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Effect of Working Capital Management on the Performance of Quoted Manufacturing Companies in Nigeria

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Abstract
The expectation placed on the role of manufacturing firms in the economy has turned out to be a mirage, especially in recent times. Many of the manufacturing companies have folded up while the few surviving ones are performing far below installed capacity due to the operational challenges in Nigeria. Thus, this study examined the effect of working capital management on the performance of quoted manufacturing companies in Nigeria. The specific objectives of this study were the inventory turnover period and account receivable period. The study employed the causal research design with the population of 69 quoted manufacturing companies in Nigeria. A sample size of 26 quoted manufacturing firms was selected using a judgmental sampling technique for companies that have required data for 2011-2021 period of study. Panel data regression analysis which comprises the time series and cross-section data was used. The findings revealed that the inventory turnover period has a positive and insignificant effect on the performance of quoted manufacturing companies in Nigeria, while the account receivable period has a negative and insignificant effect on the performance of quoted manufacturing companies in Nigeria. The study concluded that the owners/managers of these companies did not properly manage their working capital components effectively as improvement in this area will enhance the increase in performance. This study therefore recommends among others that manufacturing firms formulate and implement effective inventory management systems that maximize inventory turnover period and be mindful of the time lag between credit sales and collection of receivables in order to improve their financial performance.

Keywords: Account Receivable Period, Inventory Turnover Period, Performance, Working Capital Management
JEL Classification Codes: G31, J63, L25, J5, N6

1. Introduction

Working Capital Management (WCM) is one of the passionately debated issues in short-term financial management and is equally a vital and interesting financial decision for any business as it affects a firm's return and liquidity (Bagh, Nazir, Khan, & Razzaq **(**2016). Companies are seeking the

highest level of WC in order to maximize their value. Van-Horne and Wachowicz (2004) opined that, Performance in an organization can be enhanced to meet the short-term commitments as at when due by having liquidity sufficiency and taking some WCM vital practical decisions that will improve firms' liquidity. Manufacturing companies in Nigeria have witnessed numerous obstacles that slows the degree of recouping decent returns on their investment ranging from persistent rivalry amongst the investors, corruption, poor governance and absence of policy executions. The active use of the firm's resources is essential to its long-term viability, as such effective planning and capital management are necessary to stay in business in Nigeria's brutally competitive manufacturing sector Dina and Silvije (2018) stated that, working capital is the most crucial ingredient that must be properly managed on a comprehensive scale because of its effect on organizational survival. The key components of sustaining organizational performance are effective working capital management, through effective management, due diligence and careful planning.

According to Jinadu (2010), many businesses have failed in Nigeria particularly Manufacturing. Sector (MS), where the use of Working Capital Management (WCM) is more pronounced. However, due to inadequate or improper application of WCM components in the sector, some investments that have a high anticipation of favourable returns were either collapsing and going out of business as result of inadequate liquidity, or many others have to temporarily or permanently closed down as their financial responsibilities could not be met as at when due. Okaro (2004) also, highlighted the causes of MS's poor performance to includes; high production costs, outdated technology, low-capacity utilization rates, inadequate investment, corruption, unfriendly government policies, inflationary climate, and lack of adequate infrastructures.

Onodje (2014) in his own argument roughly categorized causes of MS's subpar performance in Nigeria into internal and external factors. Internal factors include microeconomic tools are needed for the analysis and management of inner factors like fiscal controls, staff management, marketing and innovation, while external factors include; infrastructure, macroeconomic stability, loan and advances. Internal issues, in contrast to external influences, are within the control of corporate management insofar as their activities are carried out within the manufacturing companies. Because of this, internal issues must also be taken into account in any attempt to comprehend the elements driving MS performance in Nigeria.

