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THE CAUSES AND ECONOMIC IMPACT OF FREQUENT VEHICLE BREAKDOWN IN NIGERIA: A CASE STUDY OF DELTA STATE

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Abstract: This study was carried out to investigate the causes and effects of vehicle breakdown and road accidents in Delta State, across the three Senatorial Districts, using purposive random sampling technique with emphasis on convenience sampling technique to sample out the various respondents for the study. The objectives of the study were to determine the causes of frequent vehicle breakdown, assess the level of competence of vehicle mechanics, and the type of maintenance required to mitigate frequent vehicle breakdown in Delta State. The result on the causes emerged that lack of good maintenance culture was the major cause of vehicular breakdown and accidents as many drivers do not check their vehicles daily before use, no respect for road safety regulations, high alcoholic intake of drivers, over speeding and driving while making or receiving calls, and overloading of passengers/goods were some of the discussed causes. The study exposed the incompetence of many of our vehicle mechanics and the need to engage them in vocational and technical training and certification to enable them acquire the prevailing technology and entrepreneurial skills. Finally the study recommends that, there should be Government/private partnership to train mechanics, provide heavy duty towing trucks to clear breakdown vehicles and the Law Enforcement Operatives should be strict in their operations with more public education.

Keywords: Vehicle Breakdown, Road Accidents, Mechanics, Entrepreneurial Skills.

Introduction

1.1 Background of the Study

In this study, vehicle breakdown is described as a fault that develops in a vehicle due to certain circumstances which may impede the vehicle from doing its normal duties smoothly and safely. A vehicle breakdown is a mechanical or electrical failure of a motor vehicle in such a way that the underlying problem prevents the vehicle from being operated or impedes the vehicle's operation so significantly that it is very difficult, nearly impossible, or else dangerous to operate.

Vehicle breakdown is a type of unplanned incident where a vehicle fails during operation on a road way and is forced to stop. There can be many reasons for a vehicle breakdown, such as flat battery, faulty electrical wiring, fuel pressure problems, tyre puncture, driver error, etc. most breakdowns can be resolved on the spot by self-repairing or calling a mechanic. Some breakdowns are so complex as to require towing. Vehicle breakdowns can result in traffic congestion, particularly when the road is partially or fully closed due to obstruction by the broken-down vehicle or the towing equipment. Furthermore, vehicle breakdowns are usual events, and many

drivers are uncertain about how to respond to the failure. This can lead to unsafe behaviour and, in some cases, secondary incidents.

This study reveals that in Nigeria, over 80% of the vehicles that ply our roads are imported used vehicles. Most of these vehicles have done over 300 miles in the Countries where they were initially used before they were imported to Nigeria. The car dealers in Nigeria bring them in and reset their mileage lower to attract buyers. A large number of these vehicles are used for businesses while others are used as private. In this study, we shall be looking at who are the drivers of these vehicles, their level of driver's education, how much knowledge of driving rules they have acquired, driver's licence and their maintenance culture. Good vehicle maintenance culture is key to the performance and reliability of the vehicle.

These vehicles are driven on Nigerian roads that are characterised by potholes, cracked and rough surfaces, broken shoulders and depression.

However, this study shall evaluate the causes and economic impact of frequent vehicle breakdowns and their remedial measures, considering, bad roads, ill-trained automobile technicians, untrained drivers, poor vehicle maintenance culture and type of maintenance used in Nigeria.

1.2 Statement of the Problem

People seem to buy cars on daily bases, particularly, young boys in Delta State and are not willing to go through the necessary training before using them, making it very easy for many of the cars to breakdown at the least fault. Most of the vehicles result at accidents even on minor mechanical faults which could have been addressed, should the owners have little exposure to how to do little repairs on their vehicles. This issue is very common in Delta State where people are now competing to own cars, many of the users easily get involved in accidents as they also over rely on most of the inexperienced mechanics within the State. Again, indiscipline, drivers parking at undesignated bus stops and the activities of pedestrians, are also contributory factors to congestion which leads to accidents. The purpose of this dissertation is to investigate into the causes and economic impact of frequent vehicle breakdown in Nigeria, with Delta State as a case study, the level of competence of vehicle mechanics within the State, and finally assess what can be done to reduce frequent vehicle breakdown in Delta State.

