

## COVID-19: Perceptions of public transit passengers on its management and influence on sustainable transport in Ibadan

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### Abstract



This research is an empirical assessment of how the outbreak of Covid-19 impacted the public transit system and the achievement of sustainable public transport during the period of partial restriction in Ibadan. Multistage and random sampling techniques were used in selecting 181 participants for the study. Two hypotheses were tested, results from the first regression model showed the five selected socioeconomic variables and dreadful perception of the public transit system as an epicenter of the contagion by the passengers explained a moderate 52% of the variance and was a significant determinant of public transit usage during the studied period ( $R^2 = .052$ ,  $F(6,175) = 7.6$ ,  $p < .005$ ). Furthermore, the regression model for the second hypothesis which explained a paltry 24% variance revealed that respondents' trip decisions during the period of the partial lockdown were not significantly determined by their belief in the government-formulated measures against the pandemic, safety practices deployed in the management of public transit system, their economic situations and their desires to help in the achievement of sustainable urban transport ( $R^2 = .024$ ,  $F(6,175) = 1.63$ ,  $p > .005$ ). The paper presents a novel attempt that aid the understanding of the dynamics between the SES of passengers using the public transit system, and the management of an outbreak of public health emergencies.

**Keywords:** covid-19, socioeconomic situation, public transit management, dreadful perception, public health emergency, sustainable transport.

### 1. Introduction

Nigeria, Africa's biggest economy got a rude awakening to the calamitous effects of COVID-19 on the lives of its nationals, fragile economy, and weak public institutional infrastructures when the first incidence case of the disease was discovered in the country on the 28th of February 2020 [1]. As should be expected for a country that is densely populated (over 200 million estimated population) saddled with a public health system in a deplorable state, with a disproportional percentage of its working-class either unemployed or underemployed: the harsh reality of the pandemic on the shores of the country elicited morbid fears among all stakeholders. The fear expressed was not in the least unfounded because of certain realities: two of the most popular containment methods against the covid-19 pandemic as outlined by the World Health Organization involve social behavioral changes and Non-Pharmaceutical Interventionist (NPI) approaches.

Some of these are social distancing and lockdown, these two NPI approaches come' with a huge cost to national economies [2]. Implementation of these two measures in severe cases of the pandemic strongly advocates limited or complete cessation of spatial mobility (except for essential services) in cities and even rural communities [2]. The effect of such decisions on developed economies of China, the United States, and the European Union where the number of citizens engaged in the formal employment sector of the labor market surpasses that of those in the informal employment are detailed to include significant negative changes in the troika of the economic indices of investment, consumption, and international trading - all of which led to the loss of jobs [4,56]. Empirical findings from earlier research equally indicated that most informal employees are usually the first and worst hits once 'spatial mobility is curtailed': it is an economic fact that there is a disproportional propensity for workers employed

informally to be more 'mobile' either within an urban space or across regional borders than their counterparts who are engaged in the formal sector in the course of their occupational pursuit [6, 7,8].

A 2018 International Labor Organization-sponsored study revealed that the African region has the highest proportion of its workers in informal employment when the global comparison was made, the region has 85.8 percent of its workforce engaged in the informal sector, the proportion for Asia was 68.2 percent, 40.0 percent in the Latin Americas, while for the more developed economies of the United States and European Union the figure hovered between 15 to 20 percent [9]. This reality formed a huge part of the trepidation for different stakeholders on how Nigerian nationals will maintain the intricate balance between the strict adherence to the COVID-19 WHO containment protocol of movement restriction and the achievement of economic livability.

This is particularly pertinent because a recently released statistic from the Nigeria Bureau of Statistics (NBS) indicated that 56.25% (nearly 71 million) of the Nigerian labor force (workers between the ages of 16 to 64) are employed informally and a huge proportion among them depends on the public transit system as mean of mobility rather than private vehicle ownership [10]. Employees engaged in the "shadow economy" or informally (Packard et al, 2012), have been observed to show a general emotional ambivalence in their reaction towards 'perceived' State overarching regulatory influences on labor practices, first they are 'happy to have the freedom that comes with working for themselves and unhappy 'with regulatory regimes of different State laws which are viewed as undue interferences in their businesses' [6, 9].

Added to this is the fact that discovery from recent research which examined the attitudinal dispositions of most urbanites who experienced mobility restrictions as a result of covid-19 lockdown showed that there is the re-emergence of the "dreadful behavior/perception" which past calamitous events (like SARS, 9/11 terrorist attacks) on transport networks produced in passengers globally [11, 12]. The concept of dreadful behavior as defined in the literature is a "fearful reaction to any calamitous incident which occurred on or near transport facilities and which a fully operational transport system can be a catalyst to its reoccurrence" [11,12]. The combination of these two opposed attitudinal dispositions (citizens being at variance with the government rules restricting movement and at the same time exercising fears on the risk of contracting the pandemic on public transit system) expectedly created a gap worthy of critical examination.

