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BACKWARD INTEGRATION POLICY AND MANUFACTURING FIRMS VALUE ADDED IN NIGERIA

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Abstract

Research Purpose: The paper investigates the impact of the backward integration policy on manufacturing firms' value added in Nigeria. It complements the existing literature and extends the frontier of knowledge by evaluating the impact of backward integration policy (local raw materials as proxy) on manufacturing firms' value added in Nigeria.

Design/Methodology/Approach: Firm-level data were sourced from the annual reports and statement of accounts of 49 sampled manufacturing firms, Central Bank of Nigeria statistical bulletin, National Bureau of Statistics annual abstract and Nigeria Customs Service tariff books for the period (2002-2020). The Fisher-type Augmented Dickey-Fuller (ADF) unit root test procedure was employed to examine the stationarity properties of each of the variables used in the study. The test was necessary to verify the time series property of the panel data employed. Thereafter, the Pooled Ordinary Least Squares (OLS) method was employed for the regression.

Findings: The findings show that backward integration policy through the use of local raw materials in production significantly led to an increase in manufacturing firms' value added in Nigeria. An increase in the use of local raw materials in production leads to an increase in value added by all sampled firms across manufacturing industries in Nigeria. The findings also reveal that fixed assets, employment, energy cost and exchange rate have a significant positive influence on the value added of all sampled manufacturing firms, while the tax has a significant negative coefficient, implying that as tax paid by firms increases, the value added of manufacturing firms declines in Nigeria.

Originality/Value/Practical implications: Most previous studies focused on a single industry, but this study investigates the impact of backward integration policy on manufacturing firms' value added in Nigeria. The study covers a wide range of firms and industries more than previous studies. It uses firm-level and panel data of manufacturing firms in Nigeria, which makes the study unique. It is the first study that hypothesises that backward integration can be used to improve the value added of manufacturing firms and consequently reduce import dependency, promote Nigeria's product competitiveness and create more employment in Nigeria.

Keywords: Backward integration; Manufacturing; Value-added; Nigeria.

JEL Codes: L25; L60; O14

Introduction

Improving manufacturing industry performance is critical for rapid industrialisation and economic growth in any economy (Chete et al., 2014). Successive Nigerian governments have implemented several policies to promote productivity and enhance the sector's contribution to Gross Domestic Products (GDP) in the country. Such policies include the import substitution industrialisation strategy implemented during the First National Development Plan (1962-1968), the indigenisation decree of 1972 and 1977, the Structural Adjustment Programme (SAP) of 2006, and the export promotion strategy, to name but a few. Also, sector-specific intervention policies were equally implemented and targeted specific sub-sectors such as the textile, sugar, shoe and leather industries.

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Despite the implementation of these policies, manufacturing industries continue to depend on imported raw materials for production with its negative consequences on the nation's foreign exchange, resulting in high cost of production and making Nigeria's products uncompetitive in the international market. It is not surprising, therefore, that Nigeria's manufacturing industries' operations are characterised by low value addition along the manufacturing supply chain, which constrains the sector from contributing substantially to the Gross Domestic Product (GDP) in Nigeria (Soludo, 2003; National Bureau of Statistics (NBS), 2014). The sector accounts for 4 per cent of Nigeria's GDP in 2011, which increased to 10 per cent annually between 2012 and 2014 (Chete et al., 2014). The sector's contribution to GDP declined marginally to 9.2 per cent in 2016 (NBS, 2014; NBS, 2017). The relative share of the sector to GDP remains low when compared with countries of similar socio-economic development, while many industries are inefficient, uncompetitive and have low capacity utilisation (McCulloch et al., 2017; Oshodi, 2019).

Therefore, the backward integration policy (BIP) was introduced in 2002 by the Nigerian government to encourage the use of local raw materials at every stage in the manufacturing supply chains in order to increase value-addition, reduce Nigeria's dependence on imported raw materials, conserve foreign exchange, and make Nigerian firms more competitive, create jobs and diversify the economy (Nigeria Industrial Revolution Plan (NIRP), 2014). The expectation of the Nigerian government is that industries would look inward by substituting local raw materials for imported raw materials in order to improve their competitiveness in the international market, create more jobs and consequently deepen economic growth (Eze, 2018).

