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DIGITALIZATION, SOME FUNDAMENTAL FACTORS AND COMMODITY PRICES IN SOKOTO METROPOLIS, SOKOTO STATE, NIGERIA

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Abstract

This study explores effect of digitalization and some fundamental factors on commodity prices in Sokoto metropolis, Sokoto State, Nigeria using a survey dataset for a sample of three hundred and sixty-nine (369) respondents. In the estimation the study applied descriptive technique such as percentage, standard deviation and mean. From the inferential angle, this study used multiple regression and the results indicated that digitalization and food supply have significant negative influence on commodity prices in Sokoto metropolis while insecurity and disruption of supply chain have significant positive influence on commodity price in the study area. Based on the preceding, this study suggests that the government should intensify its efforts to digitalize the economy. The report also suggests that the government and key stakeholders to increase their investment in agriculture by focusing more on food production. Finally, government and commodity leaders must work together to improve security in the study region.

***Keywords*:** *Digitalization, fundamental factors, commodity price, multiple regression.*

1. Introduction

Over the past decades, digitalization has been transforming the economy globally. It resulted in the major enhancement and transformation of production and distribution in developing, emerging and developed economies all over the world. The impact of digitalization on commodity prices is now obvious in almost all nations including Nigeria. The impact is expected to continue as digitalization penetrates and brings about significant changes in each and every section of the economy. Thus, the global transition towards a "digital economy" with an estimated worth of $11.5 trillion globally, equivalent to 15.5 per cent of global GDP and which has grown two and half times faster than global GDP over the past 15 years, calls for urgent policy measures in Nigeria. This is needed for the purpose of providing the necessary regulatory framework to support the spread of these new digital technologies and ensuring that greater levels of digitalization of Nigeria's economy and the

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society at large, are achieved (Nigerian Communication Commissions, 2021; Charbonneau et al, 2017; Coffinet & Perillaud, 2017).

Similarly, digitalization can affect commodity prices through different channels. For instance, it can influence the prices of goods and services by reducing the costs of production and distribution and by improving efficiency. Prices can also be affected through the creation of new higher quality products or by transforming existing market structures and services. Digitalization may have also changed the formation of commodity prices by improving the flow of information. For these reasons, digitalization can result in a downward shift or the flattening of the Phillips curve -known as the decrease in the prices of commodities (Charbonneau et al, 2017; Coffinet & Perillaud, 2017).

However, the macroeconomic proposition of digitalization is not well understood. The analysis of the economic implication of digitalization has frequently centered on measurement issues such as commodity price, GDP and productivity, its implications for economic activity, market dynamics, particularly for labour and financial markets, and public finance (IMF, 2018; Mühleisen, 2018; He et al., 2017; Gupta et al., 2017; World Bank Report, 2022). In addition, digitalization upset and distorts economic agents and decision-making. Thus, market structures have been altered, new markets have surfaced, and the universal economy has become interrelated in an unprecedented approach. Moreover, the literature on the impact of digitalization on commodity prices, and more broadly on monetary policy is in its infancy stage (World Bank Report, 2022).

Digitalization emerges to be an appropriate force explaining the persistently rise or fall in commodity prices as observed across the globe over the past decades. The difficulties in rationalizing these trends call for considering factors beyond the traditional drivers of commodity price (Gorodnichenko et al., 2018; Cavallo & Rigobon, 2016; Cavallo, 2018).

Despite its relevance in economic growth, the research on the influence of digitalization on commodity pricing in Nigeria is quite scarce. For example, Iwedi, Nkwadochi, and Chituru's (2022) research focused on the impact of digitization of financial services on the Nigerian economy. Shettima and Sharma's (2020) research, on the other hand, focused on the impact of digitalization on Nigerian small and medium-sized businesses. Surprisingly, there is no specific study on the influence of digitalization on commodity pricing in Nigeria in general, and Sokoto State in particular, to the best of this study's knowledge.

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In addition, digitization contributes to the transformation of the world into a global village, whatever happens in other nations will also occur in Nigeria. A shift in commodity prices in Germany may cause price changes in Nigeria in general, and in Sokoto State in particular. To that aim, this study investigates the impact of digitalization and other fundamental factors on commodity pricing in the Sokoto metropolitan area of Sokoto State, Nigeria.

2. Literature review

On the theoretical side, structural characteristics such as market power and price adjustment frequency can reflect the indirect influence of digitalization. In a conventional New Keynesian model, these factors define the slope of the Phillips curve. In this approach, the net effect of these channels is uncertain (Bernini, 2021; Anderton et al., 2020).