According to Kaur (2010) WCM is a management tactic that focused on maintaining operational levels of current assets and current liabilities to guaranteed firms sufficient liquidity to meet its immediate obligations as at

when due. The major objectives of working capital management are to increase the profitability of a company and sustaining adequate liquidity to meet short-term commitments as they fall due (Ajayi, Abogun & Odediran, 2017). Manufacturing sector all over the world is a well-known catalyst for a country's economic development, as such its poor performance clearly portends thoughtful economic risks. Based on the above, the researcher evaluated the effects of WCM components on the performance of Nigeria quoted manufacturing companies with the specific dimensions as effects of inventory turnover period and accounts receivable period on the performance of listed Nigeria manufacturing companies.

The hypothesis of this study is to:

Ho_1: Inventory Turnover Period has no significant effect on the performance of quoted manufacturing companies in Nigeria.

Ho_2: Account Receivable Period has no significant effect on the performance of quoted manufacturing companies in Nigeria.

2. Literature Review

2.1 Concept of Working Capital Management

WCM is a tool used by organization to successfully manage current assets and current liabilities in order to continue to adequately meet up short-term commitments. Effective organization of current assets and current liabilities is a key factor of working capital, that enable businesses maintain sufficient liquidity to accomplish short-term commitments. Managing the association between company's current assets and short-term commitments is known as short-term financing decision-making. According to Abdul-Kadir *et al.* (2017) WCM goal is to ensure that firm remains viable and have necessary resources to settle short-term commitments and future operative expenses. According to Egbide (2009), managing working capital involves dealing with current assets and current liabilities that includes up to date financial obligations and assets components. In order to achieve the ideal mix, rash decisions made out of necessity should be minimized because working capital should never be overinvested or underinvested. Taulia (n.d) defined working capital management as the process of managing company's current assets and current liabilities in order to maintain adequate liquidity to meet its short-term fiscal commitments and profitability enhancement.

2.1.2 Concept of Inventory Turnover Period (ITP)

The times it took an organization to transform raw materials into finished goods is referred to as the inventory turnover period. This depicts how effectively inventories are been managed and its contribution to success of a firm. Agunsola and Gbadebo (2022) simply refer Inventory turnover period as

the time lag for a company to convert its raw material into finished goods. To ensure survival and profitability, any business dealing in physical goods or services, required efficiency in inventory management. Mugo (2016) stated that keeping adequate quantities of inventory minimizes losses due to product scarcity as well as potential manufacturing process delays. However, excessive stock investment means that funds cannot be used for investments that could yield higher returns. A large portion of a company's current assets is its inventory in form of raw materials, works-in-progress, and finished goods that make up the inventory. When there is an equilibrium point between maintaining inventories as low as reasonable and having inventory for sales, working capital can be improved. But if there are fewer stocks, a company loses profits because it cannot satisfy customer demand. But in order to prevent both an opportunity cost and obsolescence, the company must be cautious about storing too much inventory.

Douglas, Wambugu, and Maina (2018) defined inventory turnover period as the number of days a company's process for converting initial supplies into completed products. Inventory management aims to keep stock levels that satisfy a firm's sales volumes while minimizing the expenses of financing and keeping items. Sales and costs are traded off when inventory management is used (Deloof, 2003). For many businesses, inventory makes up a sizable portion of all resources, and efficient organization of these resources is necessary for regular production and selling activities, in order to minimizing storage expenses. Although having more inventory on hand could increase sales and at the same time more expensive, as such the best amount of product to have on hand as inventory must be properly determined by the company since large portion of current assets, particularly in the case of industrial companies are inventories. Companies spent huge money on stocks to meet consumer demands and maintain a productive manufacturing cycle but they should be mindful of cost associated with holding huge inventories such as carrying and opportunity cost in order to increase its profitability (Umar, 2019).

2.1.3 Concept of Accounts Receivable Period

Accounts receivable can be viewed as short-term loans from the supplying company to its clients. Giving customers these financing terms is a crucial step in gaining purchases (Benard, 2006). Funds become unavailable as a result of the accounts receivables' continued growth, which can be viewed as opportunity costs. According to Ross, Westerfield, and Jordan (2008), the account receivable period means the time between the sale of finished goods and the collection of the receivables. Sometimes, it is referred to as the receivable turnover ratio and is a crucial metric for determining how

effectively a business manages its finances. Van-Horne and Wachowicz (2008) put it that account receivable turnover is determined by dividing Annual net credit sales/receivables.