Various efforts by the government and the Central Bank of Nigeria (CBN) through incentives or waivers to manufacturing industries to promote BIP in Nigeria have produced mixed results. Some firms have fully embraced the policy, while others are at different stages of implementing the policy, and some have not even started implementing the policy. The need to assess the impact of BIP in Nigeria after several years of its implementation is the justification for this study. The paper will provide the answers to these questions: Does the use of local raw materials boost manufacturing firms' value added in Nigeria? What policies should be put in place to strengthen BIP in Nigeria? Therefore, the paper investigates the impact of the backward integration policy on manufacturing firms' value added in Nigeria.

This paper contributes to existing literature both theoretically and empirically in a number of ways. To begin with, it is the first to investigate the impact of the backward integration policy on manufacturing firms' value added in Nigeria. Second, unlike previous studies, which focused on individual industries within the economy, this study covers a wide range of firms and industries. Third, on the theoretical front, it is the first study to identify that backward integration through the use of local raw materials can be used to boost value added in manufacturing firms in Nigeria.

The rest of the paper is organised as follows: Section 2 reviews relevant literature; Section 3 presents the methodology of the study; Section 4 reports the empirical results, while section 5 concludes the study.

Literature review

Vertical integration involves a company taking control of different production stages along the supply chains. When a company takes control of its suppliers, it is called backward integration, and when it takes control of its distributors, it is referred to as forward integration (Kenton, 2019). It is presumed that a company increases the control of the supply chain in vertical integration when it increases its market share by taking over its competitors in the related markets at the same level of the supply chain in horizontal integration. However, diversification occurs when a company grows by adding new products to its existing portfolio (Abedrabbo Ode, 2020).

Kenton (2019) looks at backward integration strategy as an offshoot of vertical integration strategy in which an organisation undertakes tasks previously embarked upon by businesses in the supply chain through merging with or acquiring businesses or doing it on their own. He asserts that the company

engages in backward integration in order to improve efficiency and save costs. For, Nagambu (2020), backward integration enables a company to have control over the supply chain and have direct access to the required raw materials, which enables them to achieve efficiency and competitiveness over other companies in the industry.

Vertical integration theory has its root in transaction costs economics traceable to the Coase (1937) seminar work titled "The nature of the firms". Coase (1937) argues that a firm would not exist if there were no explicit transaction costs. He emphasised that all activities embarked upon by firms can be explained if transaction costs exist. According to him, with a limited and uncertain environment, economic agents would always seek the most cost-effective means of achieving their goals. What then determines the size of a firm depends on consideration of the marketing costs (the costs of using the price mechanism) and the costs of organising within the firm? The principle of marginalism comes into play in decision making. At the margin, these "costs must be equal to each other or equal to the costs involved in leaving the transaction" to be "organised" by the price mechanism. The firm would undertake the task or embark on production if the cost of embarking on production through the market price mechanism is higher than that of embarking on the production within the firm. But if the cost of undertaking the task or production within the firm is higher, it pays the firm to allow the goods to be produced or task to be undertaken through the price mechanism.

Transaction costs economists believe that high profits connote efficiency rather than market power and that firms may become so large and profitable not because of lower production and distribution costs but because of organisational economies, which help to reduce management costs (Ferguson & Ferguson, 1994). Furthermore, Ferguson and Ferguson (1994) opined that transaction costs economics focuses on an individual firm and its uniqueness. Moreover, that although a firm may produce what other firms produce and compete with them, what is different is that the firm is likely to be organised differently or use different technologies.

Coase's transaction costs economics was developed and extended by Williamson (1975), who identified factors that favour undertaking activities within a firm instead of relying on the market forces. He opined that a firm might either use its own advertising experts or contract its advertising to an agency. Transaction costs are the costs that arise when using the market (arranging, monitoring and policy contract) as distinct from management costs. On the other hand, Maddigan (1981) opined that vertical integration is the use of management control to organise the use of inputs and outputs instead of the use of market forces. It is desirable and enables the management of a firm to increase profitability and reduce risks (Maddigan, 1981). It also allows a firm to reduce cost, increase efficiency, and reduce and restrict competition (Koch, 1980).