There is also a need to unravel the perception of the users of the public transit system as it relates to issues surrounding the sustainability of government-inspired safety measures rolled out against the spread of the contagion and the effect of such on the achievement of an overall urban transport sustainability goal. Another reality that can be gleaned from findings in recent research is the fact that the interrelationships between operational sustainable safety practices (in public transit systems) imposed by governments and the economic impacts on the livelihoods of nationals across different regions within countries seemingly encouraged the use of private automobiles as against public transit [12, 13, 14, 15, 16, 17]. For example, in Italy, richer regions (where there was an obvious preponderance in the usage of a personal automobile as against mass transit) which incidentally had a higher rate of the incidence of the pandemic at its peak had a lower rate of mobility contraction. While residents of poorer regions that reported a lower rate of the spread of the covid-19 pandemic (at its peak) had a higher level of mobility contraction [14]. A similar situation also played out in Paris, where it was reported that at the peak of the mobility restriction occasioned by the COVID-19 induced lockdown, poorer residents who naturally depend on the public transit system for intra-city mobility reported a near-total mobility contraction and experienced a slower spread of the contagion: a scenario which was a sharp contrast to the situation among car owners [15]. It is observable that the majority of available research conducted on safety practices (mobility contraction arising from the effects of the covid-19 pandemic) have some striking similarities: first, they relied heavily on secondary data [15, 17].

Second, most of these studies emanated from developed economies where the public transit system is highly formalized with a regulatory regime that is an offshoot of the competent eutaxy that often defines such an operational environment. Third, careful observation of most of the available works on the discourse also revealed that there is no deliberate attempt made by investigators to critically examine through empirical research how the mobility contraction occasioned by the covid-19 pandemic affected

the different occupational classes (formalized employees and those in the shadow economy) and also to objectively unravel critical determinants of the continual usage of the public transit system as against private automobiles even with the reality of possible infection of the contagion in the study area.

## 2. Literature Review

There has been an ongoing debate by scholars revolving around what should constitute an agreeable taxonomy for informal employment across the spatiotemporal divides [18, 19, 20, 21]. While it is a truism that the shadow economy has some striking similarities that give the participants in it some degrees of uniformity (generally their activities circumvent or otherwise avoid government regulation, taxation, or observation and, workers in it have higher indices of job turnover/mobility) wherever it is operational. In practice, the characterization of the shadow economy in sub-Saharan Africa (SSA) has some distinctive peculiarities that differentiated its form and daily operational quiddity from what is found in most Western societies.

Firstly, informal employment is the biggest employer in sub-Sahara Africa (with over 80% of the population of the working class in the region being in or another form of informal employment). This contradicts the employment structure in Western societies where employees in the shadow economy are merely small fractions of the entire working class [18, 19, 20, 21]. Secondly, statistics from Europe and the US show that most workers employed in the informal sectors are usually emigrants (mostly illegal immigrants) who both lacked the legally required immigration status to apply for formal jobs and who sometimes also are bereft of basic educational/professional certification to pick up formal employment [22, 19, 21].

The situation is different in most countries in the SSA region where a significant number of those employed in the shadow economy are nationals of their respective countries with a reasonable level of educational/professional training which should otherwise guarantee their employability into the formal employment category [21]. Kiaga et al, (2020) rightly observed that “there is little distinction between workers in the formal and informal labor sectors in SSA” (when educational qualification is used as a parameter). It is with the knowledge of the foregoing that analysts posited that workers in the shadow economy in SSA could be the fulcrum of the fight against the spread of the COVID-19 pandemic [2, 21]. Added to these salient observations are also the realities that research findings have shown that workers in the shadow economy in SSA are rarely captured in National Health Insurance Schemes (NHIS) and that their economic survival is strongly tied to being highly mobile, particularly where are beehives of human activities – urban markets, Central Business Districts, bus stations/motor parks [21]. As unearthed in the course of this study, without the medical protection of NHIS, most of these workers rely on drugs sourced from unlicensed and ill-trained hawkers (another member of the shadow economy) whenever they feel unwell. Going for the COVID – 19 test is a luxury they can hardly afford (as findings from this study indicated) even when they are promised free access by the government – the fear of losing their daily income which is normally a derivative of their daily ‘hustling’ make such thought repugnant to them.

