

Assessment of the Impact of Covid-19 Pandemic on the Manufacturing Sector of the Nigerian Economy

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Abstract

This study assessed the impact of covid-19 pandemic on performance of manufacturing sector using the monthly data of Purchasing Managers 'Index (PMI) for the manufacturing sector from January 2018 to December 2020. The Two-way ANOVA with replication was used to test if there is any quarterly and annual differences in the PMI for 2020 which is the period of the Covid-19 pandemic as against the 2018 and 2019 data. The different quarters were used as repeated trials. The result reveals that the monthly PMI which has been fluctuating between 50 and 60 index points from January 2018 till March 2020 where the pandemic crises heightened and the attendant lockdown to contain its effect began, significantly contracted from April 2020. The PMI contracted from April 2020 and still recovering till Dec 2020. A sharp decline in the second quarter (Q2) of 2020 which gradually recovered in third and fourth quarter but still in the contraction zone was observed. The result also revealed a significant contraction in PMI in 2020 as attendant effect of Covid-19 on manufacturing businesses as against the previous years. The study concludes that the covid-19 pandemic has a significant effect on the manufacturing sector of the Nigerian economy.

Keywords: Covid-19, PMI, Manufacturing Sector, Performance, ANOVA

Introduction

Nigeria is going through uncertain times as an oil-dependent economy due to the Corona Virus (COVID-19) pandemic and recent Oil Price Shock still attributable to the covid-19 crises. The vulnerabilities of Nigeria to the impact of these shocks is because of increased external dependencies for foreign exchange inflows, fiscal revenues, capital flows and fiscal deficit funding (KPMG, 2020). The COVID-19 pandemic has caused a major macro and micro-economic shock to countries of the world. The pandemic has a wide-reaching effect on businesses and has already taken the millions of lives globally. According to Hasanat, et al, (2020) the lockdown adopted by numerous nations as a means of aversive procedures of the multiply of the deadly disease have also had harmful multiplier consequence

on business. Without uncertainties, the corona virus deadly disease will have a momentous result on the countries, economies and society at large. The COVID-19 pandemic is a major shock with significant impacts on under-employment for informal workers; and overall unemployment. Livelihoods in rural areas especially the wage earners and self-employed are at risk due to market and supply chains disruptions resulting from lockdowns and movement restrictions. Women, children, youth, migrant workers and indigenous people may experience vulnerability; and the reduction in wage employment opportunities may limit the ability of small-scale businesses to diversify (Food and Agricultural Organisation, 2020).

The emergence of COVID 19 pandemic and attendant impact has adversely affected households, businesses activities, and the economy. It has also affected retail and trade activities, as finished goods could not get to final consumers, and if ever, at a delayed time; thus, affecting the manufacturing sector, especially for non-essential goods. It became difficult for manufacturers and distributors to stock up the inventory and restoring damaged machineries owing to make available sequence interruptions internationally. International trade has furthermore been hampered, as the airports and seaports, that are the core route for intercontinental exchange of goods have also been affected by restrictions due to the covid-19 pandemic (Price Waterhouse Coopers, 2020).

The transmission mechanism of the economic impact of the Covid-19 pandemic is likely to occur through several channels: global trade and prices because of factory shutdowns and delayed resumption of operations; foreign financial flows which could decline remittances; tourism: because of dwindling order and increasing travel limitations; as well through domestic resources which is being underutilized as become idle due to restrictions (World Food Programme, 2020).

Manufacturing sector plays significant function in the development of economies by contributing to the gross domestic product and a major contributor to national and global economies. Due to the Covid-19 crises, some major manufacturers have reported serious distortions in the manufacturing process. Although, while the demand for pharmaceutical and medical products up surged, the production process of non-pharmaceutical and non-essential products were drastically distorted by lockdown and social distancing mechanisms set in place by various governments. These distortions in the production processes of the manufacturing firms may have impacted seriously on Nigeria's economy. This study therefore

assesses the impact of Covid-19 pandemic on the manufacturing sector of the Nigerian economy.