1.3 Objectives of the Study

The **aim** of this study is to investigate the causes and economic effects of vehicle breakdown and road accidents in Delta State, Nigeria.

The **specific objectives** of this research are as follows:

1. Determine the causes of frequent vehicle breakdown in Delta State.
2. To determine the challenges the road side mechanic face in Delta State in diagnosing problems of Vehicle systems and components.
3. To determine the impact of skills possessed by the mechanics on the vehicles
4. To ascertain the effect of road conditions on the vehicle lifespan
5. To determine what can be done to reduce frequent vehicle breakdown in Delta State.

1.4 Research Questions

The general research question is "What are the causes and the economic impact of frequent vehicle breakdown in Nigeria". When answering the general research question a series of sub questions must be dealt with:

(1) How competent are the Mechanics in Delta State
(2) Do bad roads contribute to frequent vehicle breakdowns?
(3) Do the drivers go through adequate training before obtaining driver's license?
(4) What are the causes and effects of frequent vehicle breakdown in Delta State?
(5) What can be done to reduce frequent vehicle breakdown in Delta State?

1.5 Statement of Hypothesis

Hypothesis 1

H_0: The skills and competence of the mechanics reflect directly on the lifespan between servicing of the vehicle
H_1: The skills and competence of the mechanics doesn't reflect directly on the lifespan between servicing of the vehicle
Hypothesis 2
H_0: The road condition contributes to the frequency of vehicle breakdown
H_1: The road condition doesn't contribute to the frequency of vehicle breakdown
Hypothesis 3
H_0: The training/skills of drivers contributes to the frequency of vehicle breakdown
H_1: The training/skills of drivers doesn't contribute to the frequency of vehicle breakdown
Hypothesis 4
H_0: The frequency of the vehicular breakdown has direct economic impact
H_1: The frequency of the vehicular breakdown doesn't have direct economic impact
Hypothesis 5
H_0: Proper vehicle maintenance skills, law enforcement and abiding by rules can drive down frequency of breakdowns
H_1: Proper vehicle maintenance skills, law enforcement and abiding by rules will not drive down frequency of breakdowns

1.6 Significance of the Study

The significance of this study are as follows:
This study will give room for further research works on areas that are not covered by this work.
This research work will add to the existing knowledge in this subject matter on the causes and effects of vehicle breakdown in Delta State.
This research work will help to stimulate the activities of the VIO and ROAD SAFTY and vehicle users within Delta State.
This study will serve as a reference material to other researchers who may want to do a similar work in future.

1.7 Scope of the Study

This study consists of five chapters. It is a study on the causes and economic impacts of frequent vehicle breakdown in Nigeria (A case study of Delta State). The research covers a wide range of factors responsible for frequent Vehicle breakdown in Nigeria, which includes bad roads, untrained and unskilled automobile technicians, poor maintenance culture, inexperienced drivers, aged vehicles, inter alia. This research covers the three Senatorial districts of Delta state, that is, Delta Central, Delta North and Delta South. Commercial and private drivers were engaged in the three Senatorial Districts.

1.8 Limitations of the Study

The limitations of this work stems on the nature and scope of the work, clearly it is obvious that the roads plied by vehicles is same, but maintenance strategies and driving methods differ, therefore leading to disparity in situations making the findings relativity ratio to others lower than should be and more general.

REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

Transportation systems are designed to provide effective movement of passengers and goods from one point to another, with the intention that the systems contribute substantially to the growth and development of the nation (Gbadamosi and Adenigbo, 2017).
Transportation systems are divided into various section; Air, Water, Rail and Road (Liberty, 2023) but with respect to this work, focus will be on Road transport.Travel by motor vehicles provides unprecedented degree of mobility, leading to continuous growth of traffic.

The land transport, consists of different players; The vehicle, the passengers, the goods, the operators (owners, drivers and mates) and the repairers (mechanics) on one side of the coin while the other side has the Road Controllers (Government Agencies)and the road builders (The Engineers).

In Nigeria, the road transport sector remains the dominant mode in the movement of passengers, goods and services from one point to the another within and across urban cities (Gbadamosi and Adenigbo, 2017) and rural areas as this is the only mode of transport in most areas that can bring you and things to your door steps asides the riverine areas.

