OSUN GEOGRAPHICAL REVIEW
Published by the Department of Geography, Osun State University, State of Osun, Nigeria
ISSN: 2695 - 1959 Volume 2, 2019; 111 – 117

TELEMATICS (ICT) USAGE IN NIGERIAN RAILWAY OPERATIONS: A CASE STUDY OF IDDO – IJOKO ROUTE

F.R. Ohaegbue, I.O. Longe, E.E. Ege and S.I. Oni

Department of Geography, University of Lagos, Lagos
Corresponding author's e-mail: francisohaegbue@yahoo.com

Abstract

Over the years and in different parts of the world, railway transport carries more passengers and freight (solid and liquid) of long journeys within inter and intra regions. The issue of efficient functionalities of railway operations has been of serious concern especially in the applicability of telematics to the day-to-day operations. This study therefore is premised on the usage of ICT in railway operations with the specific objectives of evaluating the trend in passenger and freight carriage between 1963 and 2014; examining the use of ICT for sales of tickets and notification of passengers for trips cancellation as well as the functionalities of automation in railway operations. Data collection was based on secondary and primary sources as existing records on operations were collected from the Nigerian Railway Corporation while customers' perception as to the implementation of telematics were gathered through questionnaire administration. The results show that the rate of passenger and freight carriage has reduced; 82% prefer to buy train tickets online and non-terminus outlets; 70% of the respondents were never notified of trips cancellation before getting to the terminus. The study therefore recommends that the sales of train tickets be decentralized to accommodate online as well as other outlets. More so, various media such as radio, SMS, phone calls should be adopted in notification of trips delays and cancellations to prospecting passengers and cargo owners.

Keywords: Telematics, Railway, Cancellation, Delay, Check-in

Introduction

Transport before now has been a connecting factor that had allowed, and still allows the diffusion of ideas and information from one geographical location to another, as well as the movement of goods and services. Since the early 1980s, the transport infrastructure of Nigeria has been formulated around personal vehicles and expanding road infrastructures. This has often come at the expense of public transport services such as railways, and severely congested roads have been the result. The origin of rail transport dated back 1760 in England when the wooden rail tracks were covered with cast iron plate which caused the running resistance to diminish to such an extent that the application of such plates soon proliferated (Esveld, 2001).

The heavy traffic congestion on road, which the expansion and the construction of road furniture as well as infrastructures have not been able to eliminate; Over time, many researchers have come up with the fact that it is paramount to revive the rail system so as to reduce the dependency on the road transport system. According to the 'Draft National Transport Policy, published in August 2010 by the federal government, "the Nigerian railway system has the potential to provide an efficient and cost-effective means of transportation, particularly on long distance routes serving high density traffic flows".

Obaleye (2012) stated that the revitalization of railway service which is more protective and affordable would further reduce the rates of road accident, plane crash and armed attacks amongst other negative vices. It would also improve efficient service delivery on movement of goods and services like petroleum products, food items, animals, spare

parts and bulky materials (mails) amongst others. He further stated that the system can help to serve as a source of tourist attraction for passengers/travelers especially for the inquisitive ones who wish to know more on our environments. Hence the system can serve dual purposes of transport and tourism.

In recent time, the Nigerian Government has invested huge capital into the revitalization of rail transport which has been on for the past 16 years. Despite the huge investment into the rail transport, some issues still battle with the system. This also can be drawn by a fact stated by Obeche (2012) that after more than 50 years of neglect, the Federal Government seems to have realized the importance of efficient rail transport system in solving the country's transportation and economic problems. And having committed hundreds of billions of naira into revitalizing the hitherto comatose industry, the government feels it is time Nigerians enjoy rail transport again. But it appears the challenges of providing efficient rail transport system in Nigeria transcend the euphoria of putting the trains. This shows that more is required to be done within the system if the rail transport system in Nigeria will be compared to those operated in other countries (developed).

Effective operations of enterprises in every sector of the economy require a well-functioning transport system. Transport is a set of activities related to the movement of people and material goods by appropriate means (Grabara et al, 2014). It plays a very important role in logistics, because of the goods movement and the creation of ancillary services. Transport in the national economy enables the exchange of goods and services. Transport helps to move raw materials and semi-finished products for production and finished products for personal consumption.

