

COVID-19: AN ASSESSMENT OF NATURAL DISASTER EFFECT ON OPERATIONAL PERFORMANCE OF OIL AND GAS MARKETING FIRMS IN LAGOS STATE, NIGERIA

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Abstract

Competition is no longer at organisation level but at industry level hence any disruption can not only impact organisation but also affect an entire industry. The paper examined the effect of natural disaster (Covid-19) on operational performance of petroleum marketing firms in Lagos State. The purpose of the study was to examine the associations between natural disasters and operational performance of aviation fuel marketing firms. The study proposed natural disaster (coronavirus) as the predictor variable while operational performance as the criterion variable with product availability, quality, delivery, and cost of operation as measures of the criterion variable. The descriptive research design was adopted for the study while, the simple regression analysis was used to test the proposition. The study revealed that COVID-19 had positive and significant effect on operational performance of aviation-fuel marketing firms in Lagos State, Nigeria. The study recommends that Aviation-fuel marketing firms should be proactive by adopting enterprise risk management to mitigate the effect of natural disasters on their operations.

Keywords: Coronavirus, Operational performance, Aviation fuel marketing firms, Lagos

Introduction

Due to globalisation, newer sources of risk are created every day and these risks are affecting performance of businesses universally. For decades now, oil marketing firms in the downstream had been experiencing lower returns than firms operating in the upstream sector (ArthurDLittle, 2016). The decline in the performance of oil and gas marketing firms according to Muazu and Tasmin (2017), Ogundare (2020), Owuso and Poi (2019) and Shobande (2018) was attributed to several factors which include natural disasters. Disasters caused by natural hazard brings about prevalent destruction and disruption to economic activities as well as considerable loss of life. Countries affected and by extension organisations earmark a lot of resources to addressing the impacts of these hazardous events in order to design and implement policies to combat and mitigate their damaging effects. Natural events and disasters (such as floods, bushfires, hurricanes, cyclones, tsunamis, storms, droughts, earthquakes and pandemic) continue to cause severe and increasing damage to global economies (Mohan, Spencer, & Strobl, 2019). The occurrence of natural disasters in developed and developing countries like USA, Australia, Japan, Indonesia, Malaysia, Thailand and others always leave in its wake damages to lives, properties and infrastructure with economic and financial implications (Shen, Fu, Pan, Yu, & Chen, 2020; Worthington & Valadkhani, 2004). According to Shahbaz, Kazi, Bhatti, Abbasi, & Rasi (2019) the highest ever global loss was caused by natural disasters to the tune of 144 billion dollars.

The petroleum industry like any other industries in recent times has been greatly affected by Coronavirus (COVID-19) pandemic outbreak. The operations of several organisations in different parts of the world had been negatively impacted by the pandemic, which originated in Chinese city of Wuhan in December 2019, and later spread to other parts of the world (Adekoya, Adepetun, Salau, Alade, & Orimisan, 2020; Areddy, 2020; Rufai, 2020; Shen et al., 2020). The outbreak of this pandemic caused severe market and economic dislocations across the globe, disrupting global supply chains (Ozili, 2020; Rufai, 2020), as well as enormous operational disruptions for firms in various industries (Eze & Chambe, 2021; Popoola, Bamidele, & Rabiou, 2021). Operations of

Aviation industry in America, Europe, Asia and other parts of the world were disrupted because many airlines had to cancel flights due to decline in numbers of passengers (Areddy, 2020; Eze, 2020). Furthermore, due to the wide spread of this novel virus, travel restrictions were imposed by government of several countries and this had negative impact on the operations of aviation industry all-over the world, which include Nigeria (Onuba, 2020; Okeke, 2020) and by extension affected the operations of aviation fuel marketing firms. The oil marketing firms, especially aviation fuel marketing firms in Nigeria tends to be the greatest hit considering the restrictions placed on flights and numbers of passengers on an aircraft.

As a results of waned performance of oil marketing firms, the academic and management interests is rekindled in identifying the contributory factors for the existing poor performance. Covid-19 pandemic has generated critical challenges for most businesses in Nigeria, thereby propelling most companies' management to focus on crisis management and alternative business response efforts rather than focusing on routine operations (Ngwu, 2021).