At the global level, the spread of COVID-19 has resulted in a considerable slowdown of economic activities [3, 4, 5, 23, 24]. Statistics from the International Monetary Fund (2020) projected that the global economy would contract by about 4.9 percent before the end of 2020. The figure is higher than that of the 2008-2009 Global Financial Crisis of between 0.5-1.0 percent [23, 25]. As worrisome as the estimated figure appeared to be, the IMF still believed that it is subject to a downward review if there is a further need for mobility contraction, a steeper decline in productivity, and greater economic uncertainty all occasioned the virulent effects of the pandemic [23, 24]. The World Bank's estimate for Nigeria, however when compared to the global average painted a bleaker picture [26]. Before the outbreak of the pandemic the nation's economy which was just exiting a cataclysmic first recession in some forty years was projected to have a moderate growth of 2.1%. At the outbreak of the pandemic, the World Bank reversed the earlier projection and predicted that the economy will contract by 3.2%, in essence, the economy might likely shrink by 5.3% which is 0.4% lower than the global average [26].

Due to its evolving nature, few studies have assessed the impact of the covid-19 pandemic on the household economy, although there is a consensus that most individuals living within the fringes of the poverty line and those below it may feel the impact more than others [27]. [27] studied the socioeconomic impacts of covid-19 on household consumption and poverty in the San Francisco Bay Area, their study relied on secondary data in the form of census tract data and discovered that the poverty rate among the residents of the case study increased by a staggering 8.8% in just three months (from 17.1 to 25.9 percent). The study further posited that residents who relied on shared mobility and public transit system as means of accessing places of interest bore the heavier brunt of the pandemic.

The research by [27], just like those carried out in different EU cities and London (UK) concluded that there is a distinctive spatial pattern in the distribution of those who bore the most harrowing impact of the pandemic either nationally, regionally or within a city [12, 13, 14, 16, 17]. One central verity that most studies that examined the economic impact of the pandemic have established is that it is more impactful on the livelihoods of those in the lower rungs of the economic ladder. Pieces of evidence from some of the earlier studies on the management of the pandemic also indicated that the spread of the contagion responded positively to the use of behavioral changes and NPI approaches [13, 28] as means of curtailing the spread. Questions, however, are being asked if these measures which strongly advocate restriction or cessation of movement (in some instances) can be sustainable management practices in an economy where a disproportional percentage of the citizens are engaged occupationally in the informal sector and where these citizens also depend largely on shared mobility/public transit system as the main means of transportation.

This present study filled an important gap in the ongoing discourse by employing an empirical analysis to examine primarily sourced data on the effect of the pandemic on mobility decisions and the consequential impact on the economic well-being of informal employees in a developing economy. Findings from contemporary research on the discourse have shown that the deployment of mathematical modeling and empirical philosophical viewpoints in data analyses has brought some inimitable benefits for all stakeholders (research community, government agencies, and the industry) [29, 30, 31]. [30] developed a novel mathematical model that designed a novel sustainable mask Closed-Loop Supply Chain Network (CLSCN). The employment of a multi-objective Mixed-Integer Linear Programming (MILP) was created to address the locational, supply, production, distribution, collection, quarantine, recycling, reuse, and disposal decisions within a multi-period multi-echelon multi-product supply chain. Such applications provide an objective and directional result to the problems associated with the sustainable utilization of face masks as an NPI in the management of the COVID-19 pandemic, and the handling of any pandemic with a similar NPI attribute.

The study also analyzed the perceptions of respondents on how economically and operationally sustainable are the deployment of NPI approaches in the management of the covid-19 pandemic.

Findings from this study are critical given the second wave of the contagion being presently experienced in some globally. [32], while outlining some of the safety strategies public transport operators and vehicle manufacturers are incorporating as part of their 'new normal or Standard Operating Procedure (SOP) argued that it is very debatable if some of these itemized developments (reducing the number of boarding passengers, reconfiguring the internal layout of seats, periodic circulation spaces on buses and trains, installing contactless door sensors, hand sanitizer dispensers and clear screens between seats to provide a physical barrier to airborne aerosols) can be economically sustainable by operators in the long run [32, 33]. Given the foregoing, it is therefore imperative that detailed analyses on how Social Economic Situation (SES) variables of respondents (age, marital status, educational attainment, employment type, and occupational distribution) alongside important factors on how 'secured' (dreadful perception) do they passengers believed the entire public transit system is being carried out in the study area. Similarly, examination of the factors which informed respondents' trip decisions during the period of government-imposed lockdown is also necessary as this will deepen the understanding of the reactionary dispositions of the transiting public towards' issues bothering on public health and transport system. The identification of these two critical gaps led to the formulation of the following hypotheses which are tested in this study:

H1: Passengers' Social Economic Situations (age, marital status, educational attainment, employment type, and occupational type) and dreadful perception of transport facilities are not significant determinants of the usage of the public transit system for trips during the COVID -19 pandemic-induced lockdown.

H2: Respondents' trip decisions during the pandemic are significantly determined by their beliefs in the government-formulated measures against the spread of the pandemic, safety practices deployed in the management of the park, the economic situation of respondents, and their desire for a sustainable urban transport system.

