CURTAILING THE DISASTER OF MOVING MONSTERS IN LAGOS, NIGERIA

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ABSTRACT

Aside from the persistent building collapse, acute flood disaster and ocean surge which are known as regular characteristics of Lagos, Nigeria, the menace and ugly incidence of heavy-duty trucks and articulated vehicle operation has now joined the league of contemporary issues affecting *Lagosians* with huge consequences on socio-economic development and sustainability of Lagos. Based on this backdrop, this study examined the risks and disaster of heavy-duty trucks and articulated vehicles in Lagos, Nigeria with the view to proffering measures to tame the operations of the moving monsters. Data for this study were mainly from the use of questionnaire administration and complemented by the Truck Road Traffic Crashes data retrieved from the Federal Road Safety Corps archive. 150 copies of questionnaire were purposively and conveniently administered on truck drivers found along five (5) major accident-prone traffic corridors in the study area. Obtained information were analyzed using descriptive and inferential statistics (linear regression) techniques. Major findings revealed that majority of the truck drivers were male (85%), aged between 25-35 years (43%) and has 5-10 years driving experience. Findings also show that 60% of the disaster-related causal factors were ranked above Mean Index Value of 2.61, with road-related problems (3.50), drunk driving (3.25) and tailgating (3.21) were ranked first, second and third factors. Regression results revealed that incidence of truck-related disaster statistically influences the number of casualties involved ($F\frac{1}{9}$ 36.177, p= 0.000 < 0.05). Meanwhile, loss of life, vehicle, investment and time, displacement of population, environmental degradation among others were ranked very-high impact of risk and disaster of truck operation. The study recommends among others, strong policy implementation strategies to cater for prevention, preparedness, recovery and response mechanisms to address disaster related to transport operation in Nigerian cities.

Keywords: Disaster, Lagos City, Prevention, Traffic, Trucks

JEL Classification: I15, I31, L91, R41

1. INTRODUCTION

Lagos has been growing and expanding in terms of territory, population, industrialization and socio-economy prior the slave trade era and till date due to numerous natural and man-made factorable development factors including artificially-improved natural factors such as transportation routes. Specifically, the abundance of the ocean, lagoons and favourable climate in huge commercial quantities have been among the leading factors promoting continuous prosperity of the city like a typical port city with ever-increasing drifting of human, industrial, institutions, conglomerates and commercial activities. These are in addition to political and administrative functions which equally distinguished the city as a citadel of prosperity, civilization and modernization not only in the country and the African continent but also among the global cities.

The Lagos ports have usually been the busiest seaports in Nigeria and among the top ten (10) African busiest ports accounting for over 75% of all imports and export activities in the country and other landlocked countries in West Africa Sub-region such as Benin, Niger and Cameroon (The Guardian, 2018; Salisu and Raji, 2017). Obviously, Lagos port got developed into two ports of Lagos Apapa port and Tin Can port and characterized by importation and exportation of consumer goods, foodstuff, motor vehicles, industrial machines and industrial raw materials that are mostly containerized for appropriate cargo vehicles such as trains, trucks and other articulated vehicles to move inbound and outbound of the ports towards facilitating and enhancing both local and international businesses and socio-economic development (Salisu and Raji, 2017). It is of interest that the collapse of rail transport system in the country which reached its climax in the late 1980s has led to the emergence and dominance of heavy-duty vehicles including container-laden trucks, tankers and other articulated vehicles in the freight and haulage operations of industrial goods across the territorial coverage of the country. This resulted in the establishment of several haulage companies, while individuals with financial capabilities perceived it as business and thereby, delves into operational investment. As a result, trucking haulage operations become the most important mechanism for freight forwarding and transportation in the country in which trucks and articulated vehicles are used to convey voluminous and bulky items over a short and long distance in Nigeria.

It is worth knowing that aside from industrial equipment, machinery, industrial goods, manufactured products, consumer goods and household items, dangerous goods such as petroleum products which include petrol, diesel, kerosene and liquefied natural gas are now the components being moved through trucking haulage operations across major cities in the country. Considering the dominant

role of Lagos seaports and over 20 million population of Lagos (Lagos State Government, 2016), Lagos became a major player in the art of haulage operations in the country and other West African countries.

Regrettably, aside from persistent building collapse, acute flood disasters and ocean surge which are known as regular characteristics of the metropolitan city, the menace and incidences of tankers and articulated trucks operation has now joined the league of 'Lagos issues'. Also, cities such as Ibadan, Port Harcourt, Aba and Benin City among numerous others in the country have equally been reported to have experienced such ugly incidence. As a result, poor road design and network, traffic collision, fatal tanker accidents, oil spillage, fuel explosion and unlatched trucks operation and traffic gridlock among others are now regarded as a potent threat affecting Lagos with multiplier devastating effects and huge consequences in recent time. This has been a major concern not only to the government but also, the investors, business communities, industrialists, international organisations and civil society organizations as well as residents, visitors, commuters and pedestrians among others in achieving effective and efficient socio-economic and regional development, management and sustainability. This general and obvious concern is as a result of the magnitude consequences and adverse spread effects that usually accompany the incidences of unguided trucks and articulated vehicles operation in a fast-growing metropolitan city. It is in this view, that this study examined perennial risk and disaster of heavy-duty trucks and articulated vehicles with particular reference to Lagos, Nigeria and other cities with similar issues in the view to improving ease and flow of accessibility and reducing trucking operation-related disaster without compromising healthy living, well-being, safety and sustainability of road users and general public in the city.

In achieving this study aim, the following objectives were investigated: the study examined socio-economic profile drivers of trucks and articulated vehicles in Lagos, Nigeria; analyzed the disaster-related causal factors of trucks and articulated vehicles operations in Lagos, Nigeria; examined the impact/consequence of risk and disaster associated with trucks and articulated vehicles operation in the study area; and proffer measures on how to minimize if not curtail, the disasters attributed to trucks and articulated vehicles operation in the study area and cities with similar issues.

