the estimate, interpreted as the Chi-squared, are remarkably large, with the respective scores in parenthesis for taxi drivers (39.67), bus drivers (68.88) and truck drivers (54.12). Even the Wald statistic score of impulsive drivers is fairly good (1.30), with a significance level of 0.25, implying that there is about 25% chance that impulsive drivers might not perform anger behaviour when the stated traffic situations are encountered. Clearly, the obtained Wald statistic scores encourage the rejection of the hypothesis that the traffic states encountered by the drivers have no influence on their performance of anger behaviour while travelling. On the whole, we are 95% confident that the drivers sampled are drawn from a known driver population, judging from the relatively narrow margins of the obtained confidence intervals. The fit of the model is good (Table 3.1), with a high overall statistical significance, (0.00), a good log-likelihood score (2.148) and an impressive Chi-square value (30.99).

#### 4.2.1 Interpretation of the obtained odds ratios (OR)

The log odds, interpreted as the odds ratios, are reported in Table 3. They are the exponent of the coefficients of the logistic regression model, which have a good fit, as already discussed. The obtained OR values for each category of drivers are as follows: taxi drivers (7.663), bus drivers (5.560), truck drivers (9.708) and impulsive drivers (1.625). In terms of interpretation, the OR reported means that the odds are 7.7 times in favor of a taxi driver performing angry behaviour when the traffic situations studied are encountered, whereas the odds in favor of a bus driver and a truck driver behaving similarly are 5.6 times and 9.7 times respectively. The odds of performing anger behaviour are 1.6 times in favor of impulsive drivers.

In relating the results to driver behaviour, one can say that the incidence of performance of angry behaviours on inter-city road travel seemed quite strong across all category of drivers judging from the sheer size of the achieved ORs. Nevertheless, it would appear

that truck drivers admitted the highest anger performance behaviour compared to others (OR of 9.7). Taxi drivers ranked next in anger performance. This is surprising in that bus drivers are generally regarded as the most abrasive and anger prone in the Nigerian road environment.

Table 3: Multinomial Logistic Regression Results: Estimates of Log- Odds of Driver Anger Performance

Category of drivers	Coefficient (B)	Standard error	Wald	Significance	Log odds Exp(B)	95% confidence interval for Exp(B)	
						LB	UB
Taxi drivers	2.036	0.323	39.665	0.000	7.663	4.066	14.443
Bus drivers	1.716	0.207	68.875	0.000	5.560	3.708	8.337
Truck drivers	2.273	0.309	54.138	0.000	9.708	5.299	17.787
Impulsive drivers	0.486	0.426	1.302	0.254	1.626	0.705	3.748

Source: Field work 2023

Table 3.1 Fit of the Logistic Regression Model on Anger Performance

Model	-2Log kelihood	Chi-Square (x2)	df	Significance
Final	2.148	30.99	8	0.000

Source: Field work 2023

#### 4.3 Estimated model of aggression performance

The logistic regression model of aggression performance is reported in Table 4. The model shows the odds that a driver will perform an aggression behaviour when a traffic state is encountered. The estimated coefficients of three categories of the drivers, namely: taxi driver, bus driver, and truck driver are fairly significant, whereas that of the impulsive driver is significant, with a significance chi- square level of 0.007, which suggests that there is less than 7% chance that an impulsive driver will not perform an aggressive behaviour when the traffic state is encountered. This is demonstrated by the associated standard errors of their estimates reported as follows; taxi drivers (0.406), bus drivers (0.334), truck drivers (0.743), and impulsive drivers (1.017). The obtained standard errors should be assessed in relation to their associated estimated coefficients (B). To get a clearer view of this assessment, the corresponding t- statistic of the estimate was calculated. The t- values associated with the estimated coefficients of the individual drivers are as follows: taxi drivers (1.05), bus drivers (0.97), truck drivers (1.13) and impulsive drivers (2.68). The modest t values suggest that the individual estimated coefficients are fairly significant for taxi and bus drivers, weakly significant for bus drivers, but highly significant in the case of impulsive drivers. This would suggest a tentative acceptance of the model as a whole.

