IMPACT OF COVID-19 ON TRANSPORTATION IN KANO, NIGERIA

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ABSTRACT

The growing number of studies on the impact of COVID-19 is often discussed in the context of developed countries, highlighting a gap in the understanding of how the pandemic is impacting developing countries. This theoretical commentary focuses on the present and long-term impact of COVID-19 on transportation in Kano State, Nigeria. The paper recognizes the effect on transportation in emerging economies, where lockdowns and restrictions on movement may be ineffective, a state with high population density, poor transportation infrastructure and a large informal economy. Adopting the 'avoid-shift-improve' framework, this paper presents practical implications for public and private sector policymakers, as they navigate this precarious time and chart a new path for individuals and Nigeria.

Keywords: Covid-19, social distance, transportation, Kano, Nigeria

BACKGROUND

The worldwide impact of the 2019 coronavirus (2019-corona virus) has been well known. This outbreak was deemed a pandemic by the World Health Organization (WHO) on 11th March 2020. To date, there have been cases confirmed in at least 203 countries, areas or territories, according to the World Health Organization (WHO, 2020). The COVID-19 pandemic has caused extraordinary measures to be taken by many countries, such as travel restrictions and restrictions on social gatherings (De Vos, 2020). Nigeria is a key regional actor in the African continent with over 200 million people, and it confirmed its first case of COVID-19 in Lagos State on 27th February 2020.

The Kano state setting in Nigeria is particularly essential due to several reasons. First, Kano State is the country's commercial hub after Lagos, as it had a surge in population and rapid urbanization. With an estimated 20 million people across 14100 km^2, Kano state is Nigeria's second most populous city with the highest population density in Nigeria. Second, the state operates in an emerging economy, which is facing institutional adversity and underlying and persistent economic challenges as it copes with the pandemic. Third, as remote work is being trilled globally, more people are working from home. This reduces their travel needs; the inadequate power supply, internet connections and the large informal economy in Nigeria has often meant that people must travel daily to work. Fourth, the road is the most prevalent and extensively used form of transportation (Bello 2019) in the Kano metropolis. However, the inadequate fleets of public transport vehicles and dilapidated road networks present significant concerns for the state. Finally, as the growing populations struggle with the poor infrastructure, there is an increasing number of cars on Kanos roads, which causes traffic congestion and gridlock. Commuters lose up to 75% of their weekly working hours because of traffic congestion (KA Ahmad, 2018). With regards to a pandemic, Kano State has always been vulnerable medically. Analogous to the coronavirus disease.

Transportation in Kano, Nigeria
Nigeria is an emerging economy with its underlying economic challenges as it copes with the pandemic. The country ranks as Africa's largest producer of oil and the sixth-largest oil-producing country in the world, and almost 90% of its export earnings are tied to oil (NNPC, 2020). Nigeria has 36 states, and Abuja is the Federal Capital Territory. Kano State is in North West of Nigeria.
Road transportation serve Kano transportation needs; however, infrastructures in place are inadequate, mismanaged and archaic and does not optimally service the transportation demands of its residents. The new rail system, Kano Rail mass transit (KRMT), that is proposed to span through the Kano to Kaduna is currently under construction with 2022 the projected date of launching. Road transportation involves 1. the Kano Bus Transit (KBT), regulated by the Kano Metropolitan Area Transport Authority 2. The Kano keke napep Services Limited, 3. Minibuses (locally called haya), distinctly painted green and carries approximately 12–18 passengers, they are owned and operated by individuals,

4. Taxis and Shared rides like Uber 5. Tricycles (locally called Keke) and 6. Motorcycles (locally called achaba). The government has however banned Motorcycles (achaba) from major highways in the state.

As public transport brings people into close contact in a confined space, increasing their risk of exposure to the virus (Yezli and Khan, 2020), the Kano State government-issued public transport guidelines to operators and passengers to curb the spread of the coronavirus in buses, cabs, motor parks and garages in March 2020. The directive expects passenger's spacing to be fully observed, such as 2 m of a minimum distance between passengers. Still, a concern arises in how feasible it is to achieve this minimum distance in a bus or on a tricycle, where these modes of transportation are far shorter than 2 m. Taxi drivers, like tricycle and motorcycles riders, have an increased risk of acquiring the virus, given their close contact with their customers (Yezli and Khan, 2020). Moreover, cash payment which is predominant on Kano transport puts drivers and essential workers at a higher risk of spreading the virus. While social distancing is essential, it will be impractical to practice social distancing in Kano transport mode.