On the measurement of vertical integration, Maddigan (1981) identified two strategies of measuring vertical integration by previous authors. These include the following: firstly, the ratio of value added over sales, which has the advantage of easy calculation but is flawed because the ratio is influenced by other factors besides that of vertical integration. The second measure reflects the vertical integration of a firm as a percentage of total products, which is a part of a firm vertical chain (vertical ratio). The problem with the vertical ratio is that it requires the breakdown of the total value of production by product line, which is not available. Nonetheless, the take-home from Maddigan's (1981) work is that vertical integration can be used to measure the impact of structure on firms' performance.

Empirically, some studies have examined the impact of backward integration policy and vertical integration policy on different industries in different countries. Few studies on Nigeria include; Ohimain (2014); Orji et al. (2014); Olanrewaju (2016); Oloda (2017); McCulloch et al. (2017), while some studies on other countries include: Kiyota et al. (2008); Benmehaia, and Brabez (2016); Gunathilake and De Mel (2016); McCulloch et al., (2017); Del Prete and Rungi (2019); and Nasambu (2020);. All these studies glossed over the effects of backward integration on manufacturing firms/industries in Nigeria, which is the focus of this paper.

The study on Nigeria by Ohimain (2014) shows that the implementation of the backward integration policy in the Nigerian cement industry led to an increase in cement production from 2MMTPA before the introduction of the policy to 28MMTPA after ten years of implementation of the policy. By 2014,

the country became self-sufficient in cement production and is now an exporter of cement, as eight clinkers vessels were exported to Senegal by June 2020 (Dangote Cement, 2020). Also, the BUA group started exporting cement to the Republic of Niger in 2019. This was achieved by using local raw materials such as limestone, gypsum and other materials for making cement. Similarly, the study by Orji et al. (2014) concurred with Ohimain's (2014) study that implementing the backward integration policy led to increased output of cement in Nigeria. Thus, BIP was largely successful in the Nigerian cement industry.

Oloda's (2017) study shows that there exists a positive and significant relationship between vertical integration and organisational survival in selected manufacturing firms in Port Harcourt (River States, Nigeria). While, Olanrewaju's (2016) finding shows that backward integration has both positive and negative effects on rural areas in Nigeria, with the benefits exceeding its negative impacts. Amongst the benefits identified are an increase in employment of local people, improvement in road networks and the provision of social amenities such as water, schools, electricity and hospitals for rural development in Nigeria.

Benmehaia and Brabez (2016) investigated the effects of vertical integration on the food manufacturing sector in Algeria and found that food industry structure, transaction costs and market conditions independently and significantly influenced the level of vertical integration in Algeria's food manufacturing sector. On the other hand, Nasambu (2020) showed that the policy has a positive influence on the organisational efficiency of cement manufacturing firms and helps cement firms' managers to strategise in order to face stiff competition as well as improve their efficiency. He submits that cement manufacturing firms were to integrate with limestone and clinker mining firms to take full advantage of the policy in Kenya.

The determinants of vertical integration in the Egyptian clothing industry were studied by El-Haddad (2008). His study identified high-end market segments, more volatile output market conditions and political power as determinants that make firms increase integration, while volatile and uncertain market inputs, sales variability and financial constraints limit the integration of firms. Another study on the textile industry was carried out by Gunathilake and De Mel (2016). It reveals that Sri Lanka's textile and apparel industry embraced the backward vertical integration through fabric manufacturing and engaged in a joint venture with foreign apparel manufacturers. For Sri Lanka's garment industry to retain its market share due to immense global competition, the industry had to improve the quality of garments and reduce costs through the use of local inputs. This resulted in a decline in imports of raw materials, minimised lead time, and achieved the industry benchmark of 60 days in specific production categories (Gunathilake & De Mel, 2016).