### 3. Methodology

This research utilized a positivist approach. The data used were gotten from a primary source. The research instrument was a structured questionnaire. The sampling technique employed for this study is a combination of multistage and random sampling techniques. The two are used in selecting participants for this study. The targeted populations for the study are passengers which took inter-state trips between Ibadan (Oyo-state capital) and Lagos (Nigeria's commercial capital) during the period when the government-imposed movement restriction was fully /partly in place as a result of the pandemic. There are six (6) main bus parks in Ibadan which operates inter-state bussing system between Ibadan and Lagos under the management of the National Union of Road Transport Workers (NURTW). These 6 parks are sited in Ojoo, Iwo Road, Olomi Academy, Sango, University of Ibadan school gate, and Challenge. Three (3) of these parks were randomly picked for the study; these are those in Ojoo, Iwo Road, and Challenge. The study took place for three (3) months. It commenced in the first week of June and ended in the last week of September 2020.

The first phase of the Federal Government (FG) imposed lockdown due to the incidence of the pandemic began on the 29th of March and phase one ended on the 2nd of June 2020. The study was done when phase two of the lockdown was in operation (Table 1 depicted the timeline of phase two of the lockdown in Nigeria and its features). The choice of inter-city transit passengers between Lagos and Ibadan is borne out of some salient facts. First, the two cities are the biggest in terms of population sizes in the country (they have over 25 million inhabitants). Second, the volume of road traffic density between the two cities (as a reflection of the commercial activities between them) is perhaps one of the heaviest in the SSA region (NBS, 2018). It is therefore believed that findings from such a study can provide an informed insight into the perceptions of most public passengers on the management of the contagion and sustainable transport management in SSA's biggest economy (Figure 1 shows the daily incidences of the contagion between Feb 27 and Oct 10, 2020).

Table 1: Timeline of the Government Imposed Partial Lockdown in Nigeria

| Timeline   | Date   | Features   |
|--|--|--|
| Commencement of the second phase of the lockdown                                 | 2 <sup>nd</sup> of June, 2020 – 29 <sup>th</sup> of June, 2020 | *Nationwide curfew from 10 pm -4am. Healthcare workers and journalists are exempted from the curfew. *Banks are to resume normal working hours.<br>*Government offices are to be open between 9 am to 12 pm, from Monday to Friday.<br>*The ban on interstate road transport movement remains in effect except for essential services (food, energy products, manufactured goods and essential services).<br>*All airports remain closed to both domestic and international flights. |
| First adjustment of the second phase of the lockdown                             | 30 <sup>th</sup> of June-27 <sup>th</sup> of July, 2020        | *Safe reopening of schools for graduating class<br>* Ban on interstate travel lifted, buses are allowed to take trips but must only travel with 50% of their carrying capacity.  |
| Full Reopening of the economy, after six months of different phases of lockdowns | 15 <sup>th</sup> October 2020                                  | *Safe reopening of schools at all levels<br>*Reopening of all economic activities  |

Source: Author Analysis, 2022

A selected park had ten days slated for it, each month in the fieldwork program drawn up by the research team: at the end of the exercise each selected park was visited for a month. Available records obtained from the park managers of these parks showed that an estimated 9,900 passengers boarded busses from the parks to the Lagos metropolis in the first three months of the year (January to March 2020). Due to the outbreak of the pandemic and the movement restriction in place that made the busses operate at half full capacities for the periods of the field-work, an estimated population of 4,950 passengers (50% of the passengers' population between January and March) served as the targeted population for the study. Five percent of the targeted population (4,950 passengers) were randomly selected for the study. This translated to 248 passengers being sampled. At each of the three parks visited the odd-numbered busses to load passengers for the trips were chosen on the days and all the passengers inside such busses were sampled, 181(73%) of the 248 randomly distributed questionnaires were retrieved and utilized for the analysis. The breakdown of how the questionnaires were randomly sampled and retrieved for the study is thus:

Table 2: Breakdown of questionnaires' sampling in the selected parks

| Parks     | Numbers of respondents sampled | Numbers of questionnaire retrieved | Percentage |
|-----------|--------------------------------|------------------------------------|------------|
| Ojoo      | 74                             | 49                                 | 66.2       |
| Iwo Road  | 94                             | 75                                 | 79.8       |
| Challenge | 80                             | 57                                 | 71.3       |
| Total     | 248                            | 181                                | 72.9       |

Source: Author's Analysis 2022.

The research instrument is a structured questionnaire with pre-tested items that provided a measurement for the objectives of this study. The questionnaire was sub-divided into four sections: (i) socio-economic characteristics of the respondents (ii) measurement of respondents' dreadful perception concerning transport facilities as a means of the spread of the covid-19 (iii) respondents' beliefs in the capability of the sustainable management against the spread of pandemic by the government (iv) economic situations of the respondents (v) desire for the sustainable urban transport system.

This research protocol got approved by the Ethical Committee of the Redeemer's University (Nigeria). All respondents were informed of the objectives behind the research, and their consent was obtained, effort was also made to ensure strict confidentiality of all information from the respondents as outlined in the approved research protocol. This was done by the use of code rather than respondents' identities in data representation.