2. CONCEPTUAL CLARIFICATION AND BRIEF LITERATURE REVIEW

2.1. CONCEPT OF DISASTER MANAGEMENT

The term 'disaster' originated from the French word 'desastre' which is a combination of two words; 'des' meaning 'bad' and 'astre' meaning 'star' (Central

Board of Secondary Education CBSE, 2006). It is also referred to as evil or bad star. Office of Disaster Preparedness Emerging Management ODPEM (2008) defines disaster as any event, natural or man-caused which creates an intense negative impact on people, goods and services and/or the environment and exceeds the affected community's internal capacity to respond and prompting the need to seek outside assistance. United Nations UN (2017) observes disaster as a serious disruption of the functioning of a community or society, which involves widespread human material, economic or environmental impacts that exceed the ability of the affected community or society to cope using its resources. Disaster is a swift catastrophic event that seriously disrupts the functioning of a community by causing human, material, economic and environmental loss (Oruonye, 2012). However, disaster is a serious disruption in the functioning of a society causing a widespread loses materially, physically, socially, economically and environmentally which exceed the ability of the affected society to cope using its income. Meanwhile, it is also the occurrence of an abnormal or infrequent hazard that affects vulnerable communities or geographic areas.

According to CBSE (2006), disaster causes substantial damage, disruption and casualties and leaves the affected communities unable to function normally. Thus, disaster is believed to be a sting of nature or repercussion of man-made actions, causing losses of both natural and man-made resources in affected areas. Therefore, disaster results from the combination of hazard, vulnerability and insufficient capacity to reduce the potential chances of risk and happenings when hazard impacts on the vulnerable population and causes damages, casualties and disruptions. Gbadamosi and Akanmu (2019) observed that disaster from transport operations are negative externalities which occur as a result of human, mechanical and environmental-related factors with imposed costs on victims that cannot be compensated for through the market mechanism. Akanmu (2014) and Olayinka, Nwilo and Adzandeh (2013) also posited that traffic congestion, traffic noise, pollution, oil spillage, land degradation, vehicle exhaust emissions, loss of lives, properties and investments among others are major risk and disaster associated with transport operations.

Emphatically, the emergence of the concept of disaster management was introduced as a salient measure of addressing incidences of disaster in cities across the globe (CBSE, 2006). According to International Federation of Red Cross and Red Crescent Societies IFRC (2017), disaster management is defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspect of emergencies in particular prevention, preparedness, response and recovery to lessen the impact of the disaster. United Nations (2016) explains disaster management as to how human, material, economic and environmental impact of a disaster is been dealt with and equally a process of preparing for, responding to and leaving from the effect of a major failure.

James, Shaba, Zubair, Teslim, Yusuf, and Nuhu (2013) observed that the concept of disaster management embraces full disaster management circle and

process, and undoubtedly, that adequate disaster management plan reduces its impacts on lives and properties as well as promoting initiatives to address full or partial disaster management cycle. The disaster management cycle, however, consists of the process of mitigation, preparedness, response and recovery as shown in Figure1. Physiopedia (2019) define disaster mitigating or prevention as a concept of disaster management that deal outrightly with avoidance of adverse impact of hazard and related risk, in which the activities designed and engaged in are to prevent and avoid the potential adverse impact of the occurrence of disasters. The concept of Disaster preparedness focuses on the measures taken by governments, professional responses and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impact of the imminent and current disaster of either natural or man-caused. Disaster response concept focuses on immediate and short-term needs between the response stage and recovery stage of disaster usually done through the provision of emergency services and public assistance to save lives, reduce health impact and ensure public safety. Nevertheless, disaster recovery concept focuses on programmes and other related measures which go beyond the provision of immediate relief to assist those who have suffered the full impact of natural and man-caused disaster (Physiopedia (2019); James et al., 2013).

However, preparedness and mitigation are pre-disaster stages while response and recovery are post-disaster stages (Fig. 1). These stages are very essential in minimizing the severity and magnitude of destructions that are likely to accompany the man-caused transport disaster and in ensuring rapid restoration of victims to their normal stage of life before disaster incidences. Hence, the rationale of this study to focus on risk and disaster mitigation and recovery measures for heavy-duty vehicles operation.

Figure 1. *Disaster Management Cycle*
Source: James et al., 2013

2.2. LITERATURE REVIEW

According to Nigeria Post-Disaster Need Assessment NEMA (2012), Nigerian Metrological Agency (NIMET) gives the 2012 early flood warnings forecast with its implication on the people and also, the result of forewarning the looming danger to the government at various levels in the country. From this, it

could be presumed that many state governments were either too confused to act immediately on the matter or ignored the impending danger with their failure to sensitize the citizens on the expected emergency. The institutionalization of disaster management in Nigeria began in 1906 with the establishment of the Fire Brigade to combat fire (James et al., 2013), and provided humanitarian aid and relief to minimize disaster impacts.

The formal large-scale organized disaster management began in 1976 with the establishment of the National Emergency Relief Agency (NERA) which focused on the aftermath of disasters and attended to the needs of disaster victims. The Federal Government of Nigeria (FGN) in 1993 expanded the authority of the National Emergency Relief Agency (NERA) to include all stages of disasters and established the agency as an independent body under the Presidency. The National Emergency Relief Agency (NERA) was restructured in March 1999 when the agency assumed its current title, National Emergency Management Agency (NEMA), which enables the agency to oversee a more holistic approach to the management of disasters in all phases and all associated consequences. As a result, NEMA has a preliminary contingency plan in place, called the National Disaster Response Plan (NDRP); this establishes a process and structure for the systematic, coordinated, and effective delivery of federal assistance to address the consequences of any major disaster or emergency declared by the President of the Federal Republic of Nigeria. As a supplemental policy document to the National Disaster Response Plan (NDRP), the National Disaster Management Framework (NDMF) Thematic Areas has been drafted. The National Contingency Plan 2012/13 contained measures to be put in place to check and manage disasters in the country (NEMA, 2012); and provides a better platform to seek assistance from the international community at supporting and complimenting national actions