McCulloch et al. (2017) reported Bangladesh and Indonesia's experiences. According to the authors, Bangladesh's experience provides an example of a country with successful local content policies, which led to the rapid expansion of its garment industry after independence. They attributed the success to government incentives, the transfer of technology through partnership with foreign investors as well as the development of local technology through collaboration between local technology institutions and domestic machinery manufacturers. On the other hand, McCulloch et al. (2017) opine that the local content policy was not successful in Indonesia since the policy did not lead to a reduction in imported inputs as a result of the inability of the government to enforce the local content laws.

Afuah (2001) emphasised the importance of technology in backward integration. He opined that firms that are vertically integrated into new technology would perform better, while firms that had been vertically integrated into old technology would perform worse. While Del Prete and Rungi's (2019) study on backward and forward integration along global value chains observed that integration is not unidirectional but bi-directional as companies can either integrate backwards or forward. Their finding shows that decision to integrate falls within activities that have a relatively low elasticity of substitution and are often targeted at production stages that are technologically close along the supply chain, possibly to maximise coordination efforts. Kiyota et al. (2008) examine the determinants of backward vertical linkages of Japanese foreign affiliates in manufacturing for the period 1994 -2000 with a focus on local backward linkages in the host country, showing that foreign affiliates in Japanese multinationals in some

East and Southeast Asian countries embarked on local backward linkages and gained experience in local operations.

It is not in all cases that vertical integration is desirable, as pointed out by Desyllas (2008), who investigated the performance consequences of firms in the United Kingdom. According to the author, firms may experience a short-lived decline in performance in post-integration due to restructuring costs. However, vertical disintegration offers the potential for achieving improved operating performance in the long run. The positive effects of disintegration, in the long run, were attributable to firms focusing limited resources on core operations and avoiding production and administration inefficiencies associated with vertical integration.

Thus, backward integration policy is not without some challenges, as pointed out by Anuda & Faminu (2019), Olarenwaju (2016), and Desyllas (2008). In Nigeria, firms faced litigations from host communities for acquiring plots of land meant for the BIP even when compensations were made or promised. A case in point is that it took eight years before the BUA group could use the land it purchased and acquired at Lafiagi, Kwara state, for nursery, plantation and production of sugar. Other problems identified include the cost of acquiring hectares of land, which involves substantial financial outlay, which some firms cannot afford; the incessant clashes between herders and farmers, which makes the acquisition of large hectares of land difficult, insecurity problems and high cost of electricity (Olarenwaju, 2016; Anuda & Faminu, 2019).

Based on the empirical literature and vertical integration theories, the study postulates that firms should embark on vertical integration (backward integration) in order to reduce costs, enhance profitability and increase efficiency. Hence, this study hypothesised that *backward integration through the use of local raw materials has a significant impact on manufacturing firms' value added (performance) in Nigeria.*

Research methodology

In line with Maddigan's (1981) work, which suggested the use of vertical integration to measure the impact of structure on firms' performance, this study aligned with that work by investigating the impact of backward integration (vertical integration) on manufacturing firm's value added in Nigeria using local raw materials as a proxy for backward integration policy and value added as a proxy for measuring manufacturing performance.

To test this hypothesis and empirically investigate the impact of backward integration policy on the value added of all sampled manufacturing firms in Nigeria, the econometrics model specified is given as:

$$lnVAD_{it} = \alpha_0 + \alpha_1 lnFA_{it} + \alpha_2 lnEMP_{it} + \alpha_3 TAR_{it} + \alpha_4 lnCE_{it} + \alpha_5 lnCF_{it} + \alpha_6 REER_{it} + \alpha_7 INF_{it} + \alpha_8 lnIRM_{it} + \alpha_9 lnLRM_{it} + \alpha_{10} lnTAX_{it} + \mu_{it}. \quad (1)$$

where VAD_{it} is value added. It is the dependent variable and is measured by the wealth created or consumed by a firm for the number of years, which proxied firm's performance;

LRM_{it} is the key independent variable, which is measured by the cost of local raw materials in monetary terms;