Also, Manyo and Ugwu (2013), stated that accounts receivables are obligations owed to a company by its esteemed clients who have been given the trust to buy from and use its services after considering their moral character and integrity. The writers hold that before giving the buyer the goods, the company must take the essential actions otherwise credit sales would be an expensive endeavor. In the same vein, Olufemi and Olubanjo (2009), refer to accounts receivable as clients who have received goods or services from the business but have not yet paid for them. The goal of time management is to reduce the time lag between the conclusion of sales and when the payment is received. The scholars went on to say that 360 times Accountable Receivable - Sales is how the number of days Account Receivable is computed. This variable shows the typical time frame that the business needs to wait before collecting money from clients.

According to Ahmed and Joseph (2016), account receivables period is when an organization sells goods or services to its customers on credit and to be paid at a later date. This is done to encourage customers to be loyal to their products, and for such customer to be allowed or enjoyed this credit term, company owners should perform credit analysis to ascertain who is paying early and who is not. Early payment of invoice will increase the company's working capital and efficiency but, however care should be taken not to place excessive emphasis on getting payment from customers up front as this may lead to friction and damaging the relationships between the two parties that may lead to detrimental effect on the company's long-term business relationship, as the customer may choose to do business with their rivals.

Furthermore, Okpe and Duru (2015) opined that customers who have not paid for the goods and services delivered to them immediately are considered debtors. The credit policy and collection process of a company have a significant effect on accounts receivable management. This is because company with a large number of debtors to collect may run short of liquidity, thereby making it difficult to accomplished immediate fiscal responsibilities. It is on this note that keeping sales completed and payment received as quickly as possible is the key goal of debtor's management. Accounts receivable management is significantly influenced by a company's credit policy and collection practices. A credit policy lays out the conditions for determining the customer's value and method of collection and also outlines how to collect unpaid bills in order to shorten the receivable time lag (Okpe & Duru, 2015).

According to Kilonzo, Memba, and Njeru (2016). The primary goal of accounts receivable is to achieve the ideal balance between the elements of

liquidity management. The practice of forecasting and controlling cash inflows and outflows of a business is known as cash flow administration. Accounts receivable period as a part of cash flow maybe rightly affected by company's profitability and cash flow management is referring to the control of the flow of money into and out of an organization (Joshi, 2007). Effective businesses keep their cash flow at a level that optimizes value. Large stocks and a lenient lending policy could result in high sales, reduction in the danger of stock-out and also sales boosting (Lazaridis, 2006). Delaying payment of accounts payable to suppliers enable businesses to access goods at a cheap and flexible source of financing. On the other hand, it can be expensive if the business is offering discount for early payment, and uncollected accounts receivable can cause crisis in the business's ability to obtain cash.

2.1.4 Concept of Performance

There is no known standard definition of performance, many authors have emphasized repeatedly, and they have contended that it is a multifaceted term. Performance can be defined as a measurement that shares the same relationship with the terms effectiveness and efficiency, which serve as indicators of the extent to which a goal has been attained and the resources used to get there.

Samsonowa (2012) defined performance as the extent to which an organization or department achieved its goals. Performance can be expressed in terms of profit made from investment activities in terms of yearly turnover, returns on investment, return on assets and return on equity. Both profit performance measurements and investment performance measures can be used in these metrics. The difference between company's sales and expenses is the profit (performance) which is the most affordable source of capital for manufacturing companies. Profit is a necessary condition for any business existence, expansion and competitiveness. In addition to enhancing a company's stability, profit is crucial in luring owners and shareholders to contribute money to the business. As a result, one of the goals of management in manufacturing organizations is to achieve profit, which is a fundamental prerequisite for running any business. However, due to the dynamic and fiercely competitive environment, managers cannot fulfill their goals without finding ways to attract outside finance.

In summary, performance is measured by Return on Assets (ROA) simply put as the measure of efficiency in completing a task or job by established criteria and expectations. Performance simply is about effectiveness and efficiency. Effectiveness is an indicator of the degree of goal attainment while efficiency is an indicator of how resources were judiciously utilized to achieve organizational goals.