The research team had a pre-field exercise to ensure the validity, and reliability of the research instruments. In addition, the Cronbach alpha test was carried out on each of the constructed multi-items instruments to observe their internal reliability and capability to effectively measure the research variables. A Cronbach's alpha lower than 0.60 indicates poor reliability, values between 0.6 and 0.7 are acceptable, and values equal to or higher than 0.70 indicate good scale reliability [34, 35, 36, 37]. The respondents' perceptual beliefs in the sustainability of the measures provided by the government against the spread of the pandemic subscale which contained 9 items have a Cronbach alpha of .89 ( $\alpha=.89$ ).

The subscale that assessed how the park managers implemented the safety practices outlined by the government in the management of the park had 7 items with a Cronbach's alpha of .79 ( $\alpha=.79$ ). The subscale on the role played by the economic situation of respondents on trip decisions had 8 items with a Cronbach alpha of .86 ( $\alpha=.86$ ). The subscale on how Covid-19 influenced the desire for sustainable urban transport system had 7 items with a Cronbach alpha of .75 ( $\alpha=.75$ ).

The last subscale which measured the dreadful perception of transport facilities as a means of the spread of the Covid-19 had 7 items with a Cronbach alpha of .79 ( $\alpha=.79$ ). All the information obtained from the questionnaires was codified into Microsoft Excel (2014) workbook sheet for database management activities. Subsequent statistical analyses were carried out using IBM Statistical Package for Social Sciences (SPSS), version 23.

#### 4. Results

Below is the breakdown of the demographic and inferential analyses from the gathered data.

Table 3: Socioeconomic Attributes of the Respondents

| Attributes  | Total Number of Respondents | Percentage (%) |
|---|-----------------------------|----------------|
| <b>Gender</b>   | 181                         | 100            |
| Male  | 95 (52.48)                  | 52.48          |
| Female  | 86 (47.52)                  | 47.52          |
| <b>Age</b>  | 181                         | 100            |
| 21-25   | 20                          | 11             |
| 26-30   | 23                          | 12.7           |
| 30-34   | 37                          | 20.44          |
| 35-39   | 30                          | 16.57          |
| 40-44   | 33                          | 18.23          |
| 45 and above  | 38                          | 20.99          |
| <b>Marital Status</b>   | 181                         | 100            |
| Single  | 47                          | 26.5           |
| Married   | 102                         | 56.35          |
| Divorced  | 17                          | 9.40           |
| Widowed   | 15                          | 8.20           |
| <b>Educational Status</b>   |                             |                |
| Primary School Leaving Certificate  | 2                           | 0.8            |
| Secondary School Leaving Certificate  | 48                          | 18.11          |
| Ordinary National Diploma   | 190                         | (71.70)        |
| Bsc and others  | 25                          | 9.40           |
| <b>Types of Employment</b>  |                             |                |
| Informal  | 156                         | 86.18          |
| Formal  | 25                          | 13.82          |
| <b>Occupational Type</b>  |                             |                |
| Business owners   | 83                          | 45.86          |
| Artisans  | 39                          | 21.54          |
| Technicians   | 34                          | 18.78          |
| Civil /Public servants  | 25                          | 13.82          |
| <b>Major means of Mobility</b>  |                             |                |
| Personal Vehicle  | 42                          |                |
| Shared Mobility (Taxi)  | 32                          |                |
| Shared Mobility (Commercial Bus)  | 107                         |                |
| <b>Effect of the Pandemic on the Use of Shared Mobility</b>                   |                             |                |
| Strongly Affected   | 82                          | 45.30          |
| Affected  | 75                          | 41.43          |
| Indifferent   | 10                          | 5.52           |
| Not Affected  | 14                          | 7.73           |
| <b>Willingness to Comply with Public Transit Covid-19 Prevention Protocol</b> |                             |                |
| Strongly Willing  | 51                          | 28.18          |
| Willing   | 78                          | 43.09          |
| Not Willing   | 30                          | 16.58          |
| Strongly Not Willing  | 22                          | 12.15          |

Source: Author's Analysis, 2022

#### 4.1 Inferential Statistics

Table 4: Summary of Multiple Regression Analysis showing the prediction of respondents' socioeconomic status and dreadful perception of public transport facilities on the usage of public transit during lockdown

| Predictor                 | B     | T    | P   | R    | R <sup>2</sup> | F   | p    |
|---------------------------|-------|------|-----|------|----------------|-----|------|
| Gender                    | -.04  | -.32 | .73 |      |                |     |      |
| Age                       | -.4.1 | -2.1 | .03 |      |                |     |      |
| Marital Status            | -.08  | -0.5 | .95 | 0.58 | 0.38           | 7.6 | <.05 |
| Educational Attainment    | .04   | 3.3  | .01 |      |                |     |      |
| Employment Type           | .03   | .31  | .01 |      |                |     |      |
| Occupational Distribution | -.04  | -2.3 | .02 |      |                |     |      |
| Dreadful Perception       | -.10  | -.40 | .70 |      |                |     |      |