FA_{it} is fixed assets measured by costs of plant and machinery used by a firm in production;

EMP_{it} is labour/workers employed in each manufacturing firm for the number of years;

TAR_{it} is tariff imposed on imported raw materials;

CE_{it} is cost of energy proxied by cost of electricity/diesel/factory power used by each firm for the number of years,

CF_{it} is cost of finance of each firm for the number of years;

$REER_{it}$ is real effective exchange rate;

INF_{it} is inflation measured by the composite consumer price index per year;

IRM_{it} is measured by the cost of imported raw materials in monetary terms;

TAX_{it} is taxation of each firm for the number of years;

μ_{it} is the stochastic error term.

The data on value added, fixed assets (plant and machinery), the number of workers employed, cost of energy, cost of finance, cost of local raw materials, cost of imported raw materials, and taxation were sourced from the annual reports and statement of accounts of quoted manufacturing firms on the Nigerian Stock Exchange (NSE). The tariff data were obtained from Nigeria Customs and Excise Tariff books (1995, 2005, 2009, 2016, 2017); while inflation rate data were sourced from the Central Bank of Nigeria Statistical Bulletin and National Bureau of Statistics Annual Abstract (2006, 2011, 2012, 2014, 2017, 2019) and the real effective exchange rate data were obtained from CBN Statistical Bulletin (2010, 2011, 2012, 2013, 2014, 2015, 2016, 2020). Annual firm-level data for 49 sampled manufacturing firms were used for the period between 2002 and 2020. The choice of sampled manufacturing firms was based on the availability of data on variables of concern.

The study adopts a panel regression analysis in investigating the impact of the backward integration policy on manufacturing firms' value added in Nigeria. Specifically, the Pooled Ordinary Least Squares (OLS) estimation technique was employed. In general, panel data analysis has the following advantages: The ability to model common and individual behaviour of groups. Superiority to time series analysis in identifying and measuring statistical impacts. The ability to minimise estimation biases. The ability to handle more information, variability and efficiency. As a result of these advantages, the pooled OLS is widely used in firm-related studies (see Cardellichio, 1990; Fukao et al., 2006; Salawu, 2009; Okumu et al., 2019).

This Pooled OLS model is a model with constant coefficients relating to both intercepts and slopes. Researchers can use this approach to pool all of the data and perform an ordinary least squares regression model on it. As such, the Pooled Ordinary Least Squares (OLS) is based on the assumption that individual units in the panel data are identical and are treated thus (Asteriou & Hall, 2016). This helps the researcher to provide a uniform policy recommendation in line with the findings generated from the study. Prior to applying the Pooled OLS method, the Fisher-type augmented Dickey-Fuller (ADF) unit root test procedure was employed to examine the stationarity properties of each of the variables employed in the study.

Research results

The empirical results are presented and discussed in this section. The results include descriptive statistics presented in Table 1, correlation analysis presented in Table 2, Fisher-type ADF unit root test results presented in Table 3 and Pooled Ordinary Least Squares Regression results for all sampled manufacturing firms are reported in Table 4.

Table 1. Descriptive Statistics (Source: Author's Computation)

Variable	Mean	Std. Dev.	Min	Max
Value Added	10,500,000	25,000,000	-5,493,505	311,000,000
Fixed Asset	18,400,000	49,700,000	4,849	523,000,000
Employment	890.8	1,553.43	10	14,409
Tariff	17.74	16.04	0.00	100.0
Energy Cost	837,020	2,646,686	-81,678	43,100,000

Finance Cost	1,578,401	6,481,878	-707,800	86,400,000
Real Effective Exchange Rate	96.26	26.1	58.25	155.75
Inflation	12.43	3.31	5.40	18.9
Imported Raw Materials	11,500,000	29,300,000	0.00	306,000,000
Local Raw Materials	12,600,000	36,900,000	-28,927	635,000,000
Taxation	-790,810.6	3,000,219	-25,400,000	19,200,000