However, the International Federation of Red Cross has been a major partner in disaster management in the country. For instance, the International Federation of Red Cross society IFRC (2012) released emergency stocks, mobilized volunteers and resources through private community and humanitarian partners in response to the 2012 flood disasters in Nigeria. The society also sensitizes communities on the flood plains of the major rivers on the risks and possible mitigation of flood crisis. Moreover, to build the culture of preparedness and community resilience, NEMA (2012) set up volunteers in each of the 774 LGAs in the country with community resilience network and community peace brigade in the North-west zone of the country. This is aimed at recruiting at least two hundred emergency volunteers in each of the 774 LGAs (154,800) who would be integrated into community resilience network. In addition, relief materials which include donation of roofing sheets, cements, nails, mattresses, blankets, nylon mats, wax prints, beverages, salts, rice, cassava (gari) and beans are given by NEMA to the victims of flood disasters in Nigeria (NEMA, 2012) but not so for victims of road traffic-related disasters in the country.

Regrettably, the country has recorded several cases of road traffic crashes involving trucks on which several stakeholders' engagements have failed to manifest meaningful post-disaster measures carried out, although evidence has it that the Federal Road Safety Corps is continuously promoting preventive measures among motorist including truck drivers, but not enough (Oyeyemi, 2018). Generally, the unfortunate victims of the transportation-related disaster in Nigeria are being abandoned in hospitals, rehabilitation centres and homes without being catered for, despite posing serious threats to the regional development, management and sustainability of our cities. The major trucking disasters reported in the country from 2015 to 2018 are presented below.

Table 1. *Major Incidents of Trucks Related Disaster in Nigeria (2015-2018)*

s/n	Date	Location	Losses
1	19 January 2015	Lagos- Abeokuta Expressway	Burnt trucks
2	3 March 2015	Ogidi, Anambra State	5 persons killed
3	13 April 2015	Zuba, Abuja	4 persons killed
4	31 May 2015	Onitsha, Anambra State	46 persons killed
5	2 June 2015	Lagos State	22 vehicles and 34 buildings burnt
6	3 June 2015	Benin-Bypass, Edo State	4 trucks burnt
7	9 June 2015	Lagos State	1 truck lost and several persons injured
8	5 September 2015	Aba	5 vehicles and 5 buildings burnt
9	13 December 2017	Lagos State	22 vehicles lost and 1 person killed
10	2 June 2018	Lagos State	1 truck lost
11	28 June 2018	Michael Otedola bridge, Lagos State	55 vehicles burnt and 12 persons killed
12	13 August 2018	Abuja-Keffi Highway	14 vehicles lost
13	23 August 2018	Enugu- Port Harcourt Expressway	6 persons killed

Source(s): Oyeyemi (2018); the Guardian (2018).

Obviously from the presented Table 1, Lagos State, among others, accounted for about fifty percentage of the reported truck-related disaster locations, indicating that much of the operation of the truck disaster incidents occur around the built-up with high socio-economic related activities which boosted negatively, the impact level of observed disasters on both victims and the city at large. More so, it was also observed that most of these observed disaster cases claimed a lot of lives, properties as well as several injured victims that were unaccounted for. Unfortunately, unwanted increasing incidents is fast eating-up the socio-economic affluence of the transport opportunities and national economic threats as investors are fast moving out of the city to other cities with better safety and conducive atmosphere.

Based on this backdrop and the need to forestall the unfortunate reoccurrence of human and material losses, including health and social impact as well as environmental degradation and ensuring public safety, this study tends to awaken government, professional response and recovery organizations, communities, investors, business communities, industrialists, international organisations and civil society organizations as well as residents, visitors, commuters and pedestrians in the areas of prevention/mitigation, preparedness campaigns and measures at pre-disaster stages as well as response and recovery strategies and measures at post-disaster stages for transport operations-related disaster victims.

3. MATERIALS AND METHODS

STUDY AREA

This study focused on Lagos which comprises of twenty (20) Local Government Areas recognized by the constitution within which Lagos was stratified into five administrative zones while seventeen (17) out of the LGAs accounted for the metropolitan Lagos. Lagos remains not only the commercial and industrial capital of the country but has been a first-class city since the 1914 Township classification (Oyesiku, 1998). Before the discovery of crude oil in Nigeria in 1956, Lagos had a robust economy which was characterized by agricultural produce and pacesetting function in the provision of infrastructural facilities and services for the populace. The city remains the hub of the industrial and economic nerve of the country with a large human population and abundant market. As a gateway to the nation's economy, it is blessed with Atlantic Ocean and lagoon which make the region economically and industrially potent despite the relocation of the Federal Capital to Abuja.

Lagos, popularly acclaimed as the Centre of Excellence, is located in south-western Nigeria. It lies within latitudes 6°23 N and 6°41°N and longitude 3°9°E and 3’28E. Lagos constitute less than 2.5% of Nigeria’s total land area of 923,768 km² and accommodates over 6% of Nigeria’s total population of 1991 National Census and estimated at 21 million population in 2016 by Lagos State Government. Basically, the state lies on low lands, with about 17,500ha of built-up area of which residential areas occupy the single largest proportion of 8,739 hectares (51.9%), commercial 821 hectares (4.8 %), industrial, 1,444 hectares (8.4%), institutional and special use 2,366 hectares (13.7%), open spaces 453 hectares (2.6%) and transportation 3,205 hectares (18.6%) (Lagos State Government, 2016).