Methodology

To gauge the impact of COVID-19 on transportation in Kano, this study has relied on the surveys that were distributed via email, social media and professional networks between May 18th and 24th 2020 and administered to the residents of Kano State. A summary of the questionnaire has been provided in Appendix 1. We obtained 244 samples, of which 229 were completed, which showed a 98.5% response rate. To ensure that the respondents were residents of Kano and were in Kano at the time of response, a section of the questionnaire inquired about their residence and location at the time of response. The questionnaire also addressed the demographic characteristics of the respondent and the core objective of the study, which is the impact of COVID-19 on transportation in Kano. We extended our examination of the contemporaneous influence of COVID-19 to the economic, social and religious activities because we believe that these are key factors as to why transportation in Kano has become disruptive and consequential. The influence of COVID-19 on transportation can be assessed based on the dynamic changes to the commuters' transport demands and relative fare prices during the pandemic, the operators'

expected revenue or income structures and the loss in government revenues, which is loss emanating from taxes, tickets and other related government transport income generations sources. We obtained the quantitative responses using the Likert Scale, which were calculated on a scale of one to five. One measured no impact; two measured minor impact; three measured neutral impact; four measured moderate impact; and five measured the major impact of the influence of COVID-19 on transportation, economic, social and religious activities.

We relied on convenience sampling techniques to choose the participatory respondents and obtain the information to draw inferences. The scale of the global pandemic, as well as the limited social contact and government lockdown restrictions, has made the convenience sampling procedure the preferred method of gathering the data for this study. The convenience sampling procedure involves non-randomized experimentation and relies mainly on individual respondents or groups of respondents that are nearby or easy to reach. We expunged the incomplete observations to barricade the outliers. The study relied on a one-way analysis of variance to estimate the concomitant influence of COVID-19 on transportation in Kano. The Statistical Package for Social Sciences version 22 was used to conduct the analysis. The overarching aim of this study is to examine the impact of COVID-19 on transportation in Kano State as the residents navigate their transportation demands. When drawing inferences, we reported the descriptive statistical results, the correlation results and to give non-spurious, policy-consistent outcomes on the impact of COVID-19 on transportation. To ensure that the non-bogus estimates agreed with the assumption of the classical linear regression model, (covariance between μ and X must sum to zero), Cov μ/X = 0, we estimated the correlation coefficient to determine the level of collinearity among the regressors, and subsequently, ensure that the independent ability of each of the regressors was not diffused. We evaluated the objectives of this study using the One-Way ANOVA. With the One-Way ANOVA test, we could determine whether the differences between the groups were statistically significant. We compared the *p*-value to the significance level to assess the null hypothesis that the 'impact of COVID-19 on transportation does not significantly differ from the impact of COVID-19 on economic, social and religious activities. We found that most of the respondents were females (53.8%) who were aged between 18 and 35 (47.7%)

and mainly involved with sales and the rendering of essential commodities or services (27.7%). Further sample demographics are presented in Table 1.

Table 1. Demographics Information.

	N = 229	%
Gender		
Female	177	53.8
Male	152	46.2
Age group		
18–35	157	47.7
36–50	129	39.2
50 above	43	13.1
Employment status		
Essential Worker	91	27.7
Non-Essential Worker (Public)	22	6.7
Non-Essential Worker (Private)	89	27.1
Self Employed/Business Owners	103	31.3
Not Employed.	24	7.3
The usual mode of transportation		
Public Transport	172	52.3
Private Car/Motorcycle	147	44.7
Walking	10	3.0
Cycling	0	0
Major impact of COVID-19 on Transportation in Lagos?		
Cost of Transportation	176	53.5
Shortage/lack of Transportation mode	72	21.9
Traffic congestion	50	15.2
Social distancing	31	9.4

Results

A correlation analysis was computed to assess the impact of the pandemic on transportation and economic, social and religious activities in the state. As illustrated in Table 2, there was a positive correlation between transportation affected by the pandemic and its impact on economic, social and religious activities of the people. $r = 0.442$, $n = 329$, $p = .000$. Economic activities (0.442)

was highly correlated compared to social activities (0.313) and religious activities (0.274).

Table 2. Correlation.