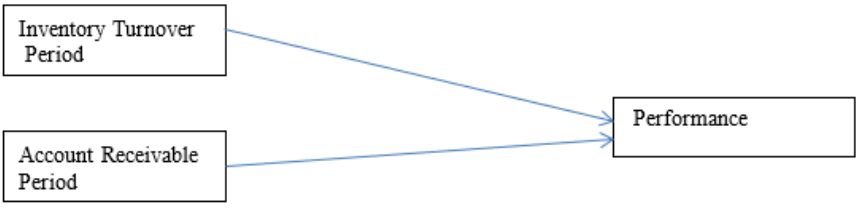

Figure 1: Conceptual Framework
Source: Author's Design

2.2 Theoretical Review

2.2.1 Cash Conversion Cycle Theory

The cash conversion cycle represents the interaction between the components of working capital and the flow of cash within a company and can be used to determine the amount of cash needed for any business level. Gitman (1974) propounded the Cash Conversion cycle theory as a component of operational cycle that arrived at by adding the inventory turnover period to accounts receivable period and then deducting the accounts payable period from it. Its emphasis is on the length of time between the procurement of raw materials and other inputs, and the inflows of cash from the sale of finished goods that represented the number of days of operation for which financing is needed. The cash conversion cycle theory is a dynamic measure of ongoing liquidity management and provides a practical tool for firms to assess and improve their working capital management, which is critical for short-term monetary stability.

The time of operation required by finance is determined by the time interval between the purchase of raw materials and other inputs and the cash inflows from the sale of finished items (Jose, Lancaster, & Stephen, 1996). It provides a practical tool for firms to assess and improve their working capital management, which is critical for short-term financial stability. Cash conversion cycle is used as a comprehensive measure of working capital as it shows the time lag between expenditure for the purchase of raw materials and the collection of sales of finished goods (Padachi, 2006).

2.2.2 Operating Cycle Theory

Richards and Laughlin profoundly and developed the operating cycle theory in (1980). The theory is concerned with the principles of careful management of working capital in business and is founded on the intention that passive ratios are insufficient and vague in the evaluation of an organizational liquidity position. Operating Cycle Theory is a financial management concept that has been developed and refined by financial experts.

It has its roots from the field of working capital and company's operating efficiency is used for the assessment. The theory considers the various stages of a company's production, sales process and is primarily about evaluating the efficiency of company's operational processes and its ability to generate cash from its day-to-day activities. An operating cycle that is short indicates that a company can quickly turn its investments in raw materials into cash, which is generally seen as a positive sign of efficient operations.

The theory provides a practical framework for assessing firm's working capital efficiency and also helps to identify areas where a company can improve on its operational efficiency, such as reducing the time lag to produce, sell goods and how the companies can tailor their operating cycle scrutiny to their specific industry. Operating cycle theory denotes the time a firm takes in getting inventory, converting into finished good, disposing goods and receiving cash from clients in exchange (Hill, 2013). Bhattacharya (2014) put it that the length of company's operating cycle is dependent on the terms of payment extended to clients and those extended by suppliers to the company.

An operating cycle that is short basically shows that firm's cash is held for a short period of time, which according to Ross *et al.* (2008) is considered ideal from a cash flow perspective. Accounts receivable period from advocates of this theory argued that an inventory turnover period that placed users to essential facet of financial flows are indicators of operating cycle concept, but for the fact that analysis does not consider all relevant financial flows the analysis is incomplete The payables turnover period needs to be added in the analysis to give it detailed insights into the study of working capital management and liquidity (Nobanee, 2009). The theory was helpful in the assessment of cash management, inventory management and accounts receivables management and their individual and collective effects on performance of an organization.