Rail transport is the transport of passengers and freight by means of wheeled vehicles along designated rail way or rail road. It can also be referred to as an energy-efficient and capital-intensive means of mechanized land transport with its own right of way. Rail transport is part of logistics chain, which facilitates the international trading and economic growth in most countries.

Transport and logistics in developed countries are key enablers of social and economic activities in human society. As a result of ICT and economies of scale and scope, they have become globalized, streamlined organizations (Hamilton et al, 2013). This has had a "cascade effect" across supply chains, driving greater consolidation of transport and logistics between and across value and supply chains (Lakshmanan et al, 2011). In Nigeria, transport has evolved significantly over the last 60 years and has an ever-increasing and active role to play in a globalizing economy. Significantly, technical and technological improvements in the transport sector, most especially in the rail way system is of utmost importance as this will boast the systems performance. Apparently what is obtained in most developed countries based on rail system is as a result in advancement of technology. Rail services in most developed countries has the implant of ICT in almost all its functionalities (e.g ticketing, clock-face service, information to passengers, mode of movement etc) gives a better integration to mobility strategies. These innovative ICT based operations are missing in Nigeria. Oni and Okanlawon (2012) have pointed out on railway operations that part of the reasons why the laid down schedules are not followed is delay. When this happens, it does not only affect timing at a station but all the stations are affected. This in turn discourages people from patronizing the service due to non-adherence to schedules.

Statement of Problem

Railway service was the major means of transportation in Nigeria since the country's independence in 1960 to the 1980s. It was much more convenient and cheaper for commuters and haulage purposes due to the existence of many rail lines linking big cities across the country with commercial activities in its major routes. However, the railways lost its glorious past as Nigerians took to other means of transportation through road, air and water in the riverine areas.

In recent time, the Federal Government brought the idea of revitalizing the railway system (MTT - mass train transit and DMU - diesel multiple unit) which has not been able to bring back its lost glory, rather it serves as a means of escape from road congestion for few populace.

However, transport is tilting towards the need for data analysis as well as the need for information and communication facility to give prompt feedback at all times. This is absent within the railway system as information and communication gap has brought about delay in trips, overloading of cabins, and trip cancellation with no provision of other alternative means to convey commuters. Aside from this, long queues at each station to obtain ticket as no other

outlet can issue train ticket makes the ticketing system monotonous.

Since the rail system of transportation serves as a means of escape from road congestion, it is quite unfortunate that railway has not played important roles in Nigeria as it has in other countries even in a country like India where its social and economic activities have improved tremendously through the railway services. This improvement came as a result of telecommunication and information technology which was applied into its (India) rail system. But this seems undermined in Nigeria as the system still operates on the single-narrow-gauge railway line and the same old functionalities carried out during the colonial period. The implication is that, where there is an incoming train the other one at the opposite direction has to reverse to an interchange and wait for the incoming to sail through before proceeding on. This often causes delay and elongation of elapse time of the journey.

Aim and Objectives

The aim of the study is to evaluate the use of telematics (ICT) in Nigerian railway operation.

The specific objectives are to:

1. evaluate the trend in railway operation since 1960 till date.
2. determine the use of ICT in ticket sales and notifying of trip cancellation.
3. assess the functionalities of automation in railway operation.

Methodology

Data collection was based on primary and secondary sources as the research adopted direct interview with operators, questionnaires administration to passengers as well as existing records and maps were used. A total of 250 questionnaires were sent out on board to both Mass Transit Train (MTT) and Diesel Multiple Unit (DMU) users to sample their opinion on the usage of telematics in railway operations. Out of which 201 questionnaires were returned and hence used for the analysis. Also direct interview with the Director of Operations was conducted to ascertain the corporation's views as to the application of telematics in their operations. We further cut and digitize road/rail map using ArcMap GIS software in order to come up with the rail route between Iddo terminus, Lagos State and Ijoko terminus, Ogun State. These data collected were analyzed based on the research objectives using descriptive statistical analysis.