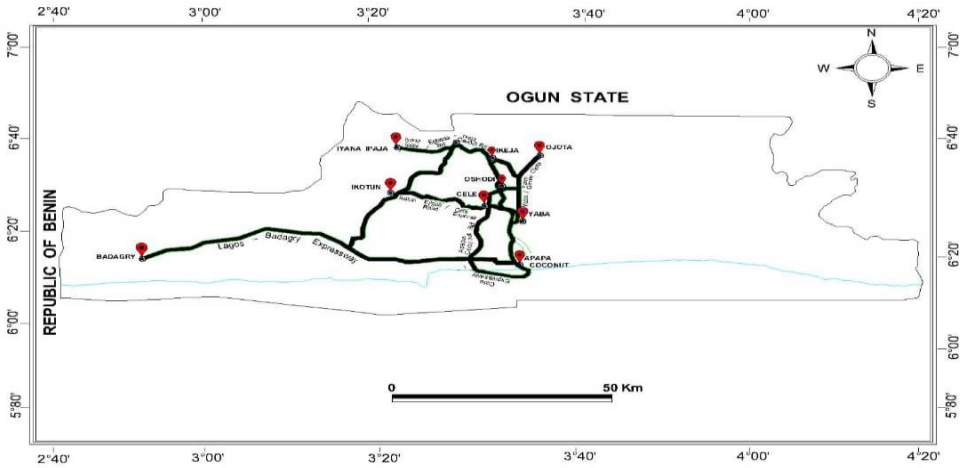

Figure 2. *Map of Lagos Showing the Trucks Traffic Corridors Used*

METHODS

This study examined perennial risk and disaster of heavy-duty trucks and articulated vehicles with particular reference to Lagos, Nigeria towards improving ease and flow of accessibility and reducing trucking operation related disaster without compromising healthy living, well-being, safety and sustainability of road users and the general public in the city. The methods and resource for this research were obtained through primary and secondary data sources. Primary data were mainly through the use of a questionnaire, administered on the purposely-selected truck drivers along some selected trucking routes corridors in Lagos, Nigeria and complemented by field observation. The questionnaire sought for data on the socio-economic profile of the respondents (truck drivers), disaster-related causal factors of trucks and articulated vehicles operations in Lagos, Nigeria as well as the risk and disaster associated with trucks and articulated vehicles operating within the study area. The structured questionnaire was of two sections (Section A and B). Section A dealt with questions on socio-economic characteristics of the sampled respondents including gender, age, marital status, educational level, average monthly income, vehicle ownership, and years of driving experience. While section B addressed questions on disaster-related causal factors of trucks and articulated vehicles operations as well as the risk and disaster associated with trucks and articulated vehicles operating within the study area. Meanwhile, the survey instrument contains both open and close-ended questions and however, was transformed quantitatively for empirical analysis.

Purposively, the secondary data were gathered from both published and unpublished materials of related articles and journals that make up theoretical

clarification and literature that the study anchored on. Meanwhile, data on trucks (tankers and trailers) road crashes in Nigeria for 11 years (2007-2017) and major trucks disaster incidents on Nigerian roads (2015-2018) collected from the Federal Road Safety Corps were used for the analysis. The researchers observed, along the selected trucking routes, the incidence of trucks operation related disasters with the aid of cameras as well as to administer the research instrument and equally experience how the rescue teams attended to disaster victims at the study locations. In other words, this study was first carried out in March 2019 and engaged research assistance to achieve the research purpose on time and objectively.

The study adopted a non-probability sampling of purposive and convenient sampling methods in respondents' selection and questionnaire distribution. This method is adopted based on the fact that only a particular set of respondents, those who were truck drivers and willing to respond to the issues under investigation were sampled. Conveniently, one hundred and fifty (150) willing respondents identified as trucks and articulated vehicle drivers found on the field were selected purposively in five different trucking routes corridors namely Apapa cities namely; Apapa Coconut/ Apapa to Cele Expressway; Ikotun to Ejigbo Road/ Jakande Gate/Oke-Afa/ Cele Expressway; Ojota to Palm-Grove/Anthony/ Onipan/ Yaba; Iyan-Ipaja/ Egbega Road to Ikeja/Oshodi; and Lagos –Badagry Expressway all in Lagos, Nigeria. However, 150 copies of questionnaire were administered on truck drivers (respondents) along these purposively selected traffic corridors within Lagos and used for data presentation and analysis. Meanwhile, the justification for selecting traffic corridors was based on the fact that these routes are characterized by heavy traffic congestion/gridlock resulting from excesses of truck drivers and trucking operations among other related causal factors. Emphatically, for thorough validity and maximum control of research instrument, a reasonable sample size of 150 was adopted.

The collected data were analyzed using both descriptive and inferential statistics. Descriptively, the data were presented in frequency percentage tables and four (4) points relative index measured (RIM) complemented with plates and figures to facilitate the interpretation of collected data. Regression analysis was also used to determine the result of the relevant hypothesis, that is, the incidences of truck-related disaster does not statistically influence the number of causalities/victims involved. The hypothesis through the regression model was necessary to explain the relationship between the dependent variable (number of Trucks Crash Cases -TCC) and the independent variable (Total Casualties Observed -TCO) in trucks-related disasters) (Table 5). The predictor variable was modelled against the dependent variable. However, the model is presented in the following equation:

$$Y = a + \beta_1 * x_1 + e$$

Where:
Y= Dependent variable;
a= Slope/intercept;

β_1 = Regression coefficients for the independent variable
x_1 = Independent variable/ predictor.
e= Error term or residual

In other words, the level of significance of the regression analysis was set at 0.05% for possible acceptance or rejection of the hypothesis. The statistical package for social sciences (SPSS) was used in running the analysis.