Table 1 presents the descriptive statistics, which shows the mean, standard deviation, minimum and maximum values of the variables used for the study. This shows that value added of the sample firms averaged 10.5 million nairas, with a spread of 25 million nairas, minimum of -5.5 million nairas and a maximum of 311 million nairas. The fixed assets of these firms averaged 18.4 million nairas, with a spread of 49.7 million nairas, minimum of 4.8 thousand nairas and a maximum of 523 million nairas. Employment in these firms averaged 891 individuals, with a spread of 1,553 individuals, minimum of 10 individuals and a maximum of 14,409 individuals. Tariff of these firms averaged 17.74 per cent, with a spread of 16.04 per cent, a minimum of 0.0 per cent and a maximum of 100 per cent. Energy costs averaged about 837 thousand nairas, with a spread of about 2.6 million nairas and a minimum of about -81.7 thousand nairas and a maximum of 43.1 million nairas. The finance cost of these firms averaged about 1.6 million nairas, with a spread of about 6.5 million nairas, minimum of -707.8 thousand nairas and a maximum of 86.4 million nairas. The real effective exchange rate averaged 96.26 nairas, with a spread of 26.1 nairas, minimum of 58.25 nairas and a maximum of 155.75 nairas. Inflation averaged 12.43 per cent, with a spread of 3.31 per cent, a minimum of 5.4 per cent and a maximum of 18.9 per cent. Imported raw materials of these firms averaged 11.5 million nairas, with a spread of 29.3 million nairas, minimum of zero and maximum of 306 million nairas. Local raw materials of these firms averaged 12.6 million nairas, with a spread of 36.9 million nairas, minimum of about -28.9 thousand nairas and a maximum of 635 million nairas. Taxation averaged about -790.8 thousand nairas, with a spread of about 3 million nairas, minimum of about -25.4 million nairas and a maximum of 19.2 million nairas.

Table 2. Correlation Analysis (Source: Author's Computation)

Variable	**VA**	**FA**	**EMP**	**TAR**	**EC**	**FC**	**REER**	**INF**	**IRM**	**LRM**	**TAX**
VA	1										
FA	0.41*	1									
EMP	0.41*	0.56*	1								
TAR	0.11*	0.05	0.34*	1							
EC	0.37*	0.56*	0.51*	0.24*	1						
FC	0.18*	0.36*	0.27*	0.11*	0.42*	1					
REER	0.01	-0.16*	0.03	0.06	-0.04	-0.02	1				
INF	-0.03	-0.04	0.01	0.17*	-0.04	-0.00	-0.18*	1			
IRM	0.32*	0.56*	0.49*	0.14*	0.46*	0.28*	-0.07*	-0.05	1		
LRM	0.39*	0.52*	0.50*	0.18*	0.49*	0.27*	-0.07*	-0.00	0.41*	1	
TAX	-0.11*	-0.12*	-0.06	0.08*	-0.07*	-0.00	-0.02	-0.01	-0.09*	-0.04	1

Note: VA, FA, EMP, TAR, EC, FC, REER, INF, IRM, LRM, TAX denotes value added, fixed asset, employment, tariff, energy costs, finance cost, real effective exchange rate, inflation, imported raw materials, local raw materials and taxation respectively.

The results of correlation analysis show how these variables relate to each other. The results show that value added is significantly and positively related to fixed assets, employment, tariff, energy cost, finance cost, imported raw materials and local raw materials, but significantly and negatively related to tax. The fixed asset is significantly and positively related to employment, energy cost, finance cost, imported raw materials and local raw materials, but significantly and negatively related to real effective exchange rate and tax. Employment is significantly and positively related to a tariff, energy cost, finance cost, imported raw materials and local raw materials. Tariff is significantly and positively related to energy cost, finance cost, inflation, imported raw materials, local raw materials and tax. Energy cost is significantly and positively related to finance cost, imported raw materials and local raw materials, but significantly and negatively related to tax. Finance cost is significantly and positively related to imported raw materials and local raw materials; the real effective exchange rate is significantly and negatively related to inflation, imported raw material and local raw materials; imported raw materials is significantly and positively related to local raw material, but is significantly and negatively related to tax. In general, none of these correlation coefficients is as high as 0.8, and according to the suggested rule of thumb (see, Asteriou & Hall, 2016), this suggests that including these variables together in a regression model will not cause severe multicollinearity problem.