In addition, Anderton et al. (2020) noted that digitalization has a direct effect on commodity price and general inflation through the share and prices of ICT products in the household consumption basket and via relative price movements of items purchased online and offline. In addition to the direct contribution of digital products to aggregate prices, digitalization can change the structure of the economy and influence prices through indirect channels, such as firms' pricing behaviors, market power and concentration, and firms' productivity and marginal costs. All other things being equal, these indirect effects of digitalization are important for monetary policy because they can reduce the rate of inflationary pressure or disinflationary forces. The impact of indirect effects on inflation is manifold and ambiguous (Byrne & Corrado, 2020).Furthermore, digitalization has uncertain effects on the degree of market power (e.g., by increasing price transparency and reducing mark-ups, or by increasing entry costs in terms of R&D investment for competitors of "superstar" firms and thereby increasing the degree of the market owner and mark-ups). There is also evidence that digitalization may reduce the costs of changing prices and that online prices are adjusted more frequently than offline prices (Bernini, 2021, Byrne & Corrado, 2020).

Some studies investigated the influence of digitalization on prices at the micro level. These studies mainly focused on the microeconomic formation of prices online and compared its dynamics with off-line prices. For instance, Cavallo and Rigobon (2016) revealed that online prices can exhibit very different patterns relative to official consumer price indexes or

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scanner prices. They also found that online prices have also been used to show that inflation expectations are influenced not only on the basis of information contained in official price statistics but also through other less representative information sources, such as individual goods price changes. Gorodnichenko et al., (2018) show that online prices display less dispersion than prices in offline markets. Goolsbee and Klenow (2018) suggested that on online platforms,' price levels and inflation are lower than those offline.

A study conducted by Yi and Choi (2005) in the United State of America affirmed that there is a negative relationship between digitalization and prices. This means that an increase in digitalization will lead to a decrease in the price of output. According to them, a one per cent increase in the number of internet users reduces inflation by 0.04-0.13 percentage points.

3. Data And Methodology

This study employed a survey research design in identifying and analyzing the influence of digitalization and some fundamental factors on commodity prices in Sokoto metropolis Sokoto State, Nigeria. The survey used primary sources of data in the analysis. In addition, the primary data was collected using a structured questionnaire. Furthermore, the population of this study comprises the entire people living in the Sokoto metropolis. Sokoto metropolis consists of Sokoto North and Sokoto South Local Government areas. According to National Population Commission (NPC), the population of the target LGAs is 581,300. Based on the population of this study, the sample size is 384.Thus, the sample size was computed with a margin error of 5% (0.05) and a confidence level of 95% using a Raosoft sample size calculator available at www.raosoft.com. Moreover, this study used simple random sampling technique in selecting the respondents.

This study employed a Likert scale in the form of Strongly disagree, Disagree, Agree, and Strongly agree in the survey questionnaire. The decision rule states that an average of 2.5 or above is regarded agreed, while an average of 2.49 or lower is considered disagreed. The mean scores for four-point questions were determined using a criterion of 2.5, according to Nahuche et al., (2022). As a result, the mean criteria of 2.5 was computed by dividing the total of 4+3+2+1 by 4.

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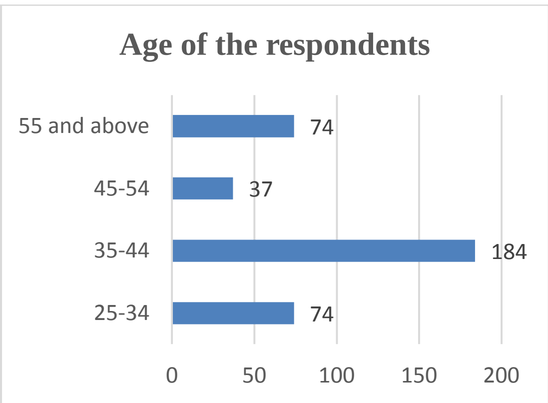
However, this study analyzed the data collected using both descriptive and inferential techniques of data analysis. The descriptive analysis summarizes and describe the dataset in percentages, charts and mean. However, the inferential analysis used to explain the effect of digitalization and some fundamental factors on commodity prices in the Sokoto metropolis. In conducting the analysis, multiple regression was used and it mathematically given as:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 Z_i + \mu_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where y is the dependent variable (commodity prices); β_o is the intercept; β_1 is the coefficient of digitalization measured as e-commerce, while β_2 are the coefficients of some fundamental factors (supply chain disruption, insecurity and food supply); and finally, μ is the error term explaining other factors that are not captured by the model.

4. Results

In this part, empirical findings for the examination of how digitalization and other factors influence commodity price in the Sokoto metropolitan are presented. The respondents in the research region received a total of 384 questionnaires, which were distributed to them. Fifteen (15) questionnaires went missing, leaving just 369collected from the respondents. This accounts for 3.91% of all surveys. This also shows that the respondents' response rate was around 96.09 percent, which is highly sufficient for drawing broad conclusions about the study. Beginning with biodata of the respondents, the results are summarized and reported Figures 1, 2, 3 and 4.