2.3 Empirical Review

2.3.1 Inventory Turnover Period

Sunusi, Boudiab, and Muhammad (2020) examined the relationship between inventory turnover period and profitability of conglomerate enterprises in Nigerian. Panel data used for this study were retrieved from the published annual accounts of listed firms for the period, 2007 to 2016.The sample size consists of six aggregates Nigerian companies that trade on the Stock Exchange. The study used Feasible Generalized Least Squares (FGLS) regression as an analytical tool. The results show that inventory turnover adversely influenced the financial performance of conglomerate companies in Nigeria. The study recommended that, if the demand for the goods is not high,

the inventory should be reduced in order to avoid obsolescence, and also the owners should put in place a robust inventory management system. This study failed to disclose the source of data used for the study and it also failed to apply panel regression.

Sonko and Akinlabi (2020) investigated the effect of inventory management on the financial performance of beverage and food industries in Lagos State, Nigeria. The selected methodology was longitudinal polling. This study's population of interest included 2,027 highest-ranking and subordinate managers from selected Nigeria eating and drinking firms in Lagos State. Stratified random sampling method was used for the study. Inferential and Descriptive statistics were used for the analysis. The findings revealed that inventory control had an enormous effect on the financial performance of food and beverages industries in Lagos State. The recommended that companies should implement proper inventory management techniques so as to prevent puts off and waste while increasing profits in general. This study did not specify the technique of interpreting the data.

Abdillah (2020) carried out a study to determine inventory turnover period's impact on the financial performance of listed car makers on the Indonesia stock exchange between 2015 and 2017. Profitability was determined by the Return on Assets (ROA). The data used were extracted from the financial statements of each sample company, which were obtained from the Indonesia Capital Market Database (ICMD). The research techniques were carried out by statistical analysis using SPSS 19.0 software, and regression analysis methods in hypothesis testing, that first examined if predicted outcome fulfils the standard presumptions. by evaluation standard presumptions and conducting statistical analysis, specifically simple linear regression analysis. Purposive sampling was used for the study. The findings showed that the inventory turnover period has no positive effect on return on assets. GAP The study made no recommendations, and it did not use panel analysis as the appropriate methodology.

Yakubu, Dangana, and Olaifa (2020) investigated working capital management effects on the financial performance of a few Nigerian public companies. The working capital management dimension used for this study was the inventory conversion period, whereas the financial success proxy was Return on Equity (ROE). The study sample size consisted of ten (10) firms mentioned in the Nigerian stock exchange as of December 31, 2019, a duration of eleven (11) years from 2009 to 2019 through a deliberate sampling approach. Regression models were used in the study for data analysis. According to the study, the Inventory Conversion Period has no significant effect on the financial performance of selected quoted firms in Nigeria. GAP

The approach used for the evaluation was inappropriate for this study; panel regression with fixed, random, and pooled variables is more suitable.

Abdul-Khadir, Abdul, and Aliyu (2020) investigated the impact of the inventory turnover period (ITP) on the financial performance of quoted conglomerate firms in Nigeria from 2006 to 2016 Financial performance proxies used for this study were; Return on Equity (ROE), return on assets (ROA), and Return on Investment (ROI). Data were extracted from ten (10) quoted conglomerate firms published financial statements, and the analysis was carried out using Structural Equation Model (SEM). The results show that the inventory turnover period has no significant effect on the financial performance (ROA, ROE, and ROI) of Nigerian quoted conglomerate firms. It is therefore recommended that companies implement effective strategies or inventory management systems that reduce inventory turnover time.

Zbigniew (2020) examined the causal relationship between inventory turnover and food company profitability. Panel data were used as a methodology for sub-sectors of the Polish food industry. The study considers raw material, work-in-process, and finished product as inventory mix. The analysis revealed that inventories' share of total assets and current assets decreased between 2005 and 2017. Inventory management efficiency was matched by improved upward path. In addition, the study revealed that inventory days earnings for total stocks are clearly shorter as the days in inventory ratio for materials and finished products decreases. Based on the results, this study recommended that increasing inventory management efficiency will improve the company's financial performance. GAP: The present research did not specify the data source or method of analysing the information.