Table 2: *Variables Source, Label Code and Operational Definition of Variables*

	Variable (Data Source) Description	**Label**	**Variable Operational Definition**
	Socio-Economic Profile of Drivers		
1	Gender	*GEN*	Dichotomous (dummy): 0 = Male 1= Female
2	Age	*AGE*	Continuous
3	Marital status	*MAS*	Dichotomous (dummy): 0 = Widowed; 1 = others
4	Educational level	*EDL*	Continuous
5	Monthly income	*INC*	Continuous
6	Vehicle ownership	*VEO*	Continuous
7	Years of driving	*YDE*	Continuous
8	Registered Truck Operators	*RTO*	Dichotomous (dummy): 0 = Yes; 1 = No
	Truck Disaster-Related Causal Factors		
9	Drunk driving	*VEO*	Very High=4; High=3; Low=2; Very Low=1
10	Driver fatigue	*ODT*	Very High=4; High=3; Low=2; Very Low=1
11	Drug and local substance intake	*POT*	Very High=4; High=3; Low=2; Very Low=1
12	Driver's vision impairment	*MOT*	Very High=4; High=3; Low=2; Very Low=1
13	Vehicle brake problems	*FOT*	Very High=4; High=3; Low=2; Very Low=1
14	Driver travelling too fast for existing road situation	*LOT*	Very High=4; High=3; Low=2; Very Low=1
15	Roadway problems	*RWP*	Very High=4; High=3; Low=2; Very Low=1
16	Driver felt pressure from carrier/vehicle	*DPC*	Very High=4; High=3; Low=2; Very Low=1
17	Drivers following too close	*DFC*	Very High=4; High=3; Low=2; Very Low=1
18	External distractions	*EXD*	Very High=4; High=3; Low=2; Very Low=1
19	Driver illegal maneuver	*DLM*	Very High=4; High=3; Low=2; Very Low=1
20	Driver inattention	*DIA*	Very High=4; High=3; Low=2;

			Very Low=1
21	Vehicle tire problems	*VTP*	Very High=4; High=3; Low=2; Very Low=1
22	Cargo/container sudden shift	*CSS*	Very High=4; High=3; Low=2; Very Low=1
23	Oil spillage	*OIL*	Very High=4; High=3; Low=2; Very Low=1
24	Poor road design and network	*PRD*	Very High=4; High=3; Low=2; Very Low=1
25	Attitude of traffic officers/police	*ATO*	Very High=4; High=3; Low=2; Very Low=1
26	Poor condition of vehicle lights/vehicle maintenance	*PVL*	Very High=4; High=3; Low=2; Very Low=1
27	Usage of mobile phone	*UMP*	Very High=4; High=3; Low=2; Very Low=1
28	False assumption of next drivers actions	*FAD*	Very High=4; High=3; Low=2; Very Low=1
29	Aggressive and unsafe driving behavior	*AUD*	Very High=4; High=3; Low=2; Very Low=1
30	Unsafe parking	*USP*	Very High=4; High=3; Low=2; Very Low=1
	Disasters associated with Truck Operation		
31	External body injuries (broken bones/burns)	*EBI*	Dichotomous (dummy): 0 = High; 1 = Low
32	Internal body injuries (brain injures/trauma/pains)	*IBI*	Dichotomous (dummy): 0 = High; 1 = Low
33	Permanent disabilities (partial/full paralyses)	*PDD*	Dichotomous (dummy): 0 = High; 1 = Low
34	Death (loss of lives)	*LOL*	Dichotomous (dummy): 0 = High; 1 = Low
35	Loss of vehicle/properties	*LOV*	Dichotomous (dummy): 0 = High; 1 = Low
36	Loss of investment	*LOI*	Dichotomous (dummy): 0 = High; 1 = Low
37	Loss of precious time	*LPT*	Dichotomous (dummy): 0 = High; 1 = Low
38	Extensive violence	*EXV*	Dichotomous (dummy): 0 = High; 1 = Low
39	Displacement of population and cargo	*DPC*	Dichotomous (dummy): 0 = High; 1 = Low
40	Environmental pollution (noise and air)	*ENP*	Dichotomous (dummy): 0 = High; 1 = Low
41	Loss of Infrastructural facilities/material damage	*IFD*	Dichotomous (dummy): 0 = High; 1 = Low

4. RESULTS AND DISCUSSION

4.1 TRUCK DRIVERS' SOCIO-ECONOMICS PROFILE

This sub-section of the study dealt with the analysis of the socio-economic profile of the sampled truck drivers along the selected traffic corridors in the study area through the use of Frequency Percentile Table to present the distribution and opinion of respondents on the issues raised. Meanwhile, the explanation of Table 3 was done using the simple percentage of the distribution. It is interesting to note that out of the 150 sampled respondents, 84.7% are male while 15.3% are female, implying that the total population of the truck and haulage drivers or operators in the study area is dominated by the male gender with a huge percentage as compared to their female counterpart. On the age group of respondents, findings revealed that majority (42.7%) of respondents are between age 25- 35 years, 18% is less than 25years of age, 26% are 36-45 years, while the least percentage (13.3%) are respondents above 45 years. This shows that most of the truck drivers are in their active ages with the strength required to meet up the physically demanding jobs available as a source of income or a form of employment. Also, the majority (about 70%) of the truck drivers are married and are expected to display a high sense of responsibility.

Evidence from Table 3 shows that the majority (about 60%) of truck drivers are holders of National Diploma or its equivalent, while primary/secondary school certificate holders, Degree certificate holders, and respondents with no formal education accounted for 12.7%, 24% and 6.6% respectively. These findings show that the majority of the truck drivers have formal education which is no doubt relevant in understanding the level of impact of disasters associated with truck operations. Furthermore, it is evident from Table 3 that majority (54%) of the truck drivers on an average monthly income earn as much as between #70,000 - #140,000 Nigerian naira, while respondents who earn less than #70,000, between #141,000 to #210,000 as well as above #210, 000 accounted for 13.3%, 26% and 6.7% respectively. By implication, the attracting huge amount of money earned by truck drivers perhaps remains one of the major reasons while a high number of higher-degree graduates are engaging in it and/or look for opportunities in the trucking/haulage businesses as a form of employment.