Impact on Transportation

Impact on Transportation	**Pearson Correlation**	**1**
	Sig. (2-tailed)	
	N	229
Economic Activities	Pearson Correlation	0.442**
	Sig. (2-tailed)	0.000
	N	329
Social Activities	Pearson Correlation	0.313**
	Sig. (2-tailed)	0.000
	N	329
Religious Activities	Pearson Correlation	0.274**
	Sig. (2-tailed)	0.000
	N	229

Table 3 below shows the results of the analysis of variance, which specifically determine whether the impact on economic, social and religious activities are statistically significant or not. The analysis compares the *p*-value to the significance level to assess the null hypothesis. This null hypothesis was rejected because the F test of the variables was significant at 0.000. The three activities resulted in different mean weights for the impact of transportation, F $(4,324) = 26.478$, 12.666, 8.547, $p = .000$. Economic activities, social activities and religious activities during COVID-19 were impacted differently by the disrupted transport services due to the pandemic.

Table 3. One-Way Anova (Analysis of Variance) Test

		Sum of Squares	df	Mean Square	F	Sig.
Economic Activities	Between Groups	54.088	4	13.522	26.478	0.000
	Within Groups	165.462	324	0.511		
	Total	219.550	328			

Social Activities	Between Groups	20.073	4	5.018	12.666	0.000
	Within Groups	128.370	324	0.396		
	Total	148.444	328			
Religious Activities	Between Groups	17.986	4	4.496	8.547	0.000
	Within Groups	170.458	324	0.526		
	Total	188.444	328			

As residents could not travel, as usual, they acknowledge a significant impact caused by the pandemic on their economic activities (M = 4.66, SD = 0.818). Recognizing the enormous informal economy of the state, accounting for approximately 65% of the economy (Medina et al., 2017). Business owners involved in informal businesses like trading, transportation, construction, food preparation, mechanical and electrical work, fashion design and hairdressing were not able to travel and carry out these activities which require a human presence. Those who hawk and sell goods in traffic, operate Uber and other forms of transportation or must travel to provide services can no longer engage in these activities, thereby impacting the state's economy. These businesses are managed by low-income self-employed owners operating in a mostly cash-dominated society, and they must leave the house every day to earn income.

The increased cost of transportation, shortage/lack of transportation mode and traffic congestion were identified as the major impact of COVID-19 on Transportation in Kano State. People in different locations around the megacity travelling to their places of work have experienced an increase in the cost of transportation. 94.5% of participants (n = 311, SD: 0.228) have experienced an increase in the cost of transportation. There are few fleets of public transport, and there are many people who want to travel. With the demand for transportation now greater than the supply, due to lock down and restriction, the transporters have increased their fares. This high cost of transportation has added to the overall cost of living in the city during this time.

Religion is considered an essential part of Nigerian life, according to the Washington-based Pew Research Centre, Nigeria has the sixth largest Christian population in the world (87 million) and the world's fifth-largest Muslim

population (90 million) (Diamant, 2019). As Yezli and Khan (2020) recognized religion as a significant pillar of Saudi society, as well as the challenges of COVID-19 and social distancing in the Kingdom of Saudi Arabia, residents of Kano, reported a major impact on their religious activities (M = 4.77, SD = 0.758). Regularly, thousands of worshipper's travels to different worship centers, and due to the lockdown, this movement has been affected. This lockdown coincides with the period of Easter and Ramadan, in which many worshippers would typically travel to places of worship.

Participants acknowledged that disruption in transport services due to the pandemic had impacted their social activities (M = 4.77, SD = 0.673). There have been significant implications for fulfilling everyday activities, such as shopping and visiting friends and family. Even after the onset of the pandemic, Yezli and Khan (2020) noted that social interactions continued among the population of Saudi Arabia, especially during the evenings, which eventually required authorities to declare a partial curfew to curb movement. Similarly, per the social orientation of the people of Lagos, many would like to socialize in the evening and weekends, frequent the clubs and attend parties; however, the restrictions on transportation have impacted these social activities. Nigeria, with a score of 30, is considered a collectivistic society (Hofstede, 2020), where there is a fundamental value in a long-term commitment to a group. Many people will still wish to check on their friends or volunteer to distributes palliative cares to friends and neighbors, but current restrictions and the lack of transportation impacts these desires.

Mitigation measures

The 'avoid–shift–improve' framework has been used to discuss the mitigation measures that arose from the study's findings. Inspired by the principles of sustainability, the framework was co-developed by the Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH to focus on the mobility needs of the people. The framework provides a balanced set of transport options to maximize the development benefits (Burns, 2020), which is relevant during these challenging times. In the context of this study, and by recognizing the economic and infrastructural challenges, avoid characterizes the factors that should be avoided to reduce transportation traffic and further disruptions to the transportation services. Shift highlights the need to maintain the existing

infrastructure and make it sustainable as we cope with the impact of the pandemic, whereas improve suggests action plans, albeit a long-term plan, to improve sustainable transportation. A summary is presented in <u>Table 4</u>.