2.3.2 Account Receivable Period

Dan (2020) examined how Nigerian manufacturing companies that are publicly traded are affected by their account receivable periods. The population of this study is made up of Nineteen (19) Manufacturing companies that were publicly traded in Nigeria stock exchange from 2010 to 2019. The tool used to test the hypotheses was Ordinary least square (OLS) regression. The Data used for the study were extracted from published financial reports of the sampled companies.

The explanatory variable was Accounts receivable period, while proxy for company success is return on assets. The finding showed that there was a correlation between the account receivable duration and the return on assets of listed manufacturing enterprises in Nigeria. The study accepted the alternative hypothesis, which states that accounts receivables period has a significant impact on the return on assets of publicly traded manufacturing firms in

Nigeria, and the null hypothesis was rejected. From the results above, the study recommended that management should concentrate in continuing to calibration funds and earnings in order to meet operational and expansion process requirements as well as shareholders' aspirations by increasing their wealth. GAP The study did not specify the basis of the information that was used.

Adejuwon and Rasheed (2022) evaluated the working capital management and organizational performance of a few Nigerian food and beverage manufacturing companies. As substitutes for WCM, average collection period was chosen, while return on sales was chosen as a substitute for performance. The study adopted an ex post facto research approach. The study's sample size consists of the 18 food and beverage companies that were listed in the Nigerian Securities Exchange as of November 2020. Findings shows average collecting period had a favourable and significant effect on the return on assets of the selected enterprises. The Nigerian enterprises' return on equity influenced by inventory turnover in days. Based on the results, the researcher recommended that management should pay attention to sound management of the companies' working capital components as they significantly influenced their profitability. GAP: This study failed to state method of analysis used for the study.

3. Methodology

This study adopted the causal research design under longitudinal sub-group which clarifies how the dependent and independent variables are correlated causally. Longitudinal study organizes data in such a way that they are repeated over period of time for different firms (Pettigrew, 1990), The research examined the causal relationship between Inventory Turnover Period and Account receivable Period as per the performance of listed manufacturing companies in Nigeria. Data for this study were extracted from financial statements of quoted manufacturing companies which were obtained from the website of the various firms since they are mandated to publish their annual reports on their websites for 11years (2011-2021).

3.1 Population, Sample Size, and Sampling Techniques

The population of this study is made up of 69 quoted manufacturing companies which are further classified into Conglomerates, Consumer goods, real estate and construction, and Industrial goods, and the study adopted a judgmental sampling technique, in which 26 quoted manufacturing companies with available and current financial statements were selected.

3.2 Model Specification

This study adopted panel data analysis which comprises the time series and a cross-section. The panel regression estimation method was used in this investigation. This is because it enables a variety of regression studies in both the spatial (units) and temporal (time) dimensions, panel data is a crucial technique for longitudinal data analysis. The pooled regression model, fixed effect model, and random effects model were the three options available in panel regression. According to Greene (2008), these three are frequently employed in empirical studies. As mentioned in the model:

$PERF = f(WCW, ITP, ARP)$……...(1)

$RERF_{it} = \infty_0 + \propto_1 WCM_{it} + \propto_2 ITP_{it} + \propto_3 ARP_{it} + U_{it}$ ……(2)

Where:

$PERF_{it}$ = Performance of Firm in time t.

WCM_{it} = working capital management of firm in time t.

ITP_{it} = Inventory Turnover Period of firm in time t.

ARP_{it} = Account Receivable Period of firm in time t.

i = number of firms (1, 2, 3, ……n)

t = 2011-2021

U_{it} = Component error term

∞_0 = constant intercept

α_1, α_2, and α_3 = the coefficients of the independent variables.

4. Results and Discussion

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	286	.1836597	1.29142	-3.03787	19.21667
ITP	286	6.711055	.7157599	1.720844	8.755908
ARP	286	83.97511	140.3197	-6.389766	1986.76

Source: Author computation from Stata 15

Table 1 shows the descriptive statistics for variables Inventory Turnover Period (ITP), Account Receivable Period (ARP) and Return on Asset (ROA). The results indicated that the mean of ROA for the firms under study is 0.184, the mean value of inventory turnover period (ITP) is 6.711 and consequently, the mean value of account receivable period (ARP) is 83.975. This means that the ROA mean value is a little over 0.18 ratio. But the firms on the average keep inventory turnover period of at least 7 days. However, the firms on the average have Account Payable period (APP) of 84 days.

