

Analysis of railway commuting factors and customers patronage in Lagos State, Nigeria

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Abstract: Railway transportation is a critical component of countries' transportation sectors worldwide. This is because, in the movement of goods and persons, railway transport networks have a clear advantage over other modes of transportation. However, despite the positive outlook, Nigeria's railway transportation networks have faced several challenges to the country's economic and social development, especially in overpopulated cities like Lagos State. The study population consists of 125 railway transportation users in Lagos state. The data were analyzed using descriptive, multiple and Partial Least Square Structural Equation Modeling (PLS-SEM). The study revealed that safety is the highest predictor of customer patronage amongst railway commuters in Lagos state. This is followed by price, travel time and service quality. This indicates that if the safety of the railway commuters (customers) is guaranteed, they will continue to use the train regardless of the service quality being offered to them. The study recommended that Public-Private Partnership (PPP) should be encouraged in running the affairs of the Nigerian railways for increased efficiency and that industry players need to be proactive by ensuring adequate professionalism in the sector and putting in place modern railway transport facilities.

Keywords: customer patronage, railway transportation, service quality, safety, travel time.

1. Introduction

Recognizing that railways play a crucial role in the mass transport of goods over long distances, conveniently and at affordable rates, the Nigerian Government is exploring the potential of this mode and has thus begun the resuscitation of the hitherto defunct Nigerian Railway Corporation (NRC), laying a firm foundation for the modernization of the country's railways, linking segregated areas. Railways

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have recently gained prominence in the development rhetoric of emerging countries' transportation sectors. Many researchers (Sturgis, 2015; Oseyomon & Ibadin, 2016; Keddy, 2017; Cudjoe, 2017; Adepoju, 2019; Choi, 2021) have argued that governments should consider railways as an alternative means of transportation. According to the World Bank (2011), investment in railways in areas where rail has a competitive edge can help boost economic growth and development.

Renovating railway transportation infrastructure will undoubtedly boost economic growth and social well-being, particularly by merging rural and inner-city economies, maintaining regional integration, attracting foreign investment, and accessing intercontinental markets. Following independence, the collapse of railway transit as a result of long-term neglect by successive governments had a significant impact on Nigeria's economic activity and development. Efforts by successive governments to restore the glory of railway transportation have failed, and ongoing improvements in the Nigerian railway transport network have been delayed, with completion deadlines repeatedly postponed, preventing many people from using the railway system as a mode of transportation. The lack of financial resources prohibits Nigerian railways from receiving critical maintenance and upgrades.

Rail networks in poor nations like Nigeria are plagued by chronic corruption and inefficiency, overcrowding and unreliable service, and a chaotic and uncoordinated operating environment. Nigeria's railway expansion is hampered by a lack of financial resources for infrastructure, locomotives, new technology, and fare subsidies. The financial troubles caused by Nigeria's low per-capita income are likely the most pressing issues. Corruption, inefficiency, outdated locomotives, accidents, lack of planning, overcrowding, noise, and absolute lack of coordination of any type (Ademiluyi & Dina, 2011) have resulted to constant traffic congestion, packed buses, and significant delays for commuters in Lagos. When compared to railways in the developed world, rail transit in Lagos/Nigeria has barely progressed in the last 100 years. In a country with a land area of 924,000km² and a population of over 140 million people, Nigeria's rail coverage of 3,505 km is inadequate, and this problem is exacerbated by broken train tracks.

According to Aworemi, Abdul-Azeez, and Olaogun (2009), with the current large number of commuters in Lagos and Nigeria as a whole demanding to be served, it is past time for the country to expand its rail system as a means of mass and rapid people and goods transit. Efforts by the state and federal governments to improve railway transportation in Lagos state have met with a number of setbacks in the past. In the past, efforts by the Lagos State Government and NRC to expand the rail commuter service in the state failed because to issues such as time-scheduling, personnel, ticketing, revenue sharing, cost-sharing, a lack of infrastructure such as car parks, and high operational costs (Oni & Okanlawon, 2012). Even after spending millions of dollars, the Lagos metro line, which began in 1983, has yet to see the light of day as of 2021 (Oladeinde, 2020). This is a significant transportation infrastructural deficit for a state with a large population, which necessitates an intermodal transportation system that includes railways, relieving the roadways of much of the burden. Transportation challenges in Lagos state will be alleviated with an effective intermodal transportation system (Adanikin & Oyedepo, 2017).

Figure 1: Commuters boarding trains in Lagos



Source: Vanguard, 2020

The condition of the Nigerian railway train services as shown in Figure 1 is abysmal and does not encourage its patronage by commuters. This has allowed for incidences where commuters safety and

convenience are impaired. The introduction of new train services has also been challenged by introduction of new increased prices (Tribune, 2020) and low customer patronage considering only one passenger turned up on the first day of the new trains' operation from Lagos to Ibadan (Aderibigbe, 2020).