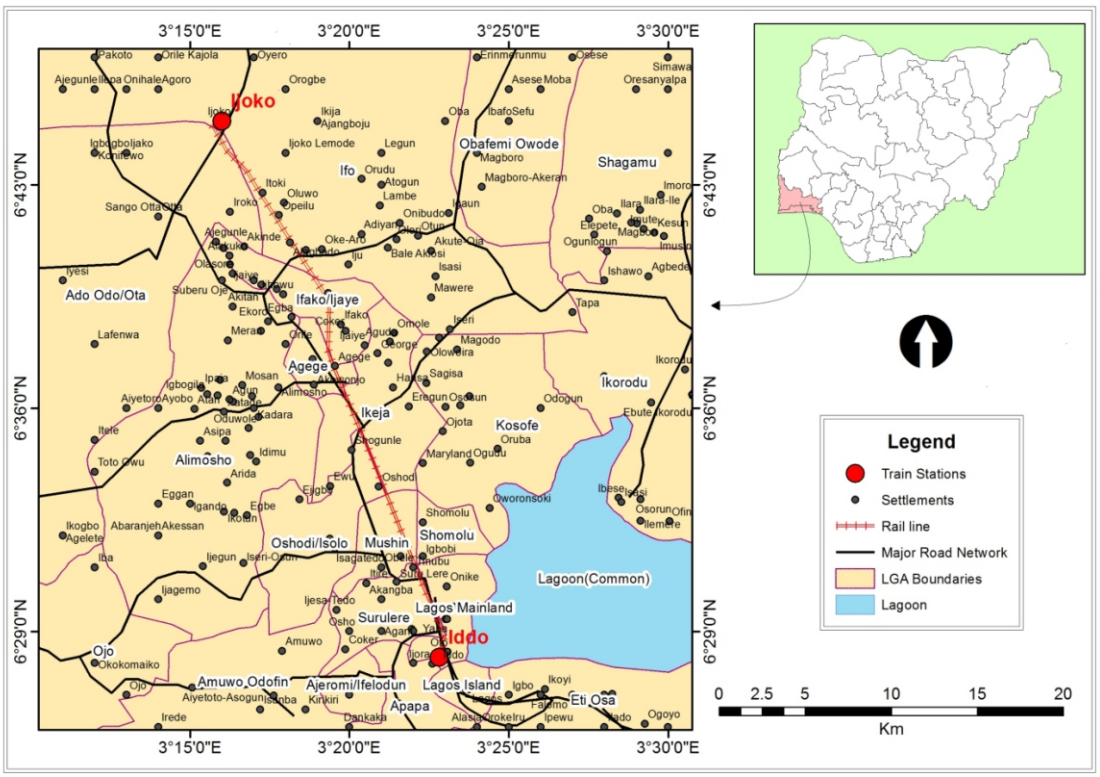

Figure 1: Rail route from Iddo terminus through Ijoko terminus
Source: MGIS Lab-Unilag, 2015

Table 1: NRC (summary of operational performance 1963 to 2014)

Year	Passengers	Freight/tons
1963/64	11,288,000	2,960,000
1964/65	10,630,000	2,834,000
1965/66	11,621,000	2,884,000
1966/67	10,005,000	2,481,000
1967/68	6,916,000	1,868,000
1968/69	8,007,000	1,614,000
1970/71	8,942,000	1,311,000
1972	5,819,000	1,519,000
1973	5,131,000	2,129,000
1974	4,342,000	1,098,000
1975	6,755,000	1,612,000
1976	7,491,000	1,452,000
1977	6,747,000	2,375,000
1978	6,750,000	1,592,000
1979	6,771,000	1,543,000
1980	4,917,000	1,153,000
1981	9,638,000	1,932,000
1982	11,612,000	2,815,000
1983	13,142,000	1,619,000
1984	15,553,000	1,458,000
1985	11,324,000	1,182,000
1986	9,878,000	852,000
1987	7,383,000	353,000
1988	4,196,000	326,000
1989	6,520,000	202,000
1990	6,345,000	198,000
1991	3,443,000	237,000
1992	1,747,000	204,000
1993	1,502,000	106,000
1994	784,491	106,000
1995	2,889,977	107,878
1996	2,626,026	137,661
1997	2,946,940	535,000
1998	1,070,424	1,513,077
1999	1,788,171	737,239
2000	2,610,435	116,837
2001	1,283,986	132,713
2002	987,088	98,190
2003	1,622,271	58,790
2004	1,751,159	62,575
2005	752,482	84,652
2006	708,802	41,495
2007	1,478,700	55,032
2008	1,996,324	63,326
2009	1,285,080	52,489
2010	1,514,215	138,533
2011	3,493,443	341,396
2012	4,155,988	182,465
2013	3,839,445	25,407
2014	3,007,673	45,338