Review of Related Literature

This study adopts the Terror Management Theory (TMT) by Greenberg, Pyszczynski and Solomon (1986). The theory posits that a basic psychological conflict births a self-preservation instinct while still appreciating the fact that death is to some extent unpredictable and inevitable. The terror management theory focuses on awareness of the certainty of human deaths as unique characteristics of living things-human beings. This awareness results in an ever-present threat and terror about the time of death, which is uncomfortable to wellbeing and performance in our everyday lives. This leads to the unconscious development of an “anxiety-buffering system, consisting of our cultural existence, relationships with others and self-esteem, to defend against this terror threat. Cultural views help individuals make sense of and navigate through existence. Self-esteem in this context refers to the drive to live up to the standards of our view. The psychological trauma that comes with the covid-19 pandemic can more than ever, lead to increased death anxiety and fear to physical wellbeing, which when not properly managed, can result to dangerous approaches of controlling pressure. This psychological distress resulting from the Covid-19 pandemic can further be heightened by other significant losses such as job loss, financial, educational and social connections resulting from the lockdown. Pyszczynski, Lockett, Greenbreg and Solomon, (2020) suggested reduction in social media introduction which is said to be associated with worse cerebral wellbeing as a way of reducing death anxiety; and adhering to practices scientific and medical practices to avoid infection. A good and stable mental health helps individuals realise their potentials and be productive, especially in this covid-19 crises.

Several shock of Covid-19 pandemic on commerce have been assessed by various studies in literature. Bartik, Bertrand, Cullen, Glaeser, Luca and Stanton (2020) conducted research on the impact of COVID on small businesses using a survey of 5,800small businesses from March 28 to April 4, 2020. The study assessed take-up rates and business flexibility effects for loans relative to grants-based programs using experimental variation. The study found that heap discharge andbusiness shutting down had previously take place few weeks to the pandemic crises as well that the jeopardy of closure was unhelpfully connected with the anticipated time-span of the pandemic. The study also found that several miniature businesses were fiscally flimsy and that the medium business with above

\$10,000 in monthly operating expense had merely about two weeks of cash on hand at the time of the investigation. The work highlighted numerous predictable predicaments with access the finances to include: technical harass and complexity creating suitability.

Gunawardana (2020) gave an overview of the socio-economic aspects of Sri Lanka which includes among other things a detail account of the MSME sector including the contribution to the economy, geographical distribution, Scalewise composition and employment. --The study also addressed the impact of COVID 19 virus to the MSMEs and discusses the measures to build resilience, recommendations for revival and sustenance of the MSME sector. The study identified the effect this pandemic to include: Working capital issues, Supply chain breakdowns, inadequate access to Markets, and psychosomatic disturbance connected with the virulent disease. The study recommended among other things, the need to implement strategies to revive the economic activities moving towards a concrete programme to retain jobs as the pandemic has delivered the fastest and deepest economic shock in history.

A research was conducted on determined the impact of corona virus (Covid-19) on the online business in Malaysia using survey design and factor analysis (Hasanat, Hoque, Shikha, Anwar, Hamid & Tat, 2020). The results illustrated that as the maximum of the products comes from China and the maximum of the industries are lockdown which means that there is no import and export of the product. The findings of the study revealed an unhelpful impact of covid-19 on the e-business in Malaysia. The negative impact established is impacting the sales as well as the buying behavior of the customers; and that the major challenge faced by the retailers still present in the e-business are the lowering of the buying behavior of the customers. The study recommended more research on the impact of Covid-19 with every possible outcome to improve the trading situation between China and Malaysia.

PWC (2020) captured the issues, implications and challenges of the COVID-19 pandemic on supply chain industry globally, regionally and in Nigeria. The study also provided insights and strategies for mitigating the impact of covid-19 on the supply chain activities. The findings of this study approximation of trade performances in Nigeria may knowledge a loss of at least N900 billion to pandemic. To alleviate the effect on commerce performance from deadly disease, therefore study recommended that players the Nigerian economy have to arrange

new method of inventory administration and allocation and fit into place strategically by means of players and mediators transversely the value chain.