Table 4. The 'avoid-shift-improve' framework.

Avoid	Shift	Improve
Avoid further disruption to transportation service provision by evaluating existing measures.	The policymakers need to manage the existing infrastructure.	Optimizing the transport infrastructure and making sure they are sustainable to meet the growing demands of commuters.
Operators should be attentive to the cleanliness of their environment.	Deploying additional staff to support with logistics and enforcing social distancing	
Awareness of transport workers exposure to infection and putting protective measures in place, such as barriers and reducing cash payment.	Working on timetabling to cope with the increased demands of transport and shortage of options due to social distancing.	Exploring alternative means of transportation, especially the waterways and railways.
	Quicker deterioration of public transport facilities is also possible; therefore, these fleets should be managed appropriately and services.	Decongesting the road, increase active travelling, reduce pollution and lead to fewer road traffic injuries.
Continually educating commuters and reminding them to follow government guidance.		
Individuals should explore the possibilities of working from home and changing their	The government should be mindful there could be an increase in the number of private cars as people avoid congestion on public transportation.	Physical planning of the built environment to support walking and micro-mobility such as bicycles, scooters and electric skateboards and

travel behavior. This will reduce their exposure to the diseases, reduce the congestion on the road and enhance their wellbeing.	Explore well-spaced public transportation, but high fare prices as people cope with the aftermath of this pandemic.	autonomous driving
	Operators should educate and inform their customers, provide coronavirus updates and its impact on their service provision.	Technology to enhance consumer engagement, buying a ticket and getting live updates.
	Recognizing financial challenges for operators and passengers. While taxes (including toll gate fees may be increased), palliative care should be provided for operators. Government should work Transport Union with possible ideas for curbing the unsustainable increase in transport fares.	Infrastructural development, especially the internet, to enhance working from home to reduce the need to travel.

Ethical extraction of data, artificial intelligence and machine learning, to understand travel patterns and behavior and future planning |

Avoid

Ferguson et al. (2020) warned that the transmission could quickly rebound if the interventions were relaxed or not well monitored, which suggests that there is a need for a constant evaluation of these measures to avoid further disruption to the transportation service provision. As people are less likely to observe the lockdown and movement restrictions (M = 2.77, SD = 1.624), the transport operators should be attentive to the cleanliness of their environment. While buses that are operated by Bus Rapid Transit and Kano Bus Services may be cleaned and disinfected, there is the possibility that the self-employed owners of minibuses, taxis and tricycles may not adhere to the same standards if they

lack the resources or willingness. This suggests that there is a need for a further evaluation of these measures.

The government, transport operating companies, regulators and public transport owners should be aware of the exposure of the transport workers. This responsibility also falls on the operators and individual operators within the informal economy to protect themselves and reduce the risk of exposure. As often as possible, the transport workers must be reminded and educated about the need to protect themselves. The transport operators must ensure that the handrails and door handles are always kept clean. This cleanliness also includes the life jackets on commuters' board ferries. If possible, hand sanitizer, water, soap and paper towels should be provided. In addition, where possible, protective screens should be installed on buses to provide a physical barrier and additional protection for the drivers and to ensure social distance.

Individuals need to explore the possibilities of working from home and changing their travel behavior. This will reduce their exposure to the disease, reduce the congestion on the road and enhance their wellbeing. As social distancing may negatively affect the subjective wellbeing and health status (De Vos, 2020), those who are not involved in essential travelling should be encouraged to walk and cycle to enhance their health and wellbeing. However, the accessibility, physical activity options and safety should be considered (Farinloye et al., 2019).

Shift

To effectively manage the existing infrastructure, the government may want to employ additional staff to support the logistics and ensure that the commuters agree to social distancing. Social distancing marking should also be considered for public transportation. As illustrated in Fig. 1, there are local governments that have a high incidence rate, and people may be mindful of going to those areas, which could present key implications for operators to and from those areas. As public transport is the most common mode of transportation, there are huge implications due to the reduced capacities of this mode as they observe social distancing. Public transport, operators and policymakers need to revise the timetables to cope with the increased demands of transport and the shortage of options due to social distancing. An increased rate of deterioration of the public transport facilities is also possible; therefore, these fleets and services

should be appropriately managed. There are prospects for private investors to explore, such as creating more space on public transport but increasing the fare prices, as people cope with the aftermath of this pandemic. The government should be mindful that there could be an increase in the number of private cars as people try to avoid the congestion on public transport. Policies and plans should be put in place to avert the impending crises of congestion.