Table 3. *Truck Drivers' Socio-Demographic Profile*

	Frequency	Percentage
Gender		
Male	127	84.7
Female	23	15.3
Total	***150***	***100***
Age		
Below 25 years	*27*	*18.0*
25- 35 years	*64*	*42.7*

36-45 years	*39*	*26.0*
Above 45 years	*20*	*13.3*
Total	***150***	***100***
Marital Status		
Married	104	69.3
Not married	46	30.7
Total	***150***	***100***
Educational Level		
Primary/Secondary school	19	12.7
NCE/ND	85	56.7
HND/Degree	36	24.0
No formal education	10	6.6
Total	***150***	***100***
Average Monthly Income		
Less than #70,000	20	13.3
#70,000- #140,000	81	54.0
#141,000- #210,000	*39*	*26.0*
Above #210,000	*10*	*6.7*
Total	***150***	***100***
Vehicle Ownership		
Individual owner	27	18.0
Hire service	70	46.7
Government	5	3.3
Partnership	48	32.0
Total	***150***	***100***
Years of Driving		
Under 5 years	25	16.7
5- 10 years	79	52.7
6-15 years	35	23.3
Above 15 years	11	7.3
Total	***150***	***100.0***
Registered Truck Operator		
Yes	*113*	*75.3*
No	*37*	*24.6*
Total	***150***	***100***

Source: Authors' Field Survey (2019)

The result on ownership of truck revealed that almost half (46.7%) of the respondents hired the trucks used in haulage business from private owners, 18% of the respondents owned the truck, 32.0% took possession of truck on a partnership arrangement, while 3.3% of the truck used belongs to the government. Meanwhile, results on the driving experience of respondents revealed that 16% has less than 5 years driving experience, about 52.7% have been driving for 5-10 years and about 23.3% has 6- 15years driving experience, while 7% have been driving over 15years. However, findings from Table 3 confirmed that most of the sampled truck drivers have reasonable years of driving experience. Evidences from Table 3

revealed that the level of registration enforcement for the truck operators in the study area is high, as over 70% of the respondents are registered truck operators.

4.2. DISASTER-RELATED CAUSAL FACTORS OF TRUCKS AND ARTICULATED VEHICLES OPERATIONS

This sub-section examined the factors causing trucks and articulated vehicles disaster-related incidences in the study area through the use of Relative Index Measured (RIM) to present the mean distribution and opinion of respondents on the issues raised. The impact rating of factors causing the disaster-related incidence of trucks operation was measured using 4-point Likert's scale with gradation value of Very low (VL=1), Low (L=2), High (H= 3) and Very high (VH=4). Findings revealed **2.61** as Mean Index Value (MIV) (Table 4). Meanwhile, it is evident from the analysis that roadway problems (3.50), drunk driving (3.25), Tailgating (driving too close) (3.21), drivers illegal maneuvering (3.06), drivers travelling too fast on existing road situation (3.00); poor road design and network (2.90), usage of mobile phone (2.87), driver inattention (lack of concentration) (2.83), vehicle brake problems (2.71), false assumption of next drivers actions (2.71), drug and local substance intake (2.68), condition of vehicle lights/vehicle maintenance (2.67) were ranked first (1^{st}), second (2^{nd}), third (3^{rd}), fourth (4^{th}), fifth (5^{th}), sixth (6^{th}), seventh (7^{th}), eighth (8^{th}), ninth (9^{th}), ninth (9^{th}) and eleventh (11^{th}) respectively among the observed 23 causal factors, while driver fatigue (1.85), vehicle tire problems (1.90), driver felt pressure from carrier/vehicle (1.94), unsafe parking (2.10) were ranked twenty-third (23^{rd}), twenty-second (22^{nd}), twenty-first (21^{st}) and twentieth (20^{th}) respectively and equally accounted for the least-ranked causal factors.

Furthermore, it is worth knowing that the majority (about 60%) of these factors rated above the Mean Index Value (MIV), indicating the weight in explaining the occurrence of a truck-related disaster. However, driver fatigue, vehicle tire problems, driver felt pressure from carrier/vehicle, unsafe parking, driver's vision impairment, external distractions, attitude of traffic officers/police, aggressive and unsafe driving, oil spillage, driver's inadequate surveillance were less pronounced causal factors as they scored Relative Index Mean (RIM) lower than the Mean Index Values (MIV) in the analysis (Table 4). It can be deduced from this analysis that there is a clear variation in the RIM of the influencing factors among sampled truck drivers.

Table 4: *Relative Index of Truck Disaster-Related Causal Factors*

s/n	Variables	VH-4	H-3	L-2	VL-1	TWV	RIM	MIV	%	RK
1	Drunk driving	280	162	38	7	487	3.25		5.41	*2*
2	Driver fatigue	104	30	60	84	278	1.85		3.09	*23*
3	Drug and local substance intake	80	243	60	19	402	2.68		4.47	*12*
4	Driver's vision	48	144	74	53	319	2.13		3.54	*19*

	impairment									
5	Vehicle brake problems	108	216	64	19	407	2.71	2.61	4.52	*10*
6	A driver travelling too fast for existing road situation	252	132	46	20	450	3.00		5.00	*5*
7	Roadway problems	356	150	16	3	525	3.50		5.83	*1*
8	Driver felt pressure from carrier/vehicle	64	78	82	67	291	1.94		3.23	*21*
9	Driver inadequate surveillance	116	135	124	14	389	2.59		4.32	*14*
10	Tailgating (driving to too close)	304	114	56	8	482	3.21		5.35	*3*
11	External distractions	88	48	158	33	327	2.18		3.63	*18*
12	Driver illegal maneuver	244	126	84	5	459	3.06		5.10	*4*
13	Driver inattention	136	219	54	16	425	2.83		4.72	*9*
14	Vehicle tire problems	60	96	52	77	285	1.90		3.17	*22*
15	Cargo/container sudden shift	192	168	66	13	439	2.93		4.88	*6*
16	Oil spillage	108	117	128	20	373	2.49		4.14	*15*
17	Poor road design and network	160	207	54	14	435	2.90		4.83	*7*
18	The attitude of traffic officers/police	72	75	152	31	330	2.20		3.67	*17*
19	Condition of vehicle lights/vehicle maintenance	124	147	120	10	401	2.67		4.45	*13*
20	Usage of mobile phone	216	132	62	21	431	2.87		4.79	*8*
21	False assumption of next drivers actions	152	153	80	21	406	2.71		4.51	*11*
22	Aggressive and unsafe driving behavior	104	129	66	48	347	2.31		3.85	*16*
23	Unsafe parking	44	114	112	45	315	2.10		3.50	*20*