Table 2: Correlation Matrix

	ROA	ITP	ARP
ROA	1.0000		
ITP	0.0377	1.0000	
ARP	-0.0409	-0.0086	1.0000

Source: Author Computation from Stata 15

Table 2 shows result of the correlation matrix for the association between independent variables and dependent variable. The result revealed that Inventory Turnover Period (ITP), has positively correlation to ROA by 3.77%, while Account Receivable Period (ARP) correlate negatively to Return on Asset (ROA) by -0.0409.

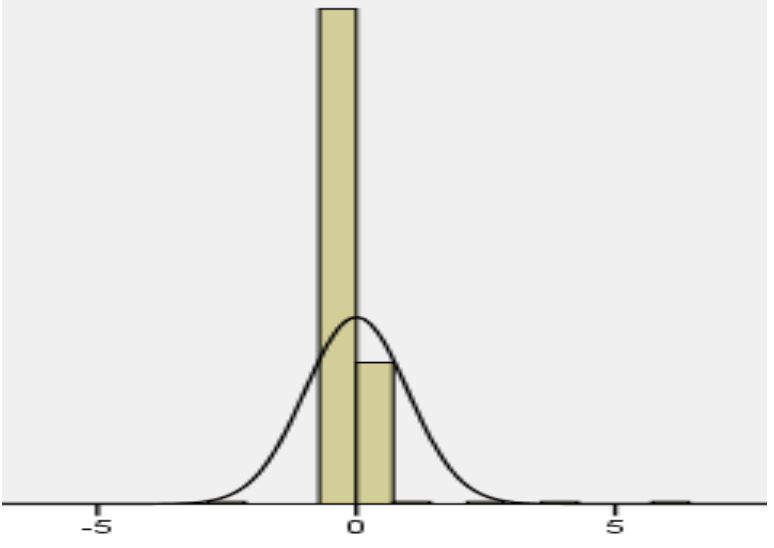

Figure 2: Normality Test

Source: Author Computation from Stata

Normality is one of the assumptions that must meet in linear regression analysis. This study applied the normality test by adopting the histogram bell-shaped method. Figure 2 shows that the histogram is symmetrical on both sides and is bell-shaped. Hence, it can be inferred that the data is normally distributed. Consequently, Unit root test was conducted to ascertain the level of stationarity of the data.

Table 3: Panel Unit Root Test – Im, Pesaran and Shin (IPS)

Variable	Level	First order difference
	Constant	Constant
ITP	-2.1475** (0.0073)	-3.6969** (0.0000)
ARP	-2.2369** (0.0006)	-4.0164** (0.0000)
ROA	-2.7024** (0.0001)	-4.7636** (0.0000)

Note: ** shows rejection-related of the null hypothesis of lacking a unit root at the 5% level of significance.
Source: Author Computation from Stata 15

Table 3 shows the outcomes of the first variance tests for the IPS in constant. It can be seen that for all series, the null hypothesis of the unit root test is rejected at the 5% critical value since the p-values are less than the 0.05 level of importance. As a result, based on the IPS test, there is strong evidence that all the series are integrated at the same level, i.e. I(0). The findings of panel unit root tests (IPS tests) shown in Table 3 back, the hypothesis that there is no unit root in all variables across manufacturing firms. considering the outcomes of the IPS tests, it is not necessary to use the panel co-integration method to test for the presence of a stable long-run relationship between the parameters.

Table 4: Residual Cointegration Test

Alternative hypothesis: common AR coefs. (within-dimension)				
			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-1.932633	0.9734	-2.460649	0.9931
Panel rho-Statistic	1.855887	0.9683	2.243416	0.9876
Panel PP-Statistic	-10.56944	0.0000	-11.85775	0.0000
Panel ADF-Statistic	-1.566472	0.0586	-2.410158	0.0080
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	3.286182	0.9995		
Group PP-Statistic	-21.51537	0.0000		
Group ADF-Statistic	-2.231498	0.0128		

Source: Author Computation from Eviews 10

The Pedroni cointegration test in Table 4 rejected the null hypothesis of no cointegration for the variables given that four of the statistics are significant as against three statistics.