There remains a need to continually educate the commuters and remind them to follow the government's guidance, which could be communicated in the form of advertisements on social media, transport companies' websites or posters near bus stops. This is what Yezli and Khan (2020) referred to as a risk communication, which involves engaging with the public to convey the aims and the reasoning behind the lockdowns and movement restrictions. Likewise, the operators should have a sense of corporate responsibility to educate and inform their customers. At the time of writing this paper, there was no information about coronavirus on the websites of the LBSL and Primero, who are operators of the BRT buses. These companies should provide coronavirus updates on their website. This could take the form of a pop-up, which would grab the attention of the reader. This information would allow the companies to educate the commuters further and share information on how they are protecting their staff and passengers.

It is evident that the bus operators will be making a financial loss, and they will have to rearrange their pricing strategies to ensure that they make a similar revenue post-COVID by increasing the fare prices while carrying fewer passengers to adhere to social distancing directives. Passengers may be forced to pay more for travelling, and the government is also losing income and may be forced to increase taxes, including toll gate fees. However, palliative packages from the government are inevitable. As many countries in the developed economy are supporting their travel industry during these challenging times, Lagos state should consider providing financial support for travel operators and working with the transport unions with possible ideas to curb the unsustainable increase in transport fares.

Improve

While acknowledging the economic challenges, it is essential to optimize the transport infrastructure and make sure that they are sustainable to meet the growing demands of the commuters. Musselwhite et al. (2020) noted that this

pandemic highlights the importance of rethinking the essential design of social and economic resilience. This is especially relevant for highly populated and congested states, such as Kano. A long-term implication of COVID-19 on transportation in Nigeria is the reminder to explore alternative means of transportation. There is a need for urgent policy measures to explore ongoing transport issues, as there has been a reliance on road transportation, which causes traffic congestion and health and economic implications. The underdeveloped nature of waterways and railways could spur the development of an alternative means of transport. As the results indicated that none of the participants were using a bicycle as their usual mode of transportation, and there was a lack of willingness to use bicycles, the government must address the possibilities of an alternative mode of transportation through urban development and awareness (Mogaji and Erkan, 2019). The environment should be planned to enhance the adoption of alternative modes of transportation and active mobility. While these examples cannot be immediately implemented to mitigate the current situation, it is essential to plan and decongest the road, which could increase active travelling, reduce pollution and lead to fewer road traffic injuries (Musselwhite et al., 2020; Uzondu et al., 2019). The role of technology should not be ignored to improve the infrastructure. The data from commuters can be ethically extracted to understand their travel patterns and behavior, as this will be relevant for effective planning and management. Moreover, artificial intelligence and machine learning can work with the big data to highlight the areas of congestions and plans for future projects (Dwivedi et al., 2019).

Conclusion
This theoretical commentary has explored the impact of COVID-19 on transportation in Kano, Nigeria. Having recognized the unique situation of the state as the financial hub of an emerging economy that is highly populated, contains a poor transportation infrastructure and a huge informal economy, this paper presents practical implications with a specific focus on these unique challenges of Kano State. People's lives and livelihoods are being affected as a result of restrictions on movement, and it is not surprising to see people find ways to circumvent these restrictions. This, however, presents a challenge that

must be dealt with to curb the spread of the disease and the financial consequences (Mogaji, 2000).

While acknowledging that humans will come out of this pandemic strong, it is essential to support each other throughout this period. This study contributes to the academic literature on the impact of coronavirus on human activities with a specific focus on an emerging economy (Adekunle et al., 2020, Mogaji, 2000). This paper gives an overview of the impact on transportation and contributes to policymakers' pursuit to overcome the negative impact of the COVID-19 pandemic on the economy and individuals.

REFFERERNCES

Web sites

Nigerian ministry of transport (www. transport. gov.ng)

Federal ministry of finance (www. finance. gov.ng)

Federal ministry of industry, trade and investment (www.fmti.gov.ng)

National Union of Road Transport Workers (NURTW) (www.nurtw.ng.com)

Others

De vos (2020) restriction on social gathering

Bello (2019), the road is the most prevalent and extensively used form of transportation

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NNPC (2020) The country ranks as Africa's largest producer of oil and the sixth-largest oil-producing country in the world, and almost 90% of its export earnings are tied to oil

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