This study contributes to the literature by investigating the effect of COVID-19 on firm's operational performance in downstream petroleum sector, specifically selected aviation fuel marketing firms in Lagos State, Nigeria. Most studies on the impact of the pandemic on the economy mostly focused on the macro level. Review of extant studies investigated the connection between COVID-19 and oil price (Gil-Alana & Monge, 2020; Narayan, 2020), COVID-19 and exchange rates (Iyke, 2020), and few ones on micro level; COVID-19 and MSMEs survival (Popoola et al., 2021), COVID-19 and MSMEs survival strategies (Eze & Chambe, 2021). To the best of our knowledge, there are few or no studies that has empirically investigated the effect of Covid-19 on operations of aviation marketing firms in Lagos State, Nigeria. In addressing this research gap, this study sought to investigate the effect of the pandemic on the operational performance of aviation fuel marketing firms in Lagos State, Nigeria. The study found that the outbreak of COVID-19 pandemic and the resultant lockdown positively affect operational performance of aviation-fuel marketing firms. Also, this study contributed to knowledge by showing the benefits of being proactive in mitigating consequences

that may arise due to unforeseen circumstances. Our analysis is novel in that we examine how COVID-19 influences operational performance in oil and gas downstream sector. The rest of the study focuses on a review of related literature, the methods adopted, the data presentation, discussion of results and findings.

Literature Review Coronavirus

Natural disasters have been described as the occurrence of an extreme hazardous event that impacts communities causing damage, casualties and disruption, and leaving the affected communities unable to function normally without outside assistance (Twigg, 2007, as cited in Petrucci, 2012). While, Udbye (2013), opined that natural disasters are random events that are not caused by or attributed to human activities and when such happen, everyone suffers and everyone is an innocent victim of such events. Natural disasters (force majeure), includes events such as earthquakes, tornados, floods, droughts, tsunamis, epidemic/pandemic phenomena, to mention but few (Abidi & Klumpp, 2012, 2013; Ngwu, 2020), and tend to have more serious human and financial impact (Haigh & Amaratunga, 2010; Ngwu, 2020; Ochonma, 2020; Udbye, 2013). In this study we are interested in investigating Coronavirus pandemic, one of the dimensions of natural disaster. Natural disasters have been identified as one of the environmental risk affecting global supply chain (Canbolat, Gupta, Matera, & Chelst, 2008; Manuj & Mentzer, 2008; Silva & Reddy, 2011) and are external to supply chain (Norrman & Jansson, 2004; Rao & Goldsby, 2009; Revilla & Saenz, n.d.). Coronavirus (caused by SARS-CoV-2) has caused major setback for businesses and economies worldwide (Ajisegiri, Odusanya, & Joshi, 2020; Siyan, Adegioriola, & Agunbiade, 2020). The pandemic has negatively impacted and disrupted supply chain activities globally through sudden fall in commodity price, such as crude oil, declining in hotels and tourism patronage, foreign financial flows, fiscal revenue, frozen labour market, social gathering restriction, travel restriction, flight restrictions and cancellation among others (Abioye, Affe, & ItuaMaduenyi, 2020; Okeke, 2020; Rufai, 2020). Developed, underdeveloped as well as emerging economies were all impacted by the pandemic (Shen et al., 2020). Measures taken by most countries to halt

the spread of the virus forced them to close their borders which subsequently reduced economic activities of many businesses and resulted to recession in most countries across the world (Sipahi, 2020). The onset of covid-19 pandemic, in Nigeria, in the 1st half of 2020, and the measures put in place to contain the spread of the virus caused a significant shock to the country's economy (Moses-Ashike, 2021). The downturn in economic activities, which was particularly significant in 2nd quarter of the year was driven by series of external factors such as decline in commodity prices, supply chain disruptions, in addition to movement restrictions and lockdown measures imposed in order to curtail the spread of the virus (Moses-Ashike, 2021), especially, in Abuja, Ogun and Lagos State (Ozili, 2020). It is on record that Covid-19 was responsible for Nigeria's second recession as soon as she exited the recession of 2016-2018, due to decline in oil revenue (Abubakre, 2020; Moses-Ashike, 2021). As posited by scholars, Coronavirus can affect a trading and transportation systems in a major way (Adekoya et al., 2020).