Arndt, Davies, Gabriel, Harris, Makrelov, Modise, Robinson, Simbanegavi, Seventer and Anderson (2020), reported ‘first pass’ estimates of the costs of the lock-down implemented by the South African government from 27 March 2020 and presented four channels by which a lockdown and other efforts are expected to influence economic activity: the forced reduction in production as a result of a national lockdown and other restrictions on non-essential business operation; the effect of interrupted worldwide creation and supply chains on South African exports; the effect of the lockdown on family circle demands for merchandise and, especially, services (e.g., tourism as a consequence of take a trip and movement restrictions); and the effect of uncertainty on business investment. The study used a Social Accounting Matrix (SAM) multiplier structure to draw these indirect impacts of the lockdown. A SAM is a matrix illustrates the flows of goods and services around the economy over a given period. The SAM for this study used 62 production sectors, four different types of labour and employing capital to produce 102 different commodities. The income generated in the production sectors was distributed to 14 different types of household. The study found changes in aggregates which reflect the impacts of covid-19 at the macroeconomic level.

Shimuafeni (2020) conducted a survey on the effect of COVID-19 on a selected business in Namibia. The survey was an experimental study aimed at providing an early indicator of the impact of COVID-19 on businesses during the first stage of the pandemic. The study used a convenient sample of 546 formal businesses across 16 sectors of the Namibian economy. The study revealed that 96.5 percent of respondent firms were adversely affected by corona virus and will continue to be affected in the coming months. The study further revealed that 50 percent of the businesses traded partially while 25.2 percent were temporarily closed. Most of operating businesses indicated reduction in local customer demand as the most common current and future effect experienced by 68.8 percent and 65.1 percent of the businesses, respectively. 63.7 percent of businesses reported loss of revenue over 50 percent with the Construction sector (11.3%), Hotels and Restaurants (15.2%) and Manufacturing sector (20.1%).

World Bank Group (2020a) discussed economic vulnerability to the COVID-19 crisis in the Western Balkans— Bosnia, Albania and Herzegovina, Kosovo,

Montenegro, North Macedonia, and Serbia. The study made use of administrative data which covered only tax registered firms and use surveys conducted by local organizations of the various countries studied. The study also made use of reliable data from the structural business survey in Albania. A forward-looking Analysis was used to consider potential severity of the crisis in the study area. The study found that trade activities in the Western Balkans experienced significant losses of income losses during the period of pandemic. The study found that continuously decreasing market demand was the major challenge reported in all the countries studied and that firm in the region suffers from liquidity constraints. The study recommended that firms should become accustomed their business models to the new normal; and those Policymakers should fiscal and business expansion support to assist companies' transit to novel standard.

Maliszewska, Mattoo and Mensbrughe (2020) simulated the potential impact of COVID-19 on GDP and trade, using a standard global computable general equilibrium model that models the shock as an increase in international trade costs, underutilization of labour and capital, a refocus of demand away from performances that need propinquity amid people and drop of the travel services. The study found the biggest negative shock in the output of domestic services impacted by the Covid-19 pandemic. The biggest negative shock was also found in traded tourist services. The study concluded that it was still too early to make an informed assessment of the full impact of the Covid-19 pandemic, though the study conveyed the possible degree of impending worldwide economic impact particularly, developing nations.

World Bank Group (2020b) provided an assessment of the short-term impact of the COVID-19 pandemic on businesses globally while focusing on developing countries. The study used data composed by the World Bank Group and some partner organizations across 51 nations and over 100,000 businesses. Study revealed that the COVID-19 shock has been severe across firms and with serious negative impact on sales. The study also found that smaller firms are facing superior financial restraints and that firms are depend heavily on digital way out in reaction to the astonishment. An enormous ambiguity on the future was observed particularly in the midst of firms that have significant decreased in sales. The study was justified by providing an improved appreciative of the distribution and magnitude of the astonishment, the transmission channels to business and how firms are fine-tune.

Fairlie (2020) analysed the impacts of the COVID-19 on vigorous of small businesses in the United States using data from the April 2020 Current Population Survey. The study argued that the number of active business owners in the United States dropped by 22 percent over the period of February to April 2020. The study found that African-American businesses were the hardest smack with a 41 percent drop in active businesses; and that immigrant business owners experienced substantial losses of 36 percent while Female-owned businesses were hit by 25 percent. The study concluded that these early-stage losses to small businesses may portend longer-term ramifications for job losses and economic inequality.