Failure of the Nigerian government and stakeholders in the transportation ecosystem to recognize that every investment in the transportation sector is a business that must be properly managed in order to generate profits, and that ensuring customer patronage of infrastructures is critical to its success and sustainability has been a dent on the success of the railways operations. However, with the government's recent moves to revamp the railway sector which is yielding positive results and the trains becoming operational, the need for studies to determine people's willingness to use an efficient railway network when it is available, as well as how to ensure increased customer patronage of the railway is crucial. This is being checked in this study by evaluating strategic factors (price, travel time, safety, service quality) on customer patronage of railways as an alternative mode of transportation within Lagos State, Nigeria.

2. Literature review

Price of a product or service is the amount of money a consumer must pay (Kotler 1999). Price, as described by Olajide, Lizam, and Olajide (2016), is the amount of money paid by the buyer (railway commuters) to the seller (railway operators) in return for the services provided by the railway operators, including cost and profit margin. Price management is an important aspect of railway firm activities since the railway operators' determination of the ideal level and structure of pricing impacts their profit and, as a result, their growth and competitive position (Jarocka & Ryciuk, 2016). It is critical for railway operators and users to strike the correct price balance in order to ensure the operators' financial health and competitive pricing that attract commuters. According to Nagle, Hogan, and Zale (2011), pricing is a tactical lever for closing deals and achieving sales objectives, and it is more than just calculating the "right" price for a product or service, it also requires looking beneath the demand curve, understanding and managing the monetary and psychological value that is the primary determinant of the purchase decision.

According to Nas (2015), safety is the state of being free of threats induced by natural factors or random human errors. According to Hernik and Mazur (2018), guaranteeing acceptable safety in railway transportation would be impossible without the introduction of several innovations connected to fire risk prevention, effective staff-to-passenger communication, and efficient train operation. In railway transportation, safety concerns are critical, and this can only be achieved through adequate education and training of personnel, as well as proper train operation and the maintenance of safe structures and rolling stock components of the railways in accordance with railway technical standards. As a result, railway operators must foster a safety culture that includes values such as attitudes, risk perceptions, actions, and beliefs (Ishak & Ersan, 2018). Safety therefore entails the methods and practices used by railway operators to protect commuters' lives, health, and bodily integrity.

The amount of time spent transferring people or things from one location to another is referred to as travel time (Leonard & Macha, 2021). The main benefit of a transportation project is frequently the reduction in travel time. Congestion relief measures, such as incorporating railway transportation into a country's intermodal design, are justified primarily by the time savings they will provide. For train passengers, less travel time helps to turn "unproductive" time into economically worthwhile time (Lyons, Jain & Holley, 2007). Traffic congestion linked with road transportation in Lagos State, Nigeria, has always been an issue because the trip time is extremely long, resulting in important time lost due to traffic. Passengers' judgments about departure time, route choice, and even mode choice is complicated when they don't know the specific arrival time of a planned public transportation service and the expected travel time (Buchel & Coman, 2020). From the standpoint of the operator, travel time refers to the time it takes for trains to travel from one terminal to another. The travel time includes the access time, the waiting time, and the transferring time from the perspective of the passenger (Buchel & Coman, 2020). Reduced travel time increases value for both commuters and train operators. As a result, in railway transportation administration, control, and design, travel time is critical.

A service is an activity or a sequence of acts performed by a service provider to solve a customer's problem (Gronroos, 1984). According to Sathyan and Raj (2015), quality is defined as "fitness for use,"

"compliance with standards," and "freedom from variation." Service quality is defined as products or services that meet and exceed customers' expectations within a certain time frame (Deb & Ahmed, 2018). According to Anetoh (2016), service quality is a critical idea that businesses, such as railway firms, must grasp in order to stay in business. In the study of Sharma, et al. (2016), service quality was measured using timeliness, the number of consequential train accidents, and the number of public complaints. Service quality is an important instrument for analyzing performance and monitoring improvements in railway services. From a technological and economic standpoint, service quality is defined as services that are regarded adequate and effective for goals and efficiency (Mah & Maria, 2019). Furthermore, service quality is defined as a customer's evaluation of an organization's overall excellence (Radhita et al., 2017). The term "service quality" refers to the traits and characteristics of railways that influence their capacity to meet the needs of customers (Shao & Li, 2009). Service quality is critical to an organization's success in gaining a competitive edge and increasing its competitive strength (Gilaninia, Taleghani & Talemi, 2013). Using the RAILQUAL and SERVQUAL characteristics of tangibility, responsiveness, reliability, assurance, empathy, convenience, connection, and comfortability, Noor, et al. (2021) discovered a positive relationship between rail service quality and customer satisfaction. As a result, service quality can be defined as the railway operators' continued compliance with commuter expectations as a result of their awareness of commuter expectations from services delivered to them.