Dependent Variable: Usage of public transit during lockdown

The result of the multiple regression analysis is depicted in Table 4. The first derived hypothesis stated that: the ‘‘Socio-Economic Situation of respondents (age, marital status, education, employment type, and occupational distribution) and the dreadful perception of the public transit system does not significantly predict the usage of public transit system during lockdown’’ had seven predictors which explained 58% of the variance ( $R^2 = .0.58$ ,  $F(6,175) = 7.6$ ,  $p < .005$ ). It was found that the Socio-Economic Situation of the respondents regarding the public transit system and their dreadful perception of the public transit system significantly predicted its usage in the study area during the period the lockdown rule was in place. The result further indicated that of the seven independent variables (Table 4), 4 of them namely age ( $\beta = -.41$ ,  $t = -.2.1$ ;  $p < .05$ ), educational attainment ( $\beta = .40$ ,  $t = 3.3$ ;  $p < .05$ ), employment type ( $\beta = .03$ ,  $t = -.021$ ;  $p < .05$ ) and occupational distribution ( $\beta = -.0.35$ ,  $t = -.0.23$ ;  $p < .05$ ) significantly predicted the usage of public transit system during the period the lockdown in the study area. On the other hand, two of the SES variables of gender ( $\beta = -.0.46$ ,  $t = -.0.3$ ;  $p > .05$ ), marital status ( $\beta = -.0.8$ ,  $t = -.0.5$ ;  $p > .05$ ), and the variable measured the respondents likely dreadful perception of the entire public transit system ( $\beta = -.0.10$ ,  $t = -.0.20$ ;  $p > .05$ ) do not significantly predict the usage of the public transit system during the period the lockdown was in place in the study area (Table 4).

Table 5 detailed the multiple regression analysis of the derived hypothesis which tested that the respondents' trip decisions during the pandemic are significantly determined by their beliefs in the government formulated measures against the spread of the pandemic, safety practices deployed in the management of the park, the economic situation of respondents, and their desire to observe urban transport sustainable practices’’. The result from the analysis ( $R^2 = .0.24$ ,  $F(6,175) = 1.63$ ,  $p > .005$ ) showed that the hypothesis was rejected. In essence, the result which showed that the four predictors explained a paltry 24% of the variance also indicated that the respondents' trip decisions during the period of the lockdown were not significantly determined by the selected variables.

Table 5: multiple regression analysis of the derived hypothesis

| Predictor                              | B   | T   | P   | R   | R <sup>2</sup> | F    | p    |
|--|-----|-----|-----|-----|----------------|------|------|
| Perception on Govt Measures            | .10 | 1.5 | .13 |     |                |      |      |
| Mgt. of Public Transit System          | .12 | .24 | .81 | .20 | .24            | 1.63 | >.05 |
| Economic Situation                     | .16 | 2.0 | 0.4 |     |                |      |      |
| Desire for Sustainable Urban Transport | .01 | .12 | .10 |     |                |      |      |

Dependent Variable: Determinants of Trip Decision during Lockdown

A more detailed analysis of the result indicated that it was only the ‘economic situation’ variable ( $\beta = .16$ ,  $t = 2.0$ ;  $p < .05$ ) which significantly predicted the respondents' trip decisions during the period of the lockdown. All three remaining variables are not significant predictors of the respondents' trip decisions during the period examined.



## 5. Discussion

An indubitable fact unearthed from this study is that the bulk of those who felt the need and who engaged in inter-state trips during the period the partial lockdown was in place, where workers who are informally employed (86.19% of the randomly selected respondents are all engaged informally at the time of the study). The figure is much higher than the 56.25% that the Nigeria Bureau of Statistics declared as the national average [10]. A major inference that can be drawn from this is that more informal employees who are not on salaried income felt the greater urge to go out and engaged in economic activities – regardless of the risk of the contagion. Another reality that this research brought to light is that most of those engaged in the informal sector in Nigeria are educated over 97% of the respondents had more than six years of primary or basic education, the import of these two highlighted facts (employment structure and educational distribution) on the management of the contagion cannot be underestimated.