Considering the efficiency of road transport systems, the human factor is the most to consider as it affects and controls both the roads and vehicles (Attila *et al*., 2015). The human factor includes both owners, drivers, mechanics, etc.

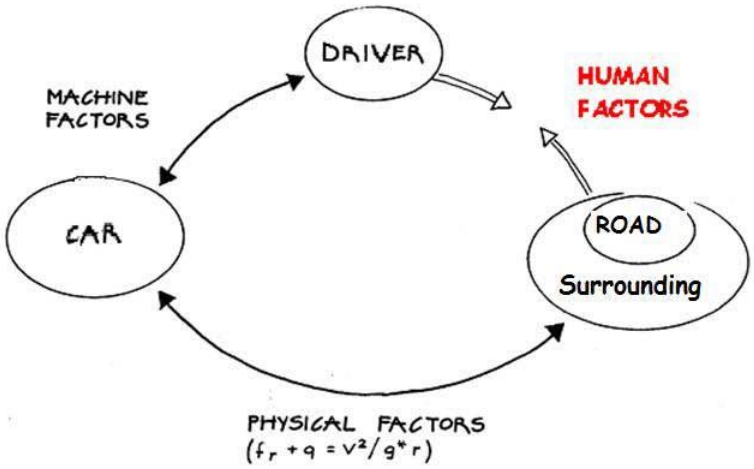

Figure 2.1: The main interface of the road transport system (Attila *et al*., 2015)

Having identified and outlined the 3 major players in road transport system, their relationship is key to the efficacy of the road transport system as a default in one affects the other, when the road is faulty, the vehicle and human suffers, when the vehicle is faulty it affects the human and also possess the ability to cause damage on the road and also when the human is faulty (sick or unskilled) the other two factors suffer relatively too. This now entails that these 3 players are equally important noting also that the human factor has control over the other non-human factors.

2.2 Theoretical Framework

The causes of frequent breakdown of the vehicle circles around the other two players, mainly the state of the roads and how operators utilize the vehicle on the road and how the repairers handle the vehicle in terms of services and repairs. The servicing schedule most times is triggered by owners and drivers and the quality of service is mostly determined by the skill of the repairer. Below are the various servicing styles employed.

Related Definitions: Road accident is defined as any activity which distracts the normal trajectory of a moving vehicle(s), in a manner that causes instability in the free flow of the vehicle. The accident is that the vehicle(s) involved veer(s) off the road, collide, run over, vehicle on fire, etc. The Federal Road Safety describes casualties as persons killed, seriously injured and slightly injured. The word casualty in this study shall be referred to any person involved in road accident. This will be grouped as casualties who survived and those who are killed in the road accident. Vehicular accident has always been attributed to human errors such as high alcoholic content in the blood stream of the driver, over speeding, wrong overtaking among others. It has also been linked to poor road network, poor surfacing of the roads, witchcraft and the death-dying nature of some of the vehicles which ply the roads. There are numerous suggested solutions, various interventions by government,

nongovernmental organizations and other road stakeholders to curtail road accident and its replica effects on human lives and properties, it could be possible that these factors such as type and nature of the road, age and sex of casualty contribute to casualty survival in road accidents in the country and have still not been considered. In view of the intensity of road accidents, the FRSC annual road accident statistics is pegged at 40,000 (Agency, 2023)