Operational performance

A careful analysis and assessment of the performance of the firm is key to revealing if objectives of an organisation have been met (Owosu & Poi, 2019). An operationally performing organisation is described as an entity that is able to attain lower cost for energy consumption, materials purchasing, waste discharge, waste treatment, and costs associated with environmental accidents in their operations (Ninlawan, Seksan, Tossapol, & Pilada, 2010). Scholars have argued that operational performance could also be described as the ability to achieve organisational goals and objectives (Miguel & Ledur-Brito, 2011; Shin, Collier, & Wilson, 2000). Zhu, Sarkis, Cordeiro, and Lai (2008), opined that operational performance is organisation's capabilities to more efficiently produce and deliver products and services that satisfy their customers. Green, Pamela, Meacham, and Bhadauria (2012), associate operational performance with firms' production capabilities to produce and deliver products to customers.

Operational performance from the perspective of supply chain management, as opined by scholars such as Koufteros, Vonderembse,

and Doll (2002), Norrman and Jansson (2004), perceived as dimensions of improved quality, reduced cycle time, reduced costs, improved service, value delivered to customer, agility and leanness. Furthermore, Miguel and Ledur-Brito (2011), Shin et al. (2000), posited that operational performance can be measured through product quality (product performance, features, reliability, durability, among other), delivery (delivery speed, reliability and production lead time), cost (production costs and lead time), and production flexibility (process and volume flexibilities).

Conversely, Hasan (2013), affirmed that operational performance indicators include; increased savings and cost saving, ability to identify and take advantage of opportunities, enhanced quality in both inputs and the end product, improved competitiveness and increased market share, enhanced employees motivation and productivity and increased sales. Further review of extant literature revealed the difference in measurement of the same construct, by scholars, hence the lack of uniformity on what should be the indicators of operational performance (Afshan, 2013; Miguel & Ledur-Brito, 2011). Extensive review of literature indicates that there is an understanding among scholars that product quality, delivery, cost of production and product flexibility are dimensions of operational performance (Green et al., 2012; Laosirihongthong Adebajo, & Tan, 2013; Muma, Nyaoga, Matwere, & Nyambega, 2014). Therefore, this study will focus on these four key dimensions of operational performance. Covid-19 and firms' operational performance

Covid-19 pandemic has plunged the world into another global recession (Siyan et al., 2020). The pandemic effect on the global economy is broader and more severe than most epidemics, pandemics, and economic crises of recent decades (Eze & Chambe, 2021; Popoola et al., 2021). In a study carried out by Siyan et al. (2020), these scholars revealed that about 90% of the world's citizens were restricted from travelling due to travel ban imposed by some countries across the world and these decisions put the aviation industry world-wide in vulnerable position (International Air Transport Association [IATA], 2020), Nigeria inclusive. Millions of aviation jobs and that of travel and tourism jobs across the world were affected and by extension other service provider

to the aviation industry (Siyan et al., 2020) and this include aviation fuel marketing firms. Nigeria reported its first case of Covid-19 on February 27, 2020, through an Italian man who flew into Nigeria from Milan (Ajisegiri et al., 2020). The lockdown and travel restrictions affected many businesses like banking, education, entertainment, hotel and tourism, logistics, aviation to mention but a few in the country (Abioye et al., 2020; Eze & Chambe, 2021; Mgbechi et al., 2020; Popoola et al., 2021; Siyan et al., 2020). Thus this decision by Federal government virtually eliminated the demand for aviation fuel because no flight was allowed in and out of the country except those on essential duty.

Air transportation is significant and important to the economy of nations and is more reliable and faster to handle international demand volatility (Aizerman, 2004; Schaur, 2006). Simply because air transportation takes hours rather than weeks. Air transport shipping provides real option of smooth demand shocks for organisations. An efficient air transportation system and shipping modes helps in quality improvement of the air transport system and also elevate international and domestic trade, business and economic process of a nation. The aviation fuel marketers supply Jet-fuel to airline companies for their various aircraft (Avenali et al., 2015).