Due to the relatively long time series for each panel member, the unit root test was conducted to examine the stationarity properties of these variables. The Fisher-type augmented Dickey-Fuller procedure was employed here due to the unbalanced nature of the data. The results in Table 3 revealed that all the variables are stationary, judging from each of their high unit root statistics and low p-values. This also suggests that all variables are integrated of zero-order, and the regression results from such variables would not be spurious.

Table 3. Fisher-type ADF Unit Root Test Results (Source: Author's Computation).

Variable	Statistic	p-value	Order of Integration
VA	3.182	0.000	I(0)
FA	2.542	0.005	I(0)
EMP	3.681	0.000	I(0)
TAR	42.38	0.000	I(0)
EC	3.005	0.001	I(0)
FC	5.448	0.000	I(0)
REER	12.58	0.000	I(0)
INF	16.67	0.000	I(0)
IRM	10.92	0.000	I(0)
LRM	4.718	0.000	I(0)
TAX	10.13	0.000	I(0)

Note: Modified inverse chi-squared (Pm) statistics are reported. VA, FA, EMP, TAR, EC, FC, REER, INF, IRM, LRM, and TAX denotes value added, fixed asset, employment, tariff, energy costs, finance cost, real effective exchange rate, inflation, imported raw materials, local raw materials and taxation respectively.

The results of Table 4 are those presented to examine the impact of local and imported raw materials on the value added of all sampled manufacturing firms in Nigeria.

Table 4. Pooled Ordinary Least Squares Regression Results for All Manufacturing Firms (Source: Created by Author)

Variable	Coeff.	Robust Std. Err.	T	p-value
LogFA	0.364***	0.115	3.15	0.002
LogEMP	0.711***	0.165	4.30	0.000
TAR	-0.001	0.008	-0.20	0.843
logEC	0.216**	0.083	2.59	0.010
logFC	-0.022	0.028	-0.80	0.425
REER	0.011**	0.005	2.10	0.036
INF	-0.015	0.046	-0.33	0.741
LogIRM	0.080	0.077	1.04	0.300
LogLRM	0.258***	0.092	2.80	0.005
logTAX	-0.039***	0.015	-2.64	0.009
Constant	-4.424***	1.684	-2.63	0.009
R-squared	0.257			
F-statistic	23.13***			0.000

*Note: *** indicates significance at 1%; ** indicates significance at 5%; and * indicates significance at 10%.* VA, FA, EMP, TAR, EC, FC, REER, INF, IRM, LRM, and TAX denotes value added, fixed asset, employment, tariff, energy costs, finance cost, real effective exchange rate, inflation, imported raw materials, local raw materials and taxation respectively.

The pooled ordinary least squares were employed with robust estimates of the standard error to correct for likely heteroskedasticity and autocorrelation. The results revealed that local raw materials were significant in raising the value added of manufacturing firms, while the imported raw materials are not significant in affecting the value added of manufacturing firms in Nigeria. This can be seen from the significant positive coefficient of local raw materials, which was 0.258 (with a p-value of 0.005) and the insignificant coefficient of imported raw materials, which was 0.080 (with a p-value of 0.300). Thus, this finding supports the tested hypotheses that backward integration through the use of local raw materials has a significant impact on manufacturing firms' value added (performance) in Nigeria. An increase in the use of local raw materials by all sampled firms led to an increase in the value added of manufacturing firms across all industries in Nigeria. This could be attributed to the fact that some Nigerian firms in the food and beverages, paints and breweries have fully embraced the BIP, which enables them to have easy access to raw materials resulting in a reduction in the cost of production and enhancing their efficiency. This suggests that Nigerian firms are more competitive and would be able to export their products and subsequently employ more workers. The current findings concurred with the findings of Orji et al. (2014) and Ohimain (2014) on Nigeria, which opined that the implementation of the backward integration policy led to increased output of cement in Nigeria. It also conforms with the finding of Nasambu (2020), which reported that the policy led to improved organisational efficiency of cement manufacturing firms in Kenya.