The Causes of Frequent Vehicle Breakdown According to Sherry and Stanislaus (2014), research shows that due to less time and knowledge, many motorists fail to take adequate measures to look after their cars, and have very little working knowledge of basic car maintenance. This can lead to vehicle breakdowns which could be avoidable with a little forward thinking and pre-planning. Again, there is growing decline in car know-how and care among many vehicle users in Nigeria as many of the motorists prefer to rely on others to fix simple car problems rather than attempt to resolve the problem themselves. Linked to this attitudinal behaviour, some 71% of FRSC according to FRSC (2022) believe that today's motorists take less care of their vehicles. They estimate that only one in five motorists conduct the recommended tyre, oil and water checks on a weekly basis. Similarly owners are less likely to read their car manual; in fact FRSC believes a quarter of all call-outs could be prevented if the owner consulted their handbook. Hand in hand with this declining know-how goes car care. According to FRSC, as many as 75% of motorists do not carry basic items such as spare water, oil, bulbs or fuses. Moreover, the FRSC expresses concern over the number of vehicles that are not equipped with a spare tyre. The fact that a punctured tyre is the most common cause of many of the car breakdown related accidents (accounting for nearly 200,000 calls every year), suggests that this lack of time and planning may be partly responsible for the high figure. It is also believed that, with today's hectic lifestyles and a 'disposable' attitude to consumer goods, people are much less inclined to spend time trying to repair their vehicles, and often neglect to undertake basic and essential car care only to leave this to the hands of unqualified mechanics. This is because many of the drivers within Nigeria lack the basic car knowledge and willingness among motorists to investigate reasons for their vehicle breakdown themselves which is also at times attributed to illiteracy on the part of some vehicle owners to read or observe simple rules regarding driving and effective use of a vehicle. Vehicular accident has always been attributed to human errors such as high alcoholic content in the blood stream of the driver, over speeding, wrong overtaken among others. It has also been linked to poor road network, poor surfacing of the roadsand the death-dying nature of some of the vehicles which ply on the roads. There are numerous suggested solutions, various interventions by government, nongovernmental organizations and other road stakeholders to curtail road accident and its replica effects on human lives and properties, it could be possible that these factors such as type and nature of the road, age and sex of casualty contribute casualty survival in road accidents in the country and have still not been considered. It is in view of this that this research seeks to identify if there is any relationship between the casualty survival in road accident and these factors, (Sherry and Stanislaus, 2014).

Maintenance is one of the major factors in mitigating both crashes and breakdowns, especially breakdowns. Approaches to maintenance can be divided into the following categories and assigned a rating based on five tiers of quality.

2.2.1 Reactive Maintenance

This entails driving vehicles and runningequipment to the point of failure and fixing things as they break. Many casual motorists can be lumped into this category. It may cost less up front, but would certainly cost more time and money down the road. This is a **POOR maintenance strategy.**Reactive maintenance may leave the operator/owner stranded.

2.2.2 Preventive Maintenance

When just enough time is invested in maintenance to prevent major breakdowns, typically by following the schedule printed in the owner's manual. While this will maintain the manufacturer's warranty, and is preferable

to reactive maintenance, it is only a **FAIR maintenance strategy**.Preventative maintenance requires more than just 3,000-mile oil changes.

2.2.3 Predictive Maintenance

When you periodically inspect, service and clean vehicles and equipment to maintain an understanding of their exact condition and to identify problems as soon as they happen. By understanding the equipment and keeping an eye on things you are executing a **GOOD maintenance strategy**.Motorcyclists clean their bikes regularly to help predict equipment failures before they cause a crash.

2.2.4 Proactive Maintenance

Attempting to predict when things will fail based on the anticipated service life of each component, measured via historical data, mileage, operating conditions and other factors, then you proactively replace parts to prevent problems before they happen. You maintain expert-level knowledge of the equipment and have an **EXCELLENT maintenance strategy**. If you can see the top of Abe Lincoln's head, it's time to proactively replace the tires.

2.2.5 Condition Monitoring

This is the pinnacle of vehicle maintenance and is practiced by a select few. In addition to proactive maintenance, it also entails monitoring the condition of your machinery while in operation. For example, performing oil analysis before or during the regular drain interval to identify hidden wear on the engine internals. Or installing aftermarket temperature or pressure gauges, to maintain a better understanding of any potential failure points while under load.

While this level of concern can be extremely costly up front, if you operate heavy-duty equipment or race professionally, condition monitoring is already second nature, and you have earned the ultimate rating of **OPTIMUM maintenance strategy**, because failure is not an option. Compression testing is an excellent way to monitor engine condition.

The purpose of maintenance is to extend equipment lifetime, or at least the mean time to next failure whose repair may be costly. Furthermore, it is expected that effective maintenance policies can reduce the frequency of service interruptions and many undesirable consequences of such interruptions. Maintenance clearly affects components and system reliability; if too little is done, this may result in an excessive number of costly failures and poor system performance and, therefore, reliability is degraded; done too often, reliability may improve but the cost of maintenance will increase. In a cost-effective scheme, the two expenditures must be balanced.

2.3 Empirical Review

This section of the work goes on to respond to the research questions of this study.