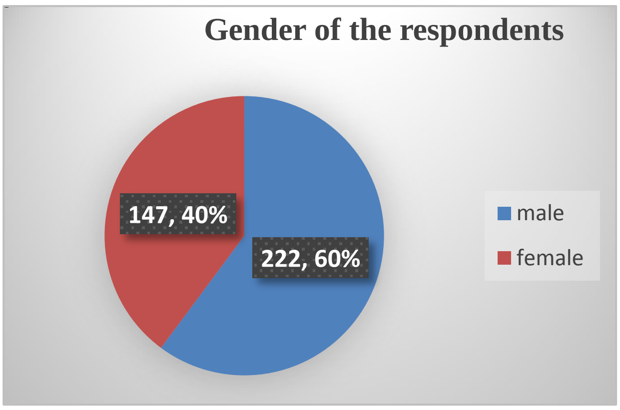


Figure 1: Age of the respondents **Figure 2: Gender of the respondents**

Figure 1 shows that 74 (20%) of the respondents are between 25-34 years, 184 (49.9%) of the respondents are between 35-44 years of age, 37 (10.0%) of the respondents are between the

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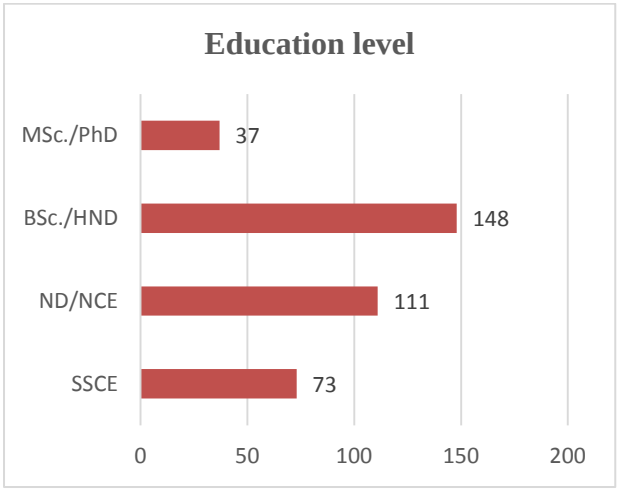
age of 45-54 and 74 (20.1%) of the respondents are between 55 and above years of age. This means that the majority of the respondents are between 35-44 years of age. Furthermore, Figure 2 revealed that out of the sample survey of 369 (100%) of the respondents, 60% (222) percent of the respondents are male and 40% (147) percent of the respondent are female. This implies that majority of the respondents in this survey are male.



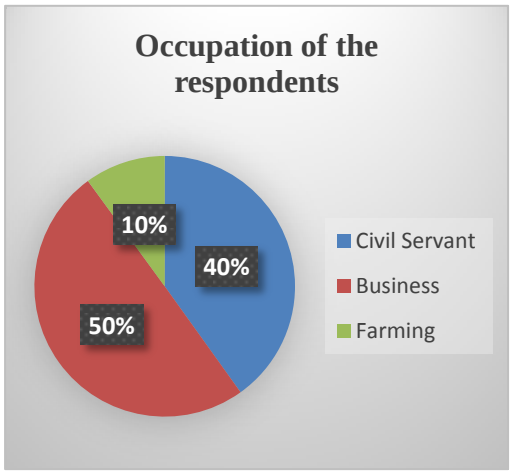


Figure 3: Education level of the respondents **Figure 4: Occupation of the respondents**

Figure 3 provide information on the level of education of the respondents. Results shows that 73(19.8%) of the respondents had senior secondary school certificates, 111(30.0%) of the respondents are either the holders of National Diploma (ND) or Nigeria Certificate of Education (NCE), 148 (40.1%) of the respondents had Degree or HND education while 37 (10.0%) of the respondents had Master's degree or PhD. Thus, the results show that majority of the respondents are the holder of BSc. or HND. Furthermore, Figure 4 shows that out of the 100% (369) sample survey of the occupation of the respondents, 40% (148) of the respondents are civil servants, 50% (184) of the respondents are into business while 10% (37) of the respondents are into farming activities. Thus, the highest percentage of the respondents are businessmen with 50% out of the sample survey of 100%.However, the mean results of the survey are presented in Table1 and 2.