WFP (2020) posits that the emergence of Covid-19 pandemic in West Africa countries will bring about crashing demand from China and the world resulting in contraction of main economic segments like extractive industry, agriculture tourism, and that brittle economies are likely to suffer more. The emergence of Covid-19 pandemic has serious repercussion for embryonic economies: weaker growth, stretched credit setting, the change of government resources to strengthen health care schemes to contain the epidemic. The attendant economic crash will worsen extreme poverty.

Several other impacts of Covid-19 pandemic on businesses have been assessed by other studies in literature. World Bank Group (2020b) found that sharp expansion in personal and corporate insolvency follows a calamity era and that firms in developing economies with shallow monetary markets are largely defenceless to trouble of liquidity and bankruptcy risks. OECD (2020) found that the hold back of economic movement resulted from the pandemic have led to rigorous technical hitches for businesses to congregate their monetary commitments; that fixed working costs for such firms: rental fee and cost of fund payments, are yet to be settled in the face of contracted substantially contracting cash flows.

Methodology

This study was conducted to ascertain the effect of Covid-19 pandemic on the manufacturing sector of the Nigerian economy. The data used was the monthly data of Purchasing Managers 'Index (PMI) for the manufacturing sector from January 2018 to December 2020. The Two-way ANOVA with replication was used to test if there is any quarterly and annual difference in the PMI for 2020 which is the period of the Covid-19 pandemic as against the 2018 and 2019 data. The different quarters were used as repeated trials. The Purchasing Managers' Indexes (PMI) is an economic indicator that gives insights on the direction of

business variables in an economy. The composite manufacturing PMI which was used in this research gives the overall direction of the economic activities in the manufacturing sector. A PMI value less than 50 index points connotes contraction in economic activities while the value above 50 index points connotes expansion in economic activities in the review period (CBN, 2020).

Results and Discussion of Findings

The results of this study are presented in this section. The descriptive statistics and the Two-way analysis of variance result are presented in this section.

Figure 1: Plot of monthly Manufacturing PMI

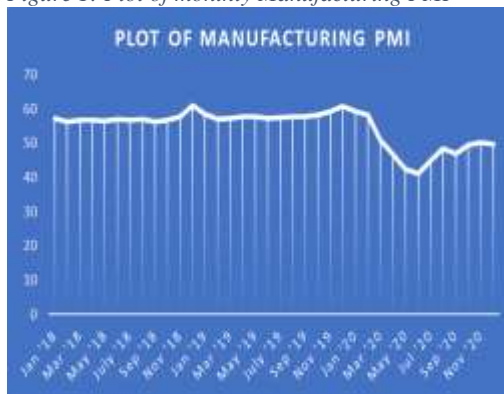


Figure 2: Chart of Average Quarterly

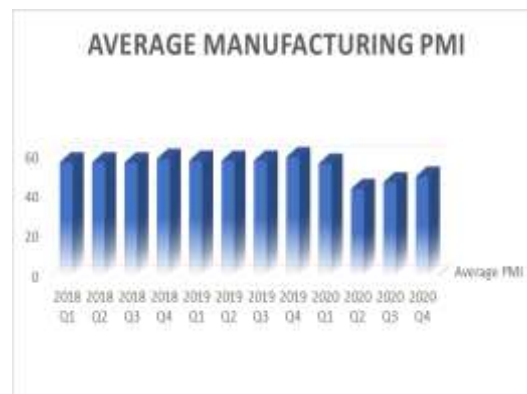


Figure 1 presents the monthly PMI for the manufacturing sector of the Nigerian Economy. The monthly PMI has been fluctuating between 50 and 60 index points from January 2018 till March 2020 where the pandemic crises heightened and the attendant lockdown to contain its effect began. The PMI contracted from April 2020 till and still recovering till Dec 2020. Figure 2 presents the average quarterly PMI for the study period. The chart shows a sharp decline in the second quarter (Q2) of 2020 which gradually increased in third and fourth quarter but still in the contraction zone. These periods that shows sharp contraction in the monthly and quarterly PMI are attendant effects of the Covid-19 pandemic and the lockdown that follows.