Patronage is defined as a customer's willingness to patronize a service provider again and again, as well as a positive, long-term attitude and disposition toward that service provider (Gremmler & Brown, 1996). According to Oladele, et al. (2019), the rate of patronage determines the survival of any firm. Consumers engage in extensive problem-solving behavior involving services and attribute compassions, leading to strong customer preferences and repeat purchase, and they engage in extensive problem-solving behavior involving services and attribute compassions, leading to strong customer preferences and repeat purchase (Nyakweba, Justus & Bosire, 2015). Customer patronage therefore refers to customers' approval or support of a particular brand, and it provides the foundation for a stable and expanding market share (Jaja, 2019). Customer patronage is earned when a company, such as a railway operator, goes above and beyond to satisfy its consumers, leaving a positive impression on them that encourages them to use the train services again (Ademola, 2013). Customer patronage occurs when a person makes a conscious effort to find a solution to his or her need(s) by examining situations that would be rewarding and somewhat satisfying despite certain hurdles encountered while achieving his or her personal desires (Adiele & Grend, 2016). Customer patronage is the foundation for a steady and expanding market share, both of which are critical requirements for the Nigerian railway business.

3. Materials and methods

Descriptive survey research design was adopted for the study. The population of the study consists of 125 railway transportation users in Lagos state. Purposive sampling method was used to select the respondents. The study employed the use of primary data using well-structured questionnaires to solicit responses from the respondents. The instrument was validated and the Cronbach Alpha reliability for the major constructs. The data gathered was analyzed through descriptive and multiple regression analysis. Data analysis was further done using the Partial Least Square Structural Equation Modeling (PLS SEM). PLS Sem have been used by several authors (Tabiu, 2019) to establish relationship between independent and dependent variables and it has been useful.

4. Results and discussion

Survey questionnaire was administered directly to Nigeria road users in Lagos State Nigeria. 100 questionnaires were retrieved and considered good for the study from the field. Table 1 shows the demographic distribution and responses to some of the questions asked the respondents.

From Table 1, the study revealed that majority of the respondents preferred transportation by road (45%), mostly used road transportation (77%), will have preferred rail transportation as it was a better option to their workplace assuming rail transportation was efficient, and spent an average of 2 hours to 3 hours in traffic daily.

Table 1: Demographic and descriptive distribution of respondents

Preferred mode of transportation	Road	45	45%
	Air	15	15%
	Rail	32	32%
	Water	08	08%
Most used mode of transportation	Road	77	77%
	Air	02	02%
	Rail	08	08%
	Water	13	13%
Assuming Rail transportation was efficient, which is better to your workplace	Road	32	32%
	Rail	68	68%
Average hours spent in traffic daily	Less than 1 hour	17	17%
	1 hour – 2 hours	26	26%
	2 hours – 3 hours	41	41%
	More than 3 hours	16	16%

Table 2 presents the multiple regression analysis result for the effect of railway commuting factors and customer patronage.

Table 2: Multiple regression of railway commuting factors and customer patronage

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.471	2.506		.986	.327
Price (P)	.398	.125	.360	3.189	.002
Safety (S)	.223	.112	.209	1.989	.050
Travel Time (TT)	.275	.105	.243	2.614	.010
Service Quality (SQ)	.013	.122	.010	.103	.918

R = .698; R² = .487, Adj R² = .465; F = 22.542

Dependent Variable: Customer Patronage (CP)

Predictors (Constant): Price, Safety, Travel time, Service quality

Table 2 reveals that railway commuting factors has a positive relationship with customer patronage with an R value of 0.698. The adjusted R² shows that about 46.5% of the variance in customer patronage as a result of the changes in the railway commuting factors while the remaining 53.5% is as a result of other factors not captured in the model. The F-value of F = 22.542 is statistically determinant with a P-value < 0.05 which suggest that railway commuting factors significantly explained the variation in the customer patronage of the railway commuters which also shows the fitness of the model. The coefficient of the regression model all showed a positive effect with β coefficients of 0.398, 0.223, 0.275 and 0.013 respectively for all the components of railway commuting factors of price, safety, travel time and service quality. The constant 2.471 implies that if all the components of railway commuting factors are held constant, the customer patronage will be positively affected.

The regression equation is thus represented as:

$$CP = 2.471 + 0.398P + 0.223S + 0.275TT + 0.013SQ + e_i$$

The study further revealed that price, safety and travel time with p-values of 0.002 and 0.050 and 0.010 have significant effects on customer patronage while service quality with p-value of 0.918 does not have significant effect on customer patronage of the railway commuters.

Partial Least Square Structural Equation Modeling (PLS SEM) using the bootstrapping procedure was followed in assessing the structural model. Figure 2 and Table 3 provides detail results of the structural model.