2.3.1 Maintenance Skills Role

The maintenance skill level of mechanics also has a direct impact on the lifespan of vehicles between maintenance periods. In Nigeria, modern cars are on the increase which ranges from various model and types ploughing most roads in the country on a daily basis. The ability of the mechanics to upskill to meet up with technological complexity of these vehicles is facing some difficulty leading to shorter lifespan between servicing periods and also increasing the frequency of vehicular breakdown. This is clearly proven with a comparative analysis between high-cost company technicians and the always available road side mechanics who are limited in skills. The vehicles that are regularly serviced by company trained technicians always have a longer lifespan between services as opposed to those from the road side technicians who upskill sparingly (Nenuwa*et al*, 2014).

2.3.2 Effects of Road Condition

Annual losses (from vehicle maintenance), due to bad roads is valued at over NGN133.8billion. In Nigeria according to Enwerem and Ali (2016), most roads are in bad shape leading to negative economic effects considering the increase in maintenance frequency. The estimated current total road network in Nigeria is about 194,000 kilometers (Enwerem and Ali, 2016). Their study showed that bad roads account for about 70% of

increased damage of vehicle parts, so with roads either poorly made or not paved at all, the direct impact leads to frequent breakdown of vehicles.

2.3.3 Operators' (Driving) Skills and Training

Poor driving skills have a direct impact on the lifespan of vehicles between maintenance periods according to Akolgo (2021), he also opined in the study that non-adherence to proper driving ethics and safe behavior is also a major cause of accidents and vehicles in most cases never recover from accidents to optimum performance. One of the highlighted negative behaviors that causes the most of damages even in the absence of a literal accident is over speeding, especially on bad roads, this causes a lot of shock impact which weakens the compatibility of the vehicles' individual parts.

2.3.4 Causes and Effects

The major causes of vehicle breakdowns have been highlighted, from the human players to the road factor to the quality of manufacture parts, all these cumulate to frequency of breakdowns. A consequence analysis was made to identify what a breakdown might lead to. The consequences were divided into three different areas depending on their effect (Okigbo, 2012).

- Economy
- Environment
- Personal injuries

To be able to compare different consequences a unanimous quantification was made. To economically estimate consequences for the environment is difficult. Knowledge of how the environment may be affected by a breakdown is necessary. Are the effects local, regional or global and what are the long-term consequences? Personal injuries are also very hard to estimate in financial terms.

2.3.5 Breakdown Frequency Reduction

Noting and taking care of the human and road factors and ensuring compliance greatly mitigates and drives down frequency of breakdowns.Sathwik*et al* (2021)in their work acknowledged the reality that machines (vehicles) are not for a life time and with day-to-day usages and time-tested in various conditions breakdown is expected, so in addition to trying to set the breakdown causing factors right, a breakdown recovery system is supposed to be at work to enable ease of recovery after a breakdown.

2.3.6Summary of Empirical Review

The literatures reviewed mostly dwelt on post issues, some dwelt more on accidents and a few on maintenance. Much of the literature concerns itself with replacements only, both after failures and during maintenance, and disregards the possibility of the kind of maintenance where less improvement is achieved at smaller cost. The oldest replacement schemes are the age replacement and the bulk replacement policies described by Barlow (Barlow, 2005) and (Zehani, 2017). Maintenance methods are divided into categories where maintenance is preferred at fixed intervals and where it is carried out as needed.