The decline in world oil price, low demand for oil products in the international market due to Covid-19 led to a significant shortfall in oil revenue of several oil dependent countries and also worsened their balance of payment position (Siyan et al., 2020). For instance, countries like Angola, Nigeria and Venezuela were affected (Mgbechi et al., 2020). In Kenya, South Africa and Nigeria there was a reduction in the price of petroleum products in the local oil and gas filling stations (Mgbechi et al., 2020). Similarly, national budget of Nigeria was also affected due to decline in oil revenue (Siyan et al., 2020). The lockdown, partial restrictions and social distancing order, airport closure affected operations and financial base of oil and gas marketing firms in the country (Mgbechi et al., 2020).

There are several studies on the effect of natural disasters on firms' operational performance in supply chain field. Hendricks and Singhal (2003, 2005), Kleindorfer and Saad, (2005), Kuria, Kwasira, and Waruguru (2015), Miguel, Brito, and Pereira (2015), Olawore and

Pearse (2015), Silva and Reddy (2011) have all examined the influence of natural disasters on business performance. The study of Bavarsad, Boshagh, and Kayedian (2014) corroborated the findings of Hendricks and Singhal (2003, 2005), Kleindorfer and Saad, (2005), Norrman and Jansson (2004), that supply chain disruptions has significant impact on firms' operational performance. Accordingly, the study by Haraguchi and Lall (2014) titled "flood risks and impacts" conducted in Thailand, expanded the scholarly curiosity, and pointed out that disruption to supply caused by natural disaster affects companies' operations. This is consistent with the findings of Abe (2014) and Inuo (2012) who separately studied the impact of floods and tsunamis on firms operating in Japan and Thailand and their studies revealed the negative effect of both natural disasters not only on the economy of both countries but on operations of several firms in the countries of study as well as global supply chain.

However, there are divergent view on the effect of natural disasters on firms' operational performance. The work of Wagner and Bode (2008) on supply chain performance along several dimensions of risk which include natural disasters, found no significant relationship between natural disasters and performances of companies investigated in Germany. Their findings was later corroborated by Schmidt and Raman (2012), who argued that natural disasters have very low impact on overall business performance which include firms' operations. These scholars are of the view that the effect of natural disasters is highly over estimated, especially the risk associated with catastrophic events, such as natural disasters. In a related study, Altay and Ramirez (2010) covered deferent industrial sectors, in several countries using longitudinal survey and found that different disasters impact firms differently. They attributed this to the predictability of climatic events (floods and windstorms) and firms' capacity to prepare ahead of time and that earthquakes, SARS (Severe Acute Respiratory Syndrome) Volcanic eruptions do not allow for any preparation time. Based on these mixed findings, this study hypothesises that:

Methodology

The paper employed cross-sectional survey to collect data from staff of three selected oil and gas firms in Lagos State. The population of the study is 528 obtained from the 2018 annual report of three of the Major oil marketers and that includes Conoil Plc., (201); MRS Oil Nigeria Plc., (117), and Forte Oil Plc., (210). Therefore, the target population for the research were staff in supply/operations/purchasing, depot/inventory/storage, finance, logistics/transportation and marketing departments in the selected oil and gas marketing firms in Lagos State, Nigeria.

We collected data from 266 respondents across three aviation marketing firms using Krejcie & Morgan (1970) table to determine the sample size for the study. The study adopted stratified and proportional technique (proportional stratification). We stratified using those who work in supply/operations/purchasing, depot/inventory/storage, logistics/transportation finance and marketing, as our sampling frame and proportional sampling technique to sort out respondent from three selected oil and gas marketing firms. The proportional sample size gives 101, 59 and 106 respectively which is the study target population. These set of employees are qualified to provides information on the implications of Covid-19 as it affects their companies' supply chain and operations.