VH-Very High; H-High; L-Low; VL-Very Low; TWV-Total Weighted Value; RIM- Relative Index Measured; MIV- Mean Index Value & RK- Rank Score
Source: Authors' Field Survey (2019)

RELATIONSHIP BETWEEN INCIDENCES OF TRUCK-RELATED DISASTER AND NUMBER OF CASUALTIES /VICTIMS INVOLVED

The incidences of truck-related disaster over the years on Nigerian roads are presented in Table 5 below. This information revealed the rate of occurrence of

unwanted crash incidences as well as the trend over the last 12 years. The highest number of casualties were recorded in 2011 with 5207 victims while the least was recorded 2007 with 1074 victims. In other words, it is worthy to note that the highest number of truck crash cases was observed in 2008 with 1229 cases while the least was recorded in 2007 with 607 cases. However, it is interesting to note that there is a variation in the number of truck crash cases over the years. Meanwhile, the highest number of trucks involved was recorded in 2009 with 1767 while the least was observed in 2012 (Table 5).

Table 5. *Trucks Road Traffic Crash Data 2007-2017*

	NUMBER OF TRUCKS INVOLVED	**TOTAL NUMBER Of CASES**	**TOTAL PERSONS KILLED**	**TOTAL PERSONS INJURED**	**TOTAL CASUALTY INVOLVED**
2007	976	607	805	269	1074
2008	1655	1229	1221	3891	5112
2009	1767	1213	1085	3714	4799
2010	1647	968	965	3220	4185
2011	644	1188	1090	4117	5207
2012	641	1194	1097	3935	5032
2013	1495	1222	1178	4006	5184
2014	998	934	1079	3206	4285
2015	1092	876	979	3048	4027
2016	1016	872	910	3516	4426
2017	932	779	737	2622	3359
Total	**12,863**	**11,082**	**11,146**	**35,544**	**46,690**

Source: Oyeyemi (2018)

Hypothesis: H_0: Incidences of Truck-Related Disaster does not Statistically Influence the Number of casualties/Victims Involved

Further investigations were carried out to establish the relationship between a dependent (number of trucks crashes) and independent variable (number of casualties/victims involved). This was examined through the use of Linear Regression Analysis (Table 5). Table 6 shows the linear regression result through the model summary and the analysis of variance table was used to test the significance of the model. More so, the unstandardized coefficient as well as the T-values and their level of significance, were used in explaining the model as a result as well. The model results through the regression coefficient of R^2 is 0.779, indicating that about 78% of the variation in several truck crashes is explained by the independent variable (predictor). From the level of model explanation, the analysis of variance of the model through the F ratio (F [1, 9]) value revealed 36.177 and it is statistically significant at (sig. = 0.000). By implication, the independent variable (predictor) significantly explains the dependent variable. This implies that the number of truck crashes significantly influences several casualties/victims involved in truck crashes.

In other words, in terms of the relative importance of the predictor in the model, the predicting variable significantly (sig. =0.000) contributed to the overall model result. Meanwhile, the hypothetical decision rule state that H_0 should be accepted if calculated p. value is at or more than table value at a specified alpha level of 0.05. Evidence from Table 6 shows that the Calculated Model Significant Value (sig. =0.000) is less than the table value at 0.05 alpha level. Hence, the alternative hypothesis ($H_{1)}$ is accepted while the H_0 is rejected and thus indicating that the number of truck crashes significantly influences several casualties/victims involved in truck crashes.

Table 6. *Regression Result (H_0: Incidences of truck-related disaster does not statistically influence the number of causalities/victims involved)*

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate
1	.895[a]	.801	.779	100.89472

a. Predictors: (Constant), TOTAL CASUALTY INVOLVED

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	368275.024	1	368275.024	36.177	.000[b]
	Residual	91617.703	9	10179.745		
	Total	459892.727	10			

a. Dependent Variable: NUMBER OF TRUCK CASES

b. Predictors: (Constant), TOTAL CASUALTY INVOLVED

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	328.919	116.842		2.815	.020
	TOTAL CASUALTY INVOLVED	.160	.027	.895	6.015	.000

a. Dependent Variable: NUMBER OF TRUCK CASES

Source: Authors' Field Survey (2019)

4.3. IMPACT OF DISASTERS ASSOCIATED WITH TRUCKS OPERATION

Table 7 presents the perception of drivers on the impact of disaster associated with trucks operation in Lagos, Nigeria. Table 7 shows that the majority (78%) of respondents rated external body injuries such as broken bones, burns, and amputated legs among others as high. The majority (58%) observed and scored internal body injuries such as brain injuries, trauma and body pains as low. Also, the majority (90%) of respondents rated permanent disabilities such as partial and full paralyses rated low as well as spinal cord injury which rarely occurs among

drivers. Evidence from Table 7 shows majority of respondents characterized death (loss of lives) (75.3%), loss of vehicle/properties (72.0%), loss of investment (59.3%), loss of precious time (90.0%), extensive violence (70.0), displacement of population and cargo (78.7%), and environmental degradation (81.3%) as high impact disaster that obviously happens when truck-related disaster occurs. In other words, 76.7% of respondents characterized the loss of infrastructural facilities/material damage as low impact disaster consequence. However, it is evident from findings that truck drivers' attitude and driving culture rated high for most of the impact factors of disaster associated with truck operation in the study area. By implication, relevant authorities and stakeholders should place urgent attention for appropriate intervention towards reducing truck disaster rate or occurrences and its consequential effect on socio-economic loss, human loss and public health.