Table 2.1: Summary of Empirical Review

S/N	AUTHOR NAME/YEAR	WORK DONE/ CONTRIBUTION	RESULT/ CONCLUSION	LIMITATION/ FURTHER RESEARCH
1	Nenuwa, IsaacOmosule, Adepo, Samuel Olusegun, Raimi, Oluwole Abiodun, &Fapetu, OluseyiFeyisetan (2017)	Evaluation on the Challenges of Modern Car Maintenance in Nigeria. • Revealed the type of maintenance approach adopted for the various segments of the modern cars	The modern car users ensure possible measures in correcting challenges in their cars through adequate servicing and reasonable maintenance cost	Efficiency optimization of modern car maintenance to further drive down cost and encourage standard maintenance frequency.
2	Enwerem G. C. & Ali G. A. (2016)	Economic Effects of Bad Roads on Vehicle Maintenance in Nigeria • Outlined factually the economic result of bad roads on vehicle maintenance.	Over 51% (based on sampled evaluation) of cars are damaged monthly in Nigeria as a result of bad roads.	Increasing the resistance of vehicles to shock propelled damages. And good road maintenance policies
3	Akolga, John (2021)	An Investigation into the Causes and Effects of Vehicle Breakdown and Road Accidents in the Bolgatanga Municipality • Investigating and providing the major causes of vehicle breakdown	Improper care for the vehicles is the major cause of vehicle breakdown.	Ways to ensure mechanics are evaluated and certified to ensure the right people care for the right vehicles.
4	OkigboNdefo (2012)	Causes of Highway Failures in Nigeria • Detailed causes of highway failures in Nigeria and remedies	Ensuring right traffic utilization of roads while avoiding improper traffic and proper traffic load analysis for various road grades	Recategorization of Nigerian road to ensure proper traffic loads at most times.
5	Sathwik Krishna L., Siva Rama Krishna S, Abdul Amjad S., Mahesh Babu U. & Lakshmi Surekha T. (2021)	A Vehicle Breakdown Service Provider System • Revealing many breakdowns can be quickly resolved by self-repairing.	Providing a Django application that will help the user to avail help by using application.	Integration of more elaborate help apps into the society.

2.4 Gap in Empirical Review

1. Much of the literature concerns itself with replacements only, both after failures and during maintenance, and disregards the possibility of the kind of maintenance where less improvement is achieved at smaller cost.
2. The oldest replacement schemes are the age replacement and the bulk replacement policies described by Barlow (Barlow, 2005) and (Zehani, 2017)
3. The literatures failed to have a comprehensive approach that will align all the factors and balance the roles of each and the impact of each.

METHODOLOGY

3.1 Research Design

The research is divided into two phases, the first phase, an exploratory phase, in which a survey approach was adopted comprising of research instruments, namely semi-structured interviews and questionnaire survey. The objectives of the first phase studies were to establish a basis for the causes and effectsof the breakdown and also to further explore the perceived gap between theory and practice. The two studies along with the key outcomes from the literature review formed the basis for investigating further and suggest further directions for study. The second phase of the study which consisted of a case study approach was designed to provide more meaningful insights into the notion of vehicle breakdown solutions.

3.2 Area of Study

This work was carried out in Delta State, Nigeria.

3.3 Sources of Data

Sources of Data include direct and indirect interviews of drivers(transporters), vehicle owners, mechanics and road construction workers from selected axis within the three senatorial districts that make up Delta State.

3.4 Population of the Study

The target population of study consist of about 90 persons from the 3 senatorial districts of Delta State (Delta Central, Delta North and Delta South) in Nigeria. These individuals consists of vehicle owners, transport operators (drivers and mates), mechanics and road maintenance engineers.

3.5 Determination of Sample Size

The sample of this study isthree (3) motor stations/loading bays,three (3) mechanic workshops and three (3) road maintenance company offices/road law enforcement offices.

3.6 Sampling Techniques

A total of three (3) motor stations/loading bays, three (3) mechanic workshops and three (3) road maintenance company offices/road law enforcement officeswere selected at random from the 3 senatorial districts.

3.7 Method of Data Collection

The choice of method for the first part of this study was interviews of an open-ended nature (Yin, 2004). This method was chosen because the respondent's role in such interviews is more that of an informant rather than just a respondent answering questions; he can speak more freely around the questions. With this method the interviewer follows a certain set of questions, but allows the respondent's answer in some way to affect the following questions. This is a method that helps the interviewer to get a better perspective of the issue he is about to chart and lets him be influenced by the respondent.

The data collection techniques used in the two research approaches are interview and questionnaire.

In the first phase, a survey method was adapted, in which the initial data were collected by conducting face-to-face, semi-structured interviews with experienced and knowledgeable practitioners, followed by questionnaire survey. In the second phase, case study method was adopted, initially face-to- face, semi-structured interviews were conducted with project executives and program managers, to understand the project context, and which was followed by a questionnaire survey within the company selected for the case study.

- **Interviews**

According to Saunders *et al* (2003), structured interviews use questions which are based on a pre-determined and standardized set, whereas in the semi- structured / unstructured interviews there is list of themes and questions to be covered. The list of themes and questions vary within semi-structured interviews depending on the flow of the conversation, and also as the area of interest explored, as the interviewee is given opportunity to talk freely about events, behaviour, views and belief in relation to the topic.