Table 1: Two- Way ANOVA With Replication Result

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Quarter	103.33	3	34.44	10.40	0.00	3.01
Year	601.71	2	300.86	90.87	0.00	3.40
Interaction	176.90	6	29.48	8.91	0.00	2.51
ERROR	79.46	24	3.31			
Total	961.40	35				

Source: Excel Analysis Output

The two-way analysis of variance result is presented in table 1. The result revealed a significant difference in PMI of both the quarters and years. This confirms a significant contraction in manufacturing PMI from the second to fourth quarters of 2020. The result also confirms a significant difference (contraction) in the 2020 PMI as against the previous years.

These findings add to literatures on impact of covid-19 on businesses. Although there is no extant study, generally, the impact of the deadly disease on recital of business as well as the manufacturing sector. Other studies found some negative effects on various aspect of business performance. The World Bank Group (2020) found that sharp expansion in personal and corporate insolvency follows a emergency era and that firms in embryonic economies with thin fiscal markets are largely exposed to challenges of liquidity and liquidation risks. OECD (2020) found that the decelerate of economic movement resulted from the effect of deadly disease have led to rigorous complications for businesses to congregate their monetary commitments; that fixed working costs for such firms: rental fee and cost of fund payments, are yet to be settled in the face of contracted substantially contracting cash flows.

Conclusion and Recommendations

This study assessed the effect of covid-19 on performance of manufacturing sector of the Nigerian economy using the monthly PMI data from January 2018 to December 2020. The result reveals that the monthly PMI which has been fluctuating between 50 and 60 index points from January 2018 till March 2020 where the pandemic crises heightened and the attendant lockdown to contain its effect began, significantly contracted from April 2020. The PMI contracted from April 2020 till and still recovering till Dec 2020. A sharp decline in the second

quarter (Q2) of 2020 which gradually increased in third and fourth quarter but still in the contraction zone was observed. The result also revealed a significant contraction in PMI in 2020 as attendant effect of Covid-19 on manufacturing businesses as against the previous years. The study therefore concludes that the covid-19 pandemic has a significant effect on the manufacturing sector of the Nigerian economy.

This study adopts the recommendation of WEF (2020): the adoption of Industry 4.0 technologies which are necessary for survival in a global marketplace and require more flexible and agile production and supply chain systems. With Industry 4.0 technologies such: Manufacturers should stay informed, should secure their cash flow, should communicate with their key stakeholders, and should use available hours to upgrade their workforce. Also, the Internet of Things, 3D printing, advanced robotics, big data and artificial intelligence, manufacturers can see the benefits of a digital mind-set to a business.

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Appendix

Table 1: Summary Statistics for Quarterly PMI

	Year	2018	2019	2020
Q1	Mean±Variance	56.8±0.25	57.7±0.54	56.2±19.71
Q2	Mean±Variance	56.8±0.07	57.6±0.04	43.4±8+8.7
Q3	Mean±Variance	56.7±0.21	57.7±0.02	46.8±3.2
Q4	Mean±Variance	58.6±5.0	59.4±1.7	49.7±0.17

Source: Excel Analysis Output

Table 2: Nigeria's Manufacturing PMI Data

MONTH	PMI	MONTH	PMI	MONTH	PMI
Jan '18	57.3	Jan '19	58.5	Jan '20	59.2
Feb '18	56.3	Feb '19	57.1	Feb '20	58.3
Mar '18	56.7	Mar '19	57.4	Mar '20	51.1
Apr '18	56.9	Apr '19	57.7	April	**46.75
May '18	56.5	May '19	57.8	May '20	42.4
June '18	57	June '19	57.4	Jun '20	41.1
July '18	56.8	July '19	57.6	Jul '20	44.9
Aug '18	57.1	Aug '19	57.9	Aug '20	48.5
Sep '18	56.2	Sep '19	57.7	Sep '20	46.9
Oct '18	56.8	Oct '19	58.2	Oct '20	49.4
Nov '18	57.9	Nov '19	59.3	Nov '20	50.2
Dec '18	61.1	Dec '19	60.8	Dec '20	49.6
*** Missing value, estimated using average of Mar and May 2020					

Source: CBN PMI Report, January 2021