This study used structured questionnaire to collect information. The decision to use a questionnaire approach to data collection is consistent with the exploratory aspects of the research question, and the complexity of the issues involved (Nyang'au, Rotich, & Ngugi, 2016; Wieland & Wallenbug, 2012; Xiao-Feng, 2013). A 6-point Likert scale was used to measure practitioners' perceptions of Covid-19 and operational performance. The end points were labelled (1, Very high and 6, Very low), which was adapted from previous studies (Afolaranmi, 2018; Akinbiyi, 2020; Arokodare, 2019). To measure the validity of the questionnaire, the instrument was provided to colleagues and a number of experts. They were asked about the content of each question and they confirmed all the questions. To measure the reliability of the questionnaire, 27 respondents in 11 Plc., [pronounced double one]

(organisation outside the sample), using purposive technique, were asked to complete the questionnaire.

The questionnaire has two sections. Section one consists of demographics and section two includes statements about Covid-19 pandemic (natural disaster) and operational performance. Covid-19 pandemic is the independent variable while operational performance is the dependent variable. There are 21 items in the scale. The survey instrument was administered on respondents, with a comprehensive covering note explaining the purpose of the study and the target population for the survey. The items on the questionnaire were generated by reviewing relevant research literature in supply chain risk management. The survey lasted from February 7 to March 10, 2021.

Discussion of Findings

The descriptive analysis of data obtained was summarized using frequency, percentages and mean scores and the inferential analysis was done using the regression statistics. Out of the 266 copies of questionnaires administered to the respondents, 237 copies of questionnaire were completed and returned which implies a response rate of 89.1%

Respondents' Demographic Analysis

Table 1: Respondents' Demographic Information

<i>Variables</i>	<i>Frequency</i>	<i>Percentage</i>	<i>Variables</i>	<i>Frequency</i>	<i>Percentage</i>
Gender:			Age:		
Male	184	77.6%	Below 20 years	12	5.0%
Female	53	22.4%	21-24 years	4	1.7%
Total	237	100.0%	25-28 years	48	20.3%
Marital Status:			29-32 years	49	20.7%
Single	125	52.7%	33-36 years	34	14.3%
Married	108	45.6%	37 years and above	90	38.0%
Separated/Divorced	4	1.7%	Total	237	100.0%
Total	237	100.0%	Work Experience:		
Department:			1-5 years	65	27.4%
Logistics/Distribution/Transportation	43	18.1%	6-10 years	81	34.2%
Supply/Purchasing	46	19.4%	11-15 years	38	16.0%
Storage/Inventory/Depot	25	10.5%	16-20 years	53	22.4%
Finance/Account	33	14.0%	Total	237	100%
Marketing/Sales	90	38.0%			
Total	237	100%			

Source: Field Survey, 2021.

Table 1 showing the distribution of the respondents' information revealed that 77.6% are male and 22.4% are female. This suggests that both gender have been adequately represented. Table 1 above also revealed that 5.1% of the respondents are below 20 years of age, 1.7% of the respondents are within the age range of 21-24 years, 20.3% are within the age range of 25-28 years, 20.7% are within the age range of 29-32 years, 14.3% are within the age range of 33-36 years while the remaining 38.0% are 37 years and above. The table also shows that majority of the respondents are single, taking a percentage of 52.7%, 45.6% are married while 1.7% are separated/divorced. As regard to the years of experience, 27.4% have 1-5 years of experience, 34.2% of the respondents have between 6 to 10 years of experience, 16.0% of the respondents have between 11 to 15 years of experience while the remaining 22.4% have 16 to 20 years of experience. Table 1 above revealed breakdown of the respondents' departments. Majority of the respondent are in the marketing department (38.0%), followed by supply/purchasing department (19.4%), followed by logistics/distribution/transportation department (18.1%), followed by finance/account department (13.9%) and lastly the storage/inventory/depot department (19.4%). It could therefore be said that the survey population with respect to their level are expected to provide an objective assessment of the issues raised in the questionnaire used, thus valid information is expected to be elicited from these set of respondents.