Table 7: *Impact of Disasters Associated with Trucks Operation*

s/n	**Variables**	**Low = 0**		**High = 1**		**Total**	
		Freq.	Percent	Freq.	Percent	Freq.	Percent
1	External body injuries (broken bones/burns)	33	22.0	117	78.0	150	100
2	Internal body injuries (brain injuries/trauma/pains)	87	58.0	63	42.0	150	100
3	Permanent disabilities (partial/full paralyses)	135	90.0	15	10.0	150	100
4	Death (loss of lives)	37	24.7	113	75.3	150	100
5	Loss of vehicle/properties	42	28.0	108	72.0	150	100
6	Loss of investment	61	40.7	89	59.3	150	100
7	Loss of precious time	15	10	135	90.0	150	100
8	Extensive violence	45	30.0	105	70.0	150	100
9	Displacement of population and cargo	32	21.3	118	78.7	150	100
10	Environmental degradation	28	18.7	122	81.3	150	100
11	Loss of Infrastructural facilities/material damage	115	76.7	35	23.3	150	100

H-High; L-Low
Source: Authors' Field Survey (2019)

Plate 1: *Impact of Disasters Associated with Trucks Operation*
Source: The Guardian (2018)

5. CONCLUSION AND RECOMMENDATIONS

The genesis of road traffic-related disaster is inseparable from the historical development of road transport in any country. Both at the global and national level, human and material resources which are vital for developmental processes are being destroyed in the occurrence of road traffic-related disaster. Based on this, the

research paper has discussed the perennial risk and disaster of trucks and articulated vehicles operation in Lagos, Nigeria and equally revealed the magnitude impact of trucks-related disaster on the development of the city. The disaster attributed to trucks and articulated vehicles operation in Lagos, Nigeria is no doubt diverse in nature and emphatically affecting not only the socio-economic life of victims but also characterized the city with devastating state of the economic, social, environmental and public health situations.

The incidences of trucks and articulated vehicles related disaster has killed thousands of lives, caused several permanent physical and mental injuries, wasted lots of properties and investment as well as crippled the overall economy of the state due to the backlash effect of unlatched and unguided trucks and articulated vehicles operation characterized by so many factors including poor attitude and excesses of drivers, resulting to incessant traffic gridlock/congestion and loss of precious time on roads, crime and excessive violence around the disaster scene. Sequentially, the spillover effect of this unlatched truck operation in the city has also led to serious environmental degradation and threat to public health and safety which consequently promoting the development and growth of urban poverty, urban slum and urban sprawl as disaster victims are abandoned and due to the irreparable damage suffered, most are left with no functional working ability and strength. Unfortunately, there are no meaningful mechanisms and functional policy measures or scheme to specially cater for these increasing number of victims and their disaster impact both at the state and the national level.

Meanwhile, evidences from the findings of the study also show that most of the examined causal factors of truck-related disaster are more of human-induced factors than the mechanical and environmental-related factors. It is noted that factors such as roadway problems, drunk driving, tailgating (driving to too close), drivers' illegal maneuver, drivers' travelling too fast for existing road situation; poor road design and network, usage of mobile phone, drivers' inattention while driving, vehicle brake problems, false assumption of next drivers actions, and drug and local substance intake while driving are rated and weighted higher factors causing truck-related disaster in the city. Furthermore, it is worth knowing that most of the impact/consequence of trucks-related disaster were obviously agreed by respondents and rated death (loss of lives), loss of vehicle/properties, loss of investment, loss of precious time, extensive violence, displacement of population and cargo, and environmental degradation as high impact disaster that obviously occurs from the unlatched and unguided trucks and articulated vehicles operation in the study area. These findings were however corroborated empirically as the study revealed through the test of the hypothesis, that the number of trucks crashes cases statistically significantly influence the number of casualties involved in the road traffic-related disaster.

It is based on this backdrop and research findings that this study concluded that unlatched and unguided trucks and articulated vehicles operation in Lagos, Nigeria is regarded and tagged as a moving monster as it is crystal clear that the present state of trucks and articulated vehicles operation in the study area is

inseparable from the killing of thousands of lives and keeping several injured including motorist and other road users without better curtailing mechanisms and post-disaster measures for victims by concerned stakeholders. Again, it is on this note that the study recommends the following as policy implications:

Formulation and implementation of transport policy including logistics and supply chain that will holistically provide an avenue for proper planning, guide and regulations for transport (trucks) operation towards providing a strong base for entry and exit control of its operation.

Special effort and approach with strong policy implementation strategies to cater for the prevention/mitigation, preparedness, recovery and response mechanisms to disaster-related to transport operations including trucks and articulated vehicles operation should be put in place to checkmate this monster.

Also, the establishment of computerized vehicle roadworthiness test institute with enforcement mechanisms that will enhance operators' mandatory compliance to the standard will help in alleviating this menace.

Establishment of smart training institutes within the city to enhance drivers training and retaining on safe driving can be implemented in order to give hand-on trainings to drivers of these trucks and haulages.

Strong political will with clear responsibility that must be backed by law and federal constitution to government level (federal, state and local), government agencies, parastatals and other transport organization on modalities of transport system operation and services should be encouraged and engaged.

Electronic traffic data management control system and data house should be established and installed in the city and other cities with similar issues to monitor as well as keeping traffic information for the current and future use.

Concerned stakeholders can also engage in serious overhauling of the transport and logistics companies towards monitoring and planning effectively as well as maximizing the revenue/ generating through various taxes paid for the development of the sector as well as taking care of trucks-disaster victims.

Revitalization and serious investment in rail transportation as it is the safest and economy-friendly means of transporting bulk freight for both inter and intra-city mobility has been observed to be a vital solution to the national threat of truck-related crashes.

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