Other variables such as fixed assets, employment, energy cost and exchange rate have a significant positive influence on the value added of all manufacturing firms. Fixed assets and employment conform to a priori expectations, while energy cost and real effective exchange rate do not. The tax has a significant negative coefficient of -0.039 (with a p-value of 0.009), implying that as tax paid by firms increases, the value added of manufacturing firms declines in Nigeria. Tariffs, inflation and finance cost do not affect the value added of these firms. The model is well fitted with a significant F-statistic value

of 23.13 (p-value of 0.000) and R-squared of 0.257, suggesting that about 25.7 per cent of variations in firms' value added is explained by the model.

The finding that employment has a positive and significant impact on the value added of manufacturing firms in Nigeria signifies that BIP would not only create more direct employment in the manufacturing firms and industries but also boost indirect employment down the supply value chain. This would help to reduce the high unemployment rate, youth restiveness and all forms of crimes and criminality resulting from job insecurity in the country. The current findings on employment are in agreement with the previous study by Olarenwaju (2016), which opined that BIP in rural areas in Nigeria led to an increase in employment of the rural people.

The implications of these findings show that the use of local raw materials helps to reduce costs of production and enhance manufacturing performance, thereby having the potential to deepen the economy. It would also make the country self-sufficient in the production of other products besides cement. In the long run, if most Nigerian firms embraced the policy, it would make Nigerian products more competitive and Nigerian firms produce for exports. It is, therefore, imperative that the backward integration policy should be vigorously pursued and embraced by firms that have not yet implemented the policy, with the government helping them to remove all bottlenecks to its implementation while reducing company income taxes so that Nigeria can derive maximum benefits from the policy. Moreover, firms should adopt the use of local technology in the processing of local raw materials as it was done in Bangladesh (McCulloch et al., 2017).

Conclusions

This paper has investigated the impact of the backward integration policy on manufacturing firms' value added in Nigeria for the period 2002 and 2020. Firm-level data for 49 manufacturing firms quoted on the NSE were used, while pooled OLS estimation technique was employed. In doing this, the study used local raw materials as a proxy for backward integration policy, while value added was used as a measure of the manufacturing firm's performance. The findings validated the hypothesis that the backward integration policy, which involves using local raw materials in production, led to a significant increase in manufacturing firms' value added in Nigeria. Thus, the more a firm uses local raw materials in production, the more value addition is created along the production supply chain, the less reliance on imported raw materials for production, and the more self-sufficient the country becomes. Thus, Nigeria needs to leverage the abundant local raw materials available in the country and use local technology for optimum production in order to increase value added at every stage along the manufacturing value chains and produce for exports.

What are the policy suggestions to strengthen BIP in Nigeria from the foregoing? First, the government should encourage more firms and industries to engage in backward integration, particularly in areas where Nigeria has a comparative advantage in production, such as rubber, brewery, hides and skin, pulp and paper industries. Second, make it easier for firms to acquire land without encumbrance. Third, reduce company income tax paid by firms in Nigeria since the tax was found to have negatively impacted manufacturing value added in Nigeria. Fourth, firms, private investors, research institutions and universities should embark on research on using local raw materials and adapting local technology to make use of local inputs. Fifth, the need to remove other bottlenecks to manufacturing performance and improve the ease of doing business in Nigeria becomes imperative. If all the above policies are implemented, more Nigerian firms will embrace BIP. Firms would add more value to their products, the foreign exchange would be conserved, manufacturing firms' products would become more competitive in the international market, more jobs would be created, and the Nigerian economy would become more diversified. The major limitation to this study is the non-use of 2021 data due to the delay in publishing the annual reports of many sampled firms (from where the 2021 data would have been extracted). Most of the firms published their annual reports from March to May 2022 for the 2021 financial year, which ended 31st December, 2021. Nevertheless, the outcome of the findings of this paper is not adversely affected. Future research could use such data and specifically look at the effects of the policy on exporting firms in Nigeria.

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