The associated Wald statistic values of the estimate, interpreted as the Chi-squared, are not large enough with the respective scores in parenthesis for taxi drivers (1.099), bus drivers (0.948) and truck drivers (1.275). For 3 categories of driver, the Wald statistics are less than the critical value of 1.96 at the 95% level of confidence. However, the Wald statistic score of impulsive drivers is good (7.185). As already hinted, the obtained Wald statistic scores do encourage weakly the rejection of the hypothesis that the traffic states encountered by the drivers have no influence on their performance of aggression behaviour while travelling. On the whole, the 95% confidence intervals are relatively wide for truck drivers (0.539, 9.922) and impulsive drivers (2.082, 12.285), which suggests imprecise estimates of their associated coefficients. This could be remedied by increasing the sample size in a future study.

Taken altogether, the fit of the model is fairly good (Table 4.1), with the overall statistical significance of 0.208 on taxi, bus and truck drivers, while the impulsive drivers achieved a very high significance (000), implying a less than 5% chance that impulsive drivers would not perform aggression behaviour when the traffic states were encountered. The overall chi-square score is good for impulsive drivers (23.095) and satisfactory for the other drivers (8.437). The log-likelihood ratios of the reduced model of aggression performance behaviour are good and are reported as follows: impulsive drivers (47.243) and the other drivers (32.585). The reduced model resulted from fitting the logistic regression model with partial deviance to test whether any driver category could be dropped (see Neter *et al.* (1996) pp. 585-90)). As it turned out, two categories of driver have been retained.

#### 4.3.1 Interpretation of the obtained Odds ratios (OR)

The log odds of the aggression performance logistic regression model are reported in Table 4, as the exponent of the coefficients of the model. The model has a satisfactory overall fit. The obtained OR values for each category of drivers are as follows: taxi drivers (1.531), bus drivers (1.384), truck drivers (2.313) and impulsive drivers (15.288). In terms of interpretation, the OR reported means that the odds are 1.6 times in favor of a taxi driver performing aggression behaviour when the traffic situations studied are encountered, whereas the odds in favor of a bus driver and a truck driver behaving similarly are 1.4 and 2.3 times respectively. The odds of performing aggression behaviour are 15.3 times in favor of impulsive drivers.

It means that in the case of taxi drivers, the propensity for aggression is about 53 % higher for aggressive drivers than for non-aggressive drivers when aggression provoking traffic situations are encountered, whereas for bus drivers, the odds of performing aggressive



behaviour is just about 39 % higher for aggression prone drivers compared to drivers who reported that the stated traffic situations would not provoke their performance of aggression behaviours.

Based on the results, one could say that aggression performance estimated for both taxi and bus drivers are relatively low. On the other hand, truck drivers recorded higher levels of aggressive behaviour that would seem to be about 2.3 times the scale of those drivers with non- aggressive tendencies. Whilst relatively moderate ORs were estimated for aggression performance across categories of drivers, it would appear that impulsive drivers exhibited a much higher level of aggressive behaviour on Nigerian roads. Indeed, the odds that an impulsive driver would display a significant aggressive behaviour when confronted with the stated traffic situations is about 15.3 times higher than the odds that he would not.

Table 4: Multinomial Logistic Regression Results: Estimates of Log- Odds of Driver Anger Performance

Category of drivers	Coefficient (B)	Standard error	Wald	Significance	Log odds Exp(B)	95% confidence interval for Exp(B)	
						LB	UB
Taxi drivers	0.426	0.406	1.099	0.294	1.531	0.691	3.395
Bus drivers	0.325	0.334	0.948	0.330	1.384	0.720	2.661
Truck drivers	0.839	0.743	1.275	0.259	2.313	0.539	9.922
Impulsive drivers	2.725	1.017	7.185	0.007	15.288	2.082	12.285

Source: Field work 2023

Table 3.1 Fit of the Logistic Regression Model on Anger Performance

Effect	Model fitting criteria	Likelihood ration tests Chi-Square	df	Significance
Driver	32.585	8.437	6	0.208
Impulsive driver	47.243	23.096	2	0.000

Source: Field work 2023

#### 4.4 Probability model of Driver Behaviour

We calculated the probabilities associated with categories of drivers being angry or aggressive when they experienced the stated traffic conditions. The purpose was to obtain a probability model of driver behaviour that is clear. The model is derived from the estimates of anger and aggression performance reported in Tables 3 and 4. The probability of anger performance ( $p(x)$ ) equals the probability of getting angry given a traffic state ( $s$ ) is calculated by the sigmoid function which transforms the log-odds to probability, with the formula:

$$S(x) = \frac{1}{1+e^{-x}} \quad \text{Eqn. 8}$$

In the formula, x is equal to the coefficient (B) of the logistic regression model (Table 3 and Table 4). To give an example, from Table 3, the probability that a taxi driver would perform anger behaviour is given by:

$$\frac{1}{1+e^{-0.426}} \quad \text{Eqn. 9}$$

The other probabilities were similarly calculated from both tables. The results of calculating the probabilities are reported in Table 5. Judging from the table, it seems clear that there is a high probability that the stated traffic situations would evoke the performance of anger and aggression behaviours across the categories of drivers studied. As expected, the probability that a driver would perform anger behaviour when the stated traffic situations are encountered is higher than the probability that the driver would perform aggressive behaviour when confronted with the factors posited as aggression provoking. However, the probability of aggressive behaviour is much higher for impulsive drivers. The probability estimates can be used to predict the behaviour of drivers on inter-city trips when prevailing traffic features are similar to those identified in this study. In that respect one can say, for example, that about 91% of truck drivers would perform anger behaviour when similar traffic conditions govern on a stretch of road. The rest of the reported probabilities can be similarly so interpreted in a predictive framework.

Table 4: Estimated Probability of Driver Behaviour

Category of drivers	Probability	
	Anger	Aggression
Taxi driver	0.88	0.61
Bus drivers	0.85	0.58
Truck drivers	0.91	0.70
Impulsive driver	0.62	0.94

Source: Field work 2023

## 5.0 Summary and Conclusions

The study investigated the behaviour of drivers in the context of inter-city travels on Nigerian roads, using data derived from self-reporting of perceived encounters with stated traffic situations. It is based on the assumption that driver behaviour is influenced by the personality factors of impulsiveness, as well as the emotional states of anger and aggression. Although professional drivers have been studied, the results could probably be used to anticipate the behaviour of other drivers in the context of inter-city trips in developing countries.

The impulsivity of drivers has turned out to be a strong factor which could be inferred to affect driving behaviour through impatience and frequent violations in lane changes, leading to reckless overtaking, a common attitude that is a major contributor to road crashes in Nigeria. The other findings of the study are equally significant. It seems apparent that the performance of anger behaviours would have a huge impact on road usage. This is confirmed by the strong showing of the estimated model of anger performance reported in the study, in terms of goodness of fit and in the status of the corresponding probabilities derived from the model. The estimated model of aggression performance behaviour is comparatively weaker, but satisfactory. To be sure, performance of aggressive behaviours would have a significant impact as well. The modeling of anger and aggression as distinct aspects of driver behaviour has perhaps been justified, although anger could in many circumstances be a trigger for performing aggressive behaviours.

Two novel features of the study should be remarked. The study is the first Nigerian attempt to have employed the standard Driver Behaviour Questionnaires showing the traffic states that are capable of eliciting anger or aggressive behaviours from drivers who encounter them. Secondly, it is new in providing quantitative estimates of qualitative responses in a Nigerian context based on data obtained from field studies. In that respect, the probability model of driver behaviour reported in this study constitutes a contribution different from the analyses of variance in anger scales commonly reported in the literature.

The findings have considerable status in that they could be used as a basis for designing policy measures for moderating anger-aggression inducing traffic states. The findings could also be used in the design of programs for managing anger and aggression that are of practical value to road safety agencies in developing countries.

### **Acknowledgement**

This research was sponsored by the Federal Road Safety Corps (FRSC), Abuja, which is the Lead Agency responsible for Road Safety Administration in Nigeria. We acknowledge the assistance of the FRSC sector commands in Bauchi, Benin-city, Enugu, Kaduna, Lagos and Sokoto in carrying out the Driver Surveys. This paper has benefited from the comments of an anonymous reviewer.

### **REFERENCES**

Alonso, F., Esteban, C., Montoro, L., Serge, A. C. (2019), Conceptualization of aggressive driving behaviours through a Perception of aggressive driving scale (PAD),