Figure 2: Structural model of railway commuting factors and customer patronage

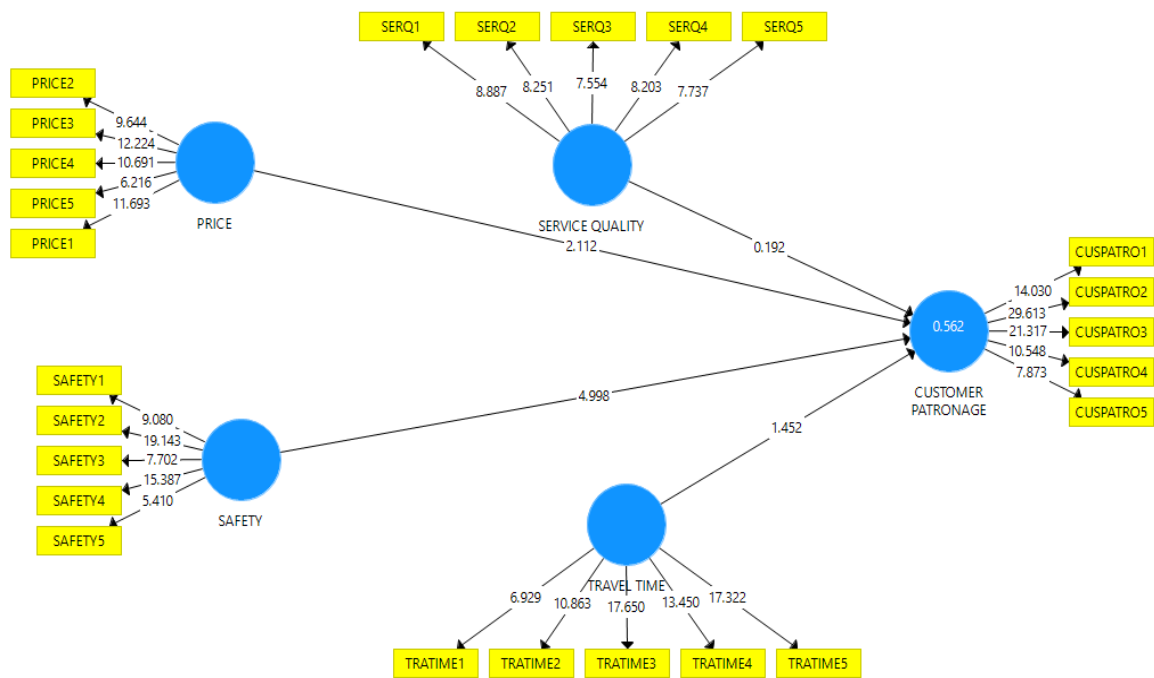


Table 3: Relationship model of railway commuting factors and customer patronage

Relationship	Sample Mean	Standard Deviation	T Statistics	Beta (β)	P Values
Price - Customer Patronage	0.218	0.102	2.112	0.215	0.037
Safety - Customer Patronage	0.468	0.094	4.998	0.469	0.000
Service Quality - Customer Patronage	0.048	0.134	0.192	0.026	0.848
Travel Time - Customer Patronage	0.156	0.117	1.452	0.169	0.150

The results in Figure 2 and Table 3 indicated that price had a significant relationship with customer patronage ($\beta = .215, p < 0.05$). Safety also had a significant relationship with customer patronage ($\beta = .469, p < 0.05$). However, the study revealed that service quality and travel time do not have a significant effect with customer patronage with β values of 0.026 and 0.169 and with $p > 0.05$. The study revealed that safety is the highest predictor of customer patronage amongst railway commuters in Lagos state. This is followed by price, travel time and service quality. This indicates that if the safety of the railway commuters (customers) is guaranteed, they will continue to make use of the train regardless of the service quality being offered them.

5. Conclusion and recommendations

In conclusion, resolving the problems in the Nigerian railway transportation sector will have a significant positive impact on the movement of goods and services, passengers, increased urbanization, socio-economic growth, and employment in Nigeria, so stakeholders should ensure that Nigerian railway transportation is improved, regardless of the challenges. Price, safety, and travel time had significant effects on customer patronage of railway usage by commuters in Lagos state, but service quality had no significant effect, according to the multiple regression results. The result of SEM-PLS reveals that only safety and price had significant effect on customer patronage while travel time and service quality were not significant. The report suggests that strong advertising be launched to persuade clients to choose railways and this could be accomplished, among other things, by competitive pricing. This study suggests that train tracks, communications infrastructure, and the repair of existing locomotives, coaches, and wagons, as well as the provision of new ones, be done through Public-Private Partnership (PPP). The research also suggests that the country's National Railway Transportation Policy be reviewed in order to properly reposition the railway transportation sector.

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Conflicts of interest/Competing interests

Not applicable

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