Research findings have shown that educational attainment enjoys a causality with determinants of healthiness in a given population by predicting key indices such as health behaviors, risky contexts, and preventative service use [38, 39, 40]. There seems to be a substantial element of such correlation in this study, as the bulk of the respondents 129 (94.09%) affirmed their willingness to adhere to the public health protocol guiding the use of the public transit system due to the incidence of the contagion. Shreds of evidence from a Japanese study on the development of a sustainable approach to the management of the contagion indicated that the literacy level of the general population helped in the assimilation of the “Three Cs” (3Cs) concept which was used to tactically denote high-risk places and situations to be avoided: 1) Closed spaces with poor ventilation; 2) Crowded spaces with a lot of people; and 3) Close contact with other persons [41, 2]. Moreover, the result of the first hypothesis showed that a substantial element of SES variables measured in the study (including educational attainment) constituted significant predictors of the use of the public transit system during the period studied. Four (4) of them, namely the gender ( $\beta = -.41$ ,  $t = -2.1$ ;  $p < .05$ ), educational attainment ( $\beta = .40$ ,  $t = 3.3$ ;  $p < .05$ ), employment type ( $\beta = .03$ ,  $t = -.021$ ;  $p < .05$ ) and occupational distribution ( $\beta = -0.35$ ,  $t = -0.23$ ;  $p < .05$ ) significantly predicted the usage of public transit system during the period the lockdown in the study area.

Another inference that can be drawn from this result is perhaps the possibility of the existence of a causal relationship between employment type, the economic well-being of citizens, and promptness in obeying emergency public health guidelines that either limit or restrict movement. Public health law theorists [42] provided an incisive understanding of the likelihood of the existence of misalignments between legislation, regulation, and the reasonable limits that governments may place on personal freedom to promote the health of the population. Generally, citizens tend to be more responsive and responsible to either a subsisting or a new emergency rule on public health when they believe that the government will be equally responsive to their needs as occasioned by the emergent public health situation. As earlier established, findings from this study showed that the bulk of the randomly sampled respondents are informally employed (86.17%) while the result from regression analysis also indicated that employment type ( $\beta = .03$ ,  $t = -.021$ ;  $p < .05$ ) and occupational distribution ( $\beta = -0.35$ ,  $t = -0.23$ ;  $p < .05$ ) (amongst other SES variables) significantly determined the usage of public transit system during the period studied (when there was a partial lifting of the lockdown). Based on the foregoing it is, therefore, safe to surmise that most of the respondents who refused to implicitly obey the ‘stay at home order of the government did so for personal economic reasons: workers who are not assured of the regular payment of salaries and those who are not on salaried income obviously, had difficulty obeying stipulated Covid-19 protocols.

The second hypothesis which x-rayed the determinants of trip decisions among the respondents during the period of the partial lockdown equally indicated that their economic situation is the sole significant predictor ( $\beta = .16$ ,  $t = 2.0$ ;  $p < .05$ ) among the other considered variables. It is particularly worrisome that the respondents' faith in the government-formulated measures to prevent the spread of the contagion ( $\beta = .10$ ,  $t = 1.5$ ;  $p > .05$ ), their belief in the implementation of sustainable Covid-19 safety protocol by the operators and managers of the public transit system ( $\beta = .12$ ,  $t = 0.24$ ;  $p > .05$ ), and their desires to positively contribute to the achievement of sustainable urban transit system ( $\beta = .01$ ,  $t = 0.12$ ;  $p > .05$ ) are not significant determinants of their trip decisions during the studied period. On a positive note is

the fact that respondents' "dreadful perception" of the public transit system was not a significant determining factor ( $\beta = -0.10$ ,  $t = -.20$ ;  $p > .05$ ) behind the usage of the public transit system during the studied period. The implication of this salient fact is unquantifiable for stakeholders desirous of achieving an impressionable level of societal sustainable transport development in the study area. A major concern of experts in the field of sustainable transport is that the outbreak of the contagion has quickly redefined the gains made in the last two decades – when the drive for sustainable transportation witnessed massive traction among the global community [43, 44, 45].

In recent times, it has been noticed that urban mass transit system, cycling and walking share of the public transit system has been in the ascendancy when compared with the use of personal automobiles as evinced through verifiable data [43, 44, 45]. Concerted efforts must therefore be made by all stakeholders to prevent the public transit system from being denoted as an 'epicenter' of the spread of the contagion, such perceptions will do incalculable damage to the goal of achieving the much-desired societal sustainable transport development. This could be done by conducting scientific research on the spatiotemporal pattern of the incidences of contagion across key interactive locations within the urban space. Results gotten from such research will prevent simplistic assumptions (mostly anecdotally obtained) that public transit systems are epicenters of the contagion. It is surprising that even though most of the sampled respondents (84.75%) affirmed that the outbreak of the contagion negatively affected their decisions to utilize the public transport system; it remained their modal choice for trips even at the risk of being infected by the contagion. This result further reinforces the belief of experts that the economic situation of a populace should be a salient consideration in the quest for a rational selection of a sustainable urban transportation option by politicians and policymakers [46, 47]. Sustainable urban transport modal options centered on the promotion of non-motorized means of mobility (biking and walking) as credible alternatives to motorized transport systems are no popular choices in the study area.