- Transportation Research part F: Traffic Psychology and Behaviour, Vol. 60, pp. 415- 426 18
- Ambak, K., Shmsudini, S., Daniel, B. D., and AbGhani, A. K. (2017), Driver Anger Scale (DAS) among car drivers: How serious are they?. MATEC Web of Conference 103, 08001
- Deffenbacher, J.L., Oetting, E.R. and Lynch, R.S (1994), Development of Driver Anger Scale. Psychological Report, Vol. 74, pp 83 – 91
- Deffenbacher, J.L, Lynch, R.S. Oetting, E.R and Swain, D.A. (2002). The driving anger expression inventory: some measure of how people express their anger on the road. Behaviour Research and Therapy, Vol. 40, pp 717 – 737
- Deffenbacher, J.L, Lynch, R.S., Filetti, E., Dahlen, R and Oetting, E.R (2003). Anger, aggression, risky behaviour, and crash-related outcomes in three groups of drivers, Behaviour Research and therapy Vol.41, issue 3 pp 333-349
- Deffenbacher, J. L., Stephens, A. N. and Sullman, M. J.M (2016), Driving anger as a psychological construct: Twenty years of research using the Driving Anger Scale, Transportation Research Part F: Traffic Psychology and Behaviour, Vol. 42, pp. 236-247
- Dukes, R.L, Clayton, S.L, Jenkins, L.T, Miller, TL and Rogers, E (2001), Effects of Aggression, Driving and Driver characteristics on Road Rage. The Social Science Journal, Vol.38 pp323 – 331
- Eysenck, S.B.G and Eysenck, H.J. (1978), Impulsiveness and venturesomeness: Their position in a dimensional system of personality description. Psychological Reports Vol.3 pp 1237-1255
- Mathews, G and Desmond, P.A. (1998), Personality and Multiple Dimensions of Taskinduced Fatigue: A study of Simulated Driving. Personality and Individual Differences, Vol. 25 pp 443 – 458
- Mathews, G., Emo, A. K., and Funke, G. J.(2005).The Transactional Model of Driver Stress and Fatigue and its implications for Driver Training, in Lisa Dorn (editor), Driver behaviour and Training Vol. II, Ashgate Publishers England, chapter 23, pp273-285.
- Mathews, G (2002). Towards a Transactional Ergonomics for Driver stress and Fatigue, Theoretical Issues in Ergonomics Science. Vol. 3 pp. 195-583
- Lawton, R., Park, D., Stradling, S.G. and Manstead, A.S.R. (1997), Predicting Road Traffic Accidents: The role of social deviance and violation. British Journal of Psychology, Vol.88 pp 249-262
- Neter, J., Kutner, M. H., Nachtsheim, C. J., Wasserman, W (1996). Applied Linear Statistical Models MCW/McGraw-Hill, the McGraw Hill companies Inc., USA. Fourth Edition, Chapter 14.

- Ogwude, I. C. (1986), Human constraints on national transport development, *Ife Social Science Review*, Vol. 9 no. 1& 2, pp.139-153
- Owsleg, C, McGWin, Jr,G and Mc Neal, S.F (2003), Impact of impulsiveness, Venturesomeness, and empathy on driving by older adults. *Journal of Safety Research*, vol.34 pp 353-359.
- Parker, D., West, R., Stradling, S. and Manstead, A.S.R. (1995), Behavioural characteristics and involvement in different types of traffic accident. *Accident Analysis & Prevention* Vol.27 no4 pp 571-581
- Parker, D, Reason, J Manstead, A. and Straddling, S. (1995), Driver Errors, driving Violations and accident Involvement. *Ergonomics* Vol. 38 no.5 pp 1036-1048.
- Parker, D., Lajunen T. and Summala, H. (2002), Anger and aggression among drivers in three European Countries. *Accident Analysis & Prevention* Vol. 34. pp 229- 235.
- Stephens, Amanda N and Groeger, John A (2008). Situational specificity of trait influences on drivers evaluations of driving behaviour. *Transportation Research Part F: Traffic Psychology and Behaviour* Vol.12, issue 1, pp 29-39
- Sullman, M. J. K., Grass, M. E., Cunill M., and Planes M, (2005). A Cross-Cultural Comparison of the Driver Anger Scale, In Lisa Dorn (editor), *Driver behaviour and Training* Vol. II, Ashgate Publishers England, pp 286-297.
- Sullman, M.J.K. and Stephens, A. N. (2013), A comparison of the driving anger scale and the propensity for angry driving scale, *Accident Analysis & Prevention* Vol.58, pp. 88-96
- Uzondur, C. C., Jamson, S., and Lai, F. (2019). Investigating unsafe behaviours in traffic conflict situations: An observational study in Nigeria, *Journal of Traffic and Transportation Engineering (English Edition)*, 6(5), 482-492,
- Uzondur, Chinebuli, Jamson, Samantha and Hibberd, Daryl (2020), Can infrastructure improvement mitigate unsafe traffic safety culture: A driving simulator study exploring cross cultural differences, *Transportation Research Part F: Traffic Psychology and Behaviour*, 73,