Source: NRC Records, 2015

Findings

The trend in railway operation since 1963- 2014.

The table below shows the summary of operational performance (1963 to 2014) of passengers and freight carried.

Table 1 shows that a larger number of commuters used the train as at 1963/64 to 1970/71, with a slight reduction between 1972 and 1987. Nigerian Railway Corporation (NRC) experienced a drastic reduction in passengers in 1988 with a continuous rise and fall that can't equate what was recorded between the 1960's and early 70's. Freight carried per tons on the train between 1963/64 to 1967 was stable, but a slight reduction was recorded in 1967 to 1985 with a sharp reduction from 1986 till 2014. From the interview with the Director of Operations, the sharp reduction in passengers was due to the neglect in the railway sector and this led to the over-dependence on road transport, but its disadvantage (congestion & accident), brought the thought of reviving the railway system which till date, has not gone back to its former glory. The drastic drop in freight haulage was and is due to lack of proper handling and insecurity of these hauled goods as most of them get damaged and stolen in transit.

ICT in ticket sales and notifying of trip cancellation

Table 2 shows a high number of preferences to online sales and sales of ticket (165) in other outlets by respondents against sales (35) at the terminal. This large number is as a result of the long queue and ill treatment given to customers by ticket sellers in terms of customers' oriented services. At times due to the long queue some commuters do not get to board the train, leaving them to a waste ticket and an extra cost as those who do not board the train opt for public buses.

Table 3 shows that most respondents were never aware of a cancelled trip till they got to the terminal. 141 out of 201 respondents stated lack of awareness. At times most commuters that use the train "to" and 'fro' wish to purchase in-bound and out-bound ticket the same time, but such opportunity is never played by the railway authority for ticket purchase. Table 4 shows that a larger number of respondents prefer to be called or sent "SMS" on cancelation o trip rather than to get to the station before being notified.

Generally, the study shows that commuters using the railway service largely prefer the use of modern technology such as telephone calls, SMS, radio service to broadcast for trip delays and cancellations.

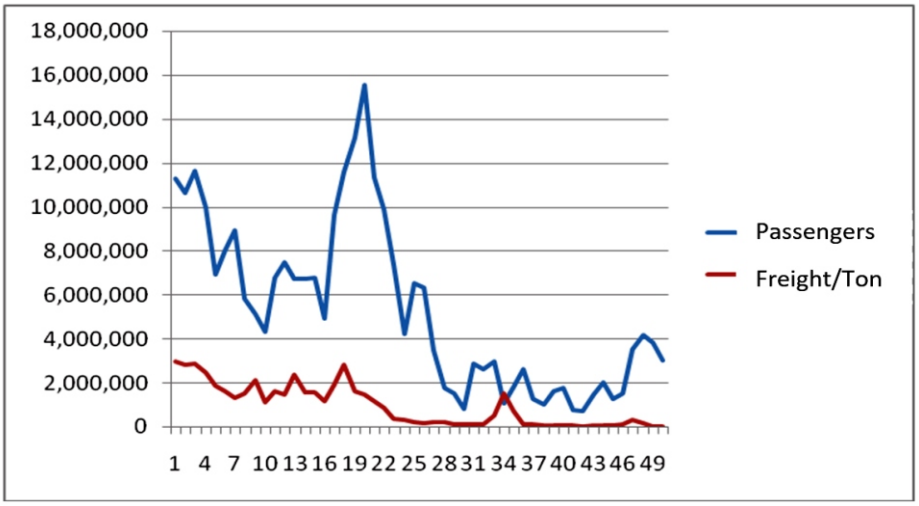

Figure 2: Variations in rise and fall of both passengers and freight recorded in 1963 to 2014.