- **Questionnaires**

A questionnaire comprises of a list of clearly and carefully structured questions, which may be based on the previous studies, with a aim to find out what a selected group of participants do, think or feel and/or to test relationship (Hussey and Hussey, 1997). There are two types of questionnaire design, open- ended and closed, in open-ended type respondent can give a personal response or opinion, where as in the closed type the respondent has to select an answer from predetermined alternatives (Saunders *et al*., 2003). Closed type questionnaires could have a multiple-choice answer format or could use rating scales, of which the most common is the Likert type scale, which allows a numerical value to be given to an opinion (Hussey and Hussey, 1997). A good questionnaire needs a careful designing based on a thorough understanding of the research (Hackley, 2003).

3.8 Validity of the Instrument

Validity is concerned with the extent to which the findings accurately represent what is happening in the situation i.e. whether the findings are really about what they appear to be about (Saunders *et al*., 2003, Hussey and Hussey, 1997). In other words, whether the data give the true reflection of what is studied. Even with a very high reliability of the data, if the questions do not measure what you intended to measure, then the validity is low, so therefore the relevance of the questions to the intended topic of study is important. 'The term validity, as used in research, refers to the appropriateness, meaningfulness, correctness, and useful of any inferences a researcher draws based on data obtained through the use of an instrument' (Fraenkel and Wallen, 2006, p 165).

The multi-method approach as a form of criterion related validity approach was used, which also helped to triangulate the findings of the research.

3.9 Reliability of the Instrument

Reliability, is concerned with the findings of the research and are said to be reliable if they are repeatable in another similar research settings (Hussey and Hussey, 1997, Saunders *et al*., 2003). The following three questions can be used to assess the reliability of the research (Easterby-Smith *et al*., 1991),

- Will the measures yield the same results on other occasions?
- Will the similar observation be reached by other observers?
- Is there a transparency how sense was made from the raw data?

Internal consistency reliability approach was used which assesses the correlation between multiple items in a test that are intended to measure the same construct (data set).

The multi-method approach was used, which also helped to triangulate the findings of the research.

3.10 Methods of Data Analysis

The data analysis is presented in two parts, the first details the descriptive and qualitative analysis of the attributes showing their level of impact whereas the second part detail the inferential statistics.

Both data were represented and analysed in chart and tabular forms.

4.0 DATA PRESENTATION AND ANALYSIS

4.1 Data Presentation

Since the aim of these interviews is to relate the maintenance and driving ethics of the interviewees and relate it to their years of driving and work experience to see its relationship and ascertain if the maintenance and driving ethics when in place can drive down the frequency of accidents and breakdowns. Tables 4.1, 4.2, 4.3 & 4.4 below displays the outcomes of the interviews.

Table 4.1: 1st and 2nd Phase Interview of Mechanics

MECHANICS						
S/N	Driving Experience	Working Experience	Maintenance Ethics	Driving Ethics	Accident Involvement	Breakdown Experience
1	17+	17+	LOW	LOW	YES	30+
2	9	12	MEDIUM	LOW	YES	10+
3	13	7	HIGH	HIGH	NO	2
4	2	4	LOW	HIGH	NO	15+
5	5+	5+	MEDIUM	MEDIUM	YES	9

Table 4.2: 1st and 2nd Phase Interview of Law Enforcement Officers

LAW ENFORCEMENT (FRSC & VIO)						
S/N	Driving Experience	Working Experience	Maintenance Ethics	Driving Ethics	Accident Involvement	Breakdown Experience
1	13	9	HIGH	HIGH	NO	5+
2	15	14	MEDIUM	HIGH	NO	20+
3	9	7	LOW	MEDIUM	NO	30+
4	10	10	MEDIUM	MEDIUM	YES	25
5	5	5	HIGH	MEDIUM	NO	2

Table 4. 3: 1st and 2nd Phase Interview of Road Construction Workers

ROAD CONSTRUCTION WORKERS						
S/N	Driving Experience	Working Experience	Maintenance Ethics	Driving Ethics	Accident Involvement	Breakdown Experience
1	4	7	LOW	LOW	YES	22+
2	6	9	MEDIUM	MEDIUM	YES	18
3	7	6	HIGH	MEDIUM	NO	5
4	5	5	HIGH	LOW	YES	3
5	7	9	MEDIUM	MEDIUM	NO	10