## 6. Conclusion and Areas of Further Research

Conclusively, some salient lessons could be learned through results garnered from this research. One such is the lucidity of the fact that some SES variables (educational attainment, gender, employment type, and occupational distribution) are significant determinants of respondents' usage of the public transit system during the studied period. Another reality brought to the fore through this research is the fact that implicit compliance with government-formulated measures aimed at restricting movement and maintaining social distancing amid the pandemic is not guaranteed. Unlike the situation available in more prosperous Western nations where governing authorities rolled out measures that discouraged the use of public transportation as means of curtailing the contagion [48, 49, 50, 51], such approaches may not readily work in SSA. Conversely, the curtailment of the contagion in the region might go beyond the holistic 'importation of any model evolved in other places' without incorporating salient socioeconomic situations as it concerns the employment nature prevalent in the region and the income levels of the bulk of the citizens in the region.

Findings from this research also indicated that respondents are highly knowledgeable about the contagion, ordinarily; this is a positive development as it is reflected in the willingness among a huge proportion of the respondents to personally observe rules (wearing face masks, maintaining social distance in transit and the use of hand sanitizers) against the spread of the contagion. However, the expression of distrust between the governed and the government reflective in their lack of faith in the government-formulated measures or the capability of the public transit managers to successfully implement sustainable measures to curtail the contagion is disturbing. Available statistics have clearly shown that the ownership holdings of the public transit system in SSA are largely concentrated in the hands of private individuals/investors who owned most of the automobiles conveying passengers and goods in the region [21].

Based on the foregoing, concerted efforts must be made by the government and these private investors to systemically improve the quality of the public transit system in the region to reposition the faith of the transiting public in it. There is no doubt that the incidence of the contagion revealed the parlous state of the public transit system in Nigeria and the disheartening state of the country's public transit system

on a timely response to health emergencies, which could be a more regular occurrence given the increasing fragility of the global public health system in the future. It is safe to suggest that the developers of national sustainable transportation policies in developing countries must carefully consider the economic situations of the populace in the designing of their programs. As could be gleaned from findings in this study, respondents' desires to positively contribute to the achievement of sustainable urban transit was not a significant determinant of trip decisions during the studied period most of the respondents presently utilize public mass transit mainly because they have no personal means of mobility (over 70% affirmed this).

An inference that could be drawn from the result is the likelihood of causality between the economic situations of respondents and their willingness to utilize the public mass transit system. Studies which investigate the perceptual beliefs of the troika of the users of the public transit system, private investors in the public transit system, and government policymakers on the implementation of a sustainable urban transportation plan in the study area are therefore needful.

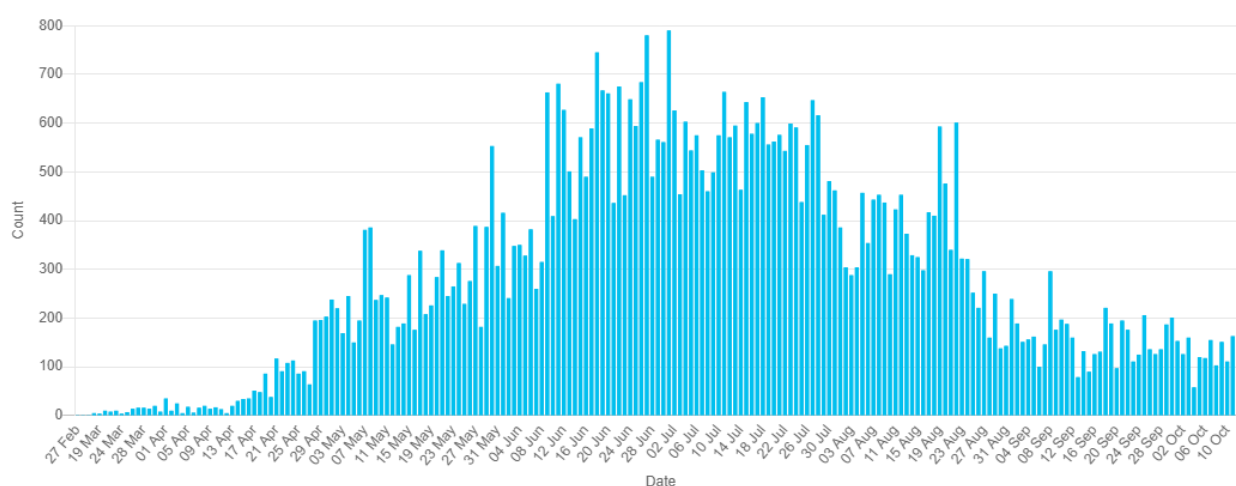


Figure 1: Graphic representation of daily incidences of covid-19 for the period the study covered (Feb 27-10 Oct, 2020)

### Contribution of Researchers

All researchers have contributed equally to writing this paper.

### Conflicts of Interest

The authors declare no conflict of interest.

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