Table 2: Respondents' preference of ticket sales online and other sales outlet .

Use of train	Options				Total
	Indifferent	Terminal	Online	Sale outlets	
	1	0	0	0	1
Daily	0	24	80	39	143
Weekly	0	6	14	6	26
Bi-weekly	0	0	3	1	4
Occasionally	0	5	10	12	27
Total	1	35	107	58	201

Source: Field work, 2015

Table 3: Notification of respondents to trip cancellation at the station

Use of train	Options					Total
	No information	At the station	Through a friend	Others	Indifferent	
	1	0	0	0	0	1
Daily	13	112	10	7	1	143
Weekly	8	13	4	1	0	26
Bi-weekly	1	3	0	0	0	4
Occasionally	10	13	2	2	0	27
Total	33	141	16	10	1	201

Source: Field work, 2015

The functionalities of automation in railway operations

Table 5 shows that a large number of respondents (107 out of 201) are dissatisfied by the checking system. Based on survey carried out on the train, checking is done while the train is on motion. Checkers are most times very rude to passengers and sometimes put up quarrels in the bid to affirm their right to check their tickets.

Table 6 shows that a large number (176 out of 201) of respondents prefer to be checked online and electronically before boarding than to be checked on board the train. This practice of checking had been since the advent of the railway system in Nigeria.

Based on the field survey carried out on the train while in motion, the reason for a standstill is not communicated, no form of relaxation is in the cabins (e.g. television).

More so, the public address system at Iddo terminus is used for playing music other than passing information as at when due (arrival and departure of vessels, report of any eventuality on outgoing or incoming train).

Table 4: Preferred notification means to cancellation of trips

Use of train	Options					Total
	indifferent	SMS	Radio services	Telephone	Others	
	1	0	0	0	0	1
Daily	4	83	29	21	6	143
Weekly	1	11	6	4	4	26
Bi-weekly	0	2	0	2	0	4
Occasionally	4	5	10	4	4	27
Total	10	101	45	31	14	201

Source: Field work, 2015

Table 5: Level of satisfaction based on ticket checking system

Use of train	Options				Total
	Indifferent	Yes	No	Void	
	1	0	0	0	1
Daily	3	55	84	1	143
Weekly	0	14	12	0	26
Bi-weekly	0	3	1	0	4
Occasionally	0	17	10	0	27
Total	4	89	107	1	201

Source: Field work, 2015

Table 6: Checking preference by commuters

Use of train	Options				Total
	On the train	Electronically	before boarding	Online	
	1	0	0	0	1
Dailv	22	66	45	10	143
Weekly	5	7	13	1	26
Bi-weekly	1	2	1	0	4
Occasionally	6	10	10	1	27
Total	**35**	**85**	**69**	**12**	**201**

Source: Field work, 2015

Recommendations

Despite Government's effort at revitalizing Nigerian Railway Corporation (NRC), the system presently is faced with a lot of challenges which need to be addressed for it to achieve its goal.

Government should ensure that the sales of tickets are decentralized as well as given to other organizations in other to break the congestion created at the station during ticket sales. Online and bulk purchase should also be encouraged as it is done in the aviation sector.

Government should ensure that the functionality of the railway system is backed up with adequate technology to improve the system such facilities as: an electronic gadget like transponder to check-in and out passengers, central communication unit to pass information on the train; while in motion, television and radio system to help while away the period of travelling.

The issue of overloaded cabin should be checked as those who do not get a seat, stand till they get a space or alight from the train. Freight carried in the train is not properly handled and secured as some of the goods get stolen in transit or damaged. Improvement of freight haulage is required and adequate security facility such as CCTV cameras to serve as surveillance.

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