Table 4. 4: 1st and 2nd Phase Interview of Vehicle Operators (Drivers & Mates)

VEHICLE OPERATORS (DRIVERS&MATES)						
S/N	Driving Experience	Working Experience	Maintenance Ethics	Driving Ethics	Accident Involvement	Breakdown Experience
1	25	25	HIGH	HIGH	NO	9
2	4	5	MEDIUM	LOW	YES	5
3	9	9	HIGH	HIGH	NO	3
4	8	8	LOW	LOW	YES	19
5	12	12	HIGH	HIGH	NO	2

4.2 Data Analysis

As earlier seen in Tables 4,1. 4.2, 4.3, and 4.4 above, the interviewees have wide range of experiences both in driving and other jobs as the case may be. The respondents with their experiences and different levels of ethics

explained and gave insights on their breakdowns and accident experiences if any and the frequency of occurrence. Some went ahead to point out the causes of these where known. The interview guides used in all the interviewswere quite similar; however, the way the questions were asked was rephrased as the interviews progressed. All the interviewees gave the permission to voice record the interview session, which assisted in transcribing and post-interview analysis.

As mentioned earlier, this phase was the start of the research and efforts were made to select suitable interviewees who could give their views on breakdowns and accidents based on their experience and ethics. The first, second, third, sixth, seventh and eighth interviews with experienced operators and workers revealed similarity not only in their responses but also to the logic behind them. In order to further establish the trend, further interviews were conducted with more people, and their responses also highlighted similar trend to the previous initial interviews. Since similar trend was being observed and to avoid the concept of saturation, the number of 1st and 2nd phase exploratory interviews was restricted to Twenty (20).

4.3 Test of Hypotheses

H_0: The skills and competence of the mechanics reflect directly on the lifespan between servicing of the vehicle

H_1: The skills and competence of the mechanics doesn't reflect directly on the lifespan between servicing of the vehicle

In addition to this, driving ethics and maintenance ethics were discussed with interviewees not setting aside their insights on the contribution of road condition. Their views and responses were also incorporated.

4.4 Discussion of Findings

The relationship between maintenance ethics and the frequency of breakdowns was clearly observed as the years of driving was used to determine the intensity; as lower number of driving years and higher number of breakdowns indicated that higher maintenance ethics play a key role and drives down number of breakdowns. It also indicates that optimum maintenance culture as seen in chapter 2 of this study is very crucial in the quest to reduce frequency of breakdowns and negligence in that aspect has led to higher breakdown toll.

Considering driving ethics and relationship to accident, it was observed that the higher the rules of driving are abided by, the lesser the chances of being involved in an accident.

The relationship between work experience and training was also observed. Those who worked as road law enforcement agents had lower accident incident records compared to the mechanics who mostly learnt driving after starting off in their roles and often learnt the crude way than from experienced instructors.

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

All these proved that proper training and imbibing of driving ethics can drive down frequency of breakdowns. Good roads and proper road signage where necessary can also play a good role not just to prevent vehicle breakdowns but for accident reductions too.

The economic impact of these breakdowns proved that the preventive measures are more cost effective as some break downs led to accidents that caused wreckage; leaving some of the vehicles in irreparable states.

5.2 Conclusion

The frequent breakdown of vehicles seen in the road transportation system in Nigeria using Delta State as a case study, has direct negative economic impact. These impacts range from having to replace vehicle parts that could have simply been serviced to total overhauling of a vehicle for a simple routine maintenance activity that was not carried out.

The causes of these breakdowns were also directly related to the human ill actions in the transport system.

5.3 Recommendations

Stemming from the insights from this study, trainings are very important, and trainings should include encouraging vehicle operators to abide by proper driving ethics. Proper maintenance culture and practices should be encouraged for all and if possible, rules should be in place to encourage good driving practices.

5.4 Contribution to Knowledge

Proper usage of vehicles does not only involve compliance to driving ethics to avoid accidents; but deploying a quality routine maintenance culture to drive down not just the frequency of accident occurrences but also the frequency of breakdowns. Total quality management involves all and not limited to one in order to optimize the processes.

5.5 Suggestion for Further Studies

The role of government and policies on road works should be delved into to further capture and reinforce the activities of other contributory factors and human players in the road transport system.

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