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Table 1: Digitalization and Commodity Prices

S/N	Statements	Mean	Std. Dev.	Decision
1.	ICT related items	2.8970	0.94421	Agree
2.	Operating cost	2.6965	1.00543	Agree
3.	E-commerce	3.2981	0.45805	Agree
4.	Market structure	3.2981	0.78229	Agree
5.	Credit agencies	3.0000	0.77670	Agree
Cumulative Mean		**3.7974**		
Decision Mean		**2.5000**		

Source: *Authors' computation from SPSS Version 22.*

Table 1 shows that digitalization negatively affect the commodity price in Sokoto metropolis, this is because the cumulative mean 3.79 is greater than the decision mean 2.5. the results however, indicated that reduction in the price of ICT related goods, decrease in the operating costs, emergence of e-commerce, changes in the structure of market and emergence of new credit agencies lead to the reduction of commodity prices in the study area.

Table 2: Internal Drivers of Commodity Prices

S/N	Statements	Mean	Std. Dev.	Decision
1.	Food supply	3.1003	0.83290	Agree
2.	Insecurity	3.1978	1.16861	Agree
3.	Cost of production	3.3008	0.45923	Agree
4.	Fuel price hike	3.1003	1.13885	Agree
5.	Excess money supply	2.3984	0.80156	Disagree
Cumulative Mean		**3.7744**		
Decision Mean		**2.5000**		

Source: *Authors' computation from SPSS Version 22.*

From Table 2, the results indicated that the respondent agree that shortages of food supply, insecurity, high cost of production, fuel price hike are the internal forces that lead to the recent increase in the commodity prices. On the other hand, they disagree on the excess money supply by the Central Bank of Nigeria as the internal drivers of the commodity prices.

Table 3: External Drivers of Commodity Prices

S/N	Statements	Mean	Std. Dev.	Decision
1.	Supply chain disruption	3.1003	.53995	Agree
2.	Russia-Ukraine crisis	3.1978	.74920	Agree
3.	Exchange rate depreciation	3.2981	.45805	Agree
4.	Boarder closure	2.8997	.30077	Agree
Cumulative Mean		**3.1239**		
Decision Mean		**2.5000**		

Source: *Authors' computation from SPSS Version 22.*

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Furthermore, Table 3 shows the results of the external drivers of commodity prices in the metropolitan city of Sokoto State, Nigeria. It is attested from the results that disruption of supply chain due to covid-19 pandemic, Russia and Ukraine crisis, exchange rate depreciation and boarder closure are the main external drivers of commodity prices.

Table 4: Effect of Digitalization, Some Fundamental Factors and Commodity Prices

Dependent variable: Commodity prices

Variables	B	Std. Error	t	Sig.
Constant	2.671	0.288	9.263	0.000
E-commerce	-0.566	0.087	-6.537	0.000
Supply chai disruption	0.245	0.112	2.195	0.029
Insecurity	0.458	0.098	4.660	0.000
Food supply	-0.493	0.093	-5.307	0.000

Source: *Authors' computation from SPSS Version 22.*

Table 4, summarized the results on the effect of digitalization and some fundamental factors on commodity prices in Sokoto metropolis. From the outcome, it is recorded that digitalization measured as e-commerce has significant negative effect on commodity price in Sokoto metropolis at 1% level. An increase in digitalization will lead to decrease the rate of commodity price. This implies that 1% increase in digitalization will lead to about 0.56% decrease in commodity prices. Furthermore, disruption of supply chain due to covid-19 pandemic has significant positive effect on commodity prices at 5% level. A 1% increase in supply chain disruption will lead to about 0.25% increase in commodity prices in Sokoto metropolis. This also implies that covid-19 adds more value to the recent increase in commodity prices.

However, the results show that there is positive and statistically significant relationship between insecurity and commodity prices in Sokoto metropolis at 1%. This implies that increase in the incident of insecurity will lead to increase the rate of commodity prices. This is true because insecurity disrupted the production of food in some local governments such as Goronyo, Isa and Sbon-birni among others in Sokoto state. Finally, the study reveals that there is negative and statistically significant relationship between food supply and commodity price in the study area. A 1% rise in the supply of food will lead to 0.495% decline in commodity prices. This expected because the higher the supply of food into the market the lower will be the price of the commodity.

ISSN: 2795-3831
E-ISSN: 2795-3823

5. CONCLUSION AND RECOMMENDATION

Based on the findings this study concludes that digitalization and food supply have significant negative influence on commodity prices in Sokoto metropolis while insecurity and disruption of supply chain have significant positive influence on commodity price in the study area. The policy implications are that, digitalization and increase in food supply will lead to decrease the rate of commodity prices in the study area. On the other hand, increase in insecurity and disruption of supply chain will increase the rate of commodity prices in the study area. Based on the foregoing, this study recommends the need for government to intensify its effort in digitalizing the economy. the study also recommends the needs for government and relevant shareholders to increase their investment in agriculture by given more emphasis on food production. Finally, there is need for government and commodity leaders to participate in improving the security in the study area.

ISSN: 2795-3831
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