The research construct was summarized using the percentages and mean score. As regards to the tables below, the calibrations are as follows:

1=Very Low (VL), 2=Low (L), 3=Moderately Low (ML), 4=Moderately High (MH), 5= High (H) and 6= Very High (VH). Any mean score below approximately '3' and below implies a **Very Low, Low or Moderately Low** while any mean score approximately '4' and above implies **Moderately High, High and Very High.**

Table 2: Mean response on Rating of operational performance as related to others in the industry

S/N	Items	Mean	Std. Deviation
1.	Product safety	4.9072	1.34031
2.	Product quality	5.1603	1.02904
3.	Product quality-control	4.9662	1.30145
4.	Product performance	4.9283	1.05722
5.	Capability to detect contaminated product	4.8101	1.09012
6.	Capability to achieve cost reductions in operations	4.2616	1.08881
7.	Delivery speed	4.4262	.96541
8.	Delivery dependability	4.8987	1.41057

Source: Field survey, 2021

The findings in Table 2 shows that there is an efficiency in operational performance of the selected oil and gas marketing companies in Lagos State, Nigeria in terms of product safety, product quality, product quality control, product performance, capability to detect contaminated product, capability to achieve cost reductions in operations, delivery speed and dependability.

Table 3:Mean response Rating of Covid-19 as it affects source of

S/N	Rating of Covid-19 as it affects source of supply and demand of aviation fuel	Mean	Std. Deviation
1.	Restriction of movement during lockdown	5.3882	.78191
2.	Difficulty in going to work during lockdown	5.3713	.80075
3.	Office closure during restriction	5.3038	.69540
4.	Flight restriction	5.3207	.62310
5.	Flight cancellation during lockdown	5.3713	.66168
6.	Airport closure	3.0211	2.00729
7.	Demand for aviation fuel	2.4177	1.54268
8.	Work load after lockdown	2.9662	2.01449
9.	Number of staff on duty during movement restriction	3.7089	1.73805
10.	Loss of Income during lockdown	5.2743	1.20587
11.	Vulnerability-fear of being infected by the virus at work	4.7848	1.39919
12.	Impact on your work	3.2658	1.76627

supply and demand of aviation fuel *Source: Field survey, 2021*

The findings showed that Covid-19 really disrupted many activities of the selected oil and gas marketing companies in Lagos State, Nigeria. The pandemic brought about worker's restriction of movement during lockdown and also flight closure/cancellation. The pandemic brought about decrease in demand for aviation fuel and a loss of income.

Conclusions and Recommendations

In this research, the relationship between natural disaster (Covid-19) and operational performance of selected aviation fuel marketing firms in Lagos State is investigated. The results of hypothesis testing showed that there is a significant positive relationship between Covid-19 pandemic and operational performance. This implies that the selected firms were proactive by adopting risk mitigation strategy before the lockdown and movement restriction by Federal government. The adoption of proactive strategy is informed by what has happened in other climes and this provide the firms the opportunity to plan ahead. Proactive mitigation strategy allows the firm to adopt a strategy that would prevent or reduce the risk; in cases where the risk is beyond the control of the firm, transfer strategy is designed to limit the impact of the disruption which has a huge influence on operations and revenue of the firm. These result is similar to works of Altay and Ramirez (2010), Schmidt and Raman (2012), and Wagner and Bode (2008). With the findings and conclusion of this study the researcher recommends that business firms should consistently use business continuity plan (BCP) or enterprise risk management (ERP) by carrying out simulation exercise from time to time, so as to test the efficacy of the strategic tool as suggested by (Ngwu, 2021) Thus we recommend that:

Oil and gas marketing firms analyse and identified risks that affects their operations and ensure that they deploy the most effective strategy that best suit the peculiar situation of risk identified.

This study offers rigorous empirical test of the influence of Covid-19 on operational performance (non-financial performance) criteria, which is rarely attended to. The study contributes to the growing literature on supply chain challenges. As with any research, the results of this study are subject to some limitations that need to be taken into account when interpreting those results. Due to confidentiality issues, the data on

operational performance may be subjective. In addition, the study investigated the relationships in the Nigerian context. Therefore, the results may not be readily transferable to other industries and countries. However, further research is needed to validate and expand the study using financial performance measures.

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