Table 5: Results of Pooled, Fixed and Random Effects Regression Estimates

	Pooled regression	**Random effect**	**Fixed effect**
	Coeff P-value	**Coeff P-value**	**Coeff P-value**
ITP_{it}	-0.011625 (0.7874)	0.0608667 (0.6430)	0.15652 (0.2440)
ARP_{it}	0.000133 (0.8595)	-0.0002652 (0.6480)	-0.00019 (0.7520)
CONST	2982.844 (0.0023)	-2.166569 (0.0290)	-6.46024 (0.0000)
R^2	0.004856	0. 0.0075	0.0108
N	285	285	285
F*	0.564100 (0.727569)	0.876532 (0.4964)	3.58 (0.0038)
Corr (U_i,X)	0	0	-0.6630
Lagrangian Multiplier test	20.30 (p-value = 0.000)		
Hausman Test		55.59 (P-value 0.0000)	

Dependent variable: (ROA_{it}).
Note: * ** *** show significance at 1 percent, 5 percent and 10 percent respectively.
Source: Author Computation from Eviews 10

Table 5 summarizes the results from the Hausman specification test shows that fixed effect model is a better estimator than random effect model, with a high Chi-square value of 55.59 and a p-value (0.0000) less than the 0.05 significance level. Furthermore, fixed effect model outperforms others because lagrangian multiplier test revealed a panel effect between the fixed and pooled regression models. The lagrangian multiplier value of 20.30, combined with a low p-value of 0.0000, indicated the presence of the Panel effect. The fixed effects result revealed that the R^2 is 1.08%. This means that a change in the dependent variable which is Return on Asset (ROA) is as a result of the changes in the independent variables' Inventory Turnover Period (ITP) and Account Receivable Period (ARP), while the remaining 98.92% maybe be caused by other factors not included in the model which could be other WC components, government policy, environmental factors or business environments.

The F-statistic reported in the panel regression in Table 5 is from a test of the hypothesis that all of the slope coefficients (excluding the constant, or intercept) in a regression are zero. The p-value given just below the F-statistic,

denoted Prob (F-statistic), is the marginal significance level of the F-test. If the p-value is less than the significance level of 0.05, reject the null hypothesis that all slope coefficients are equal to zero. From the result, the p-value of the F-statistic (0.0038) which is essentially means that the null hypothesis is rejected that all of the regression coefficients are zero. This indicated a good fit of the model.

The result indicates that the relationship between Inventory Turnover Period (ITP) and return on Asset (ROA) is positive and statistically insignificant ($\beta = 0.15652$, P-value = 0.2440 > 0.05. This means that a positive change in ROA will have an influence associated with positive change in Inventory Turnover Period (ITP) of listed manufacturing firms in Nigeria. Good Inventory Turnover Period (ITP) explains the genuineness of a company's Inventory management, without proper Inventory Turnover Period (ITP), no matter how an organization produces, it returns still will not insignificantly add to the economy which implies that it does create positive returns slowly. The result indicates that Account Receivable Period (ARP) and return on asset (ROA) is negative and statistically insignificant ($\beta = -0.00019$, P-value = 0.7520 > 0.05. This means that a negative change in return on asset (ROA) of listed manufacturing firms in Nigeria will negatively be influenced by Account Receivable Period (ARP).

4.1 Hypotheses Testing

H_{O1}: Inventory Turnover Period has no significant effect on the performance of quoted manufacturing companies in Nigeria

The decision rule states that if the p-value is less than level of significance of 0.05, the null hypothesis is rejected and the alternate hypothesis is accepted. If the p-value is greater than 0.05, the null hypothesis is accepted and the alternate hypothesis is rejected. The p-value for Inventory Turnover Period (ITP) in Tables 5 is 0.2440, which exceeds the level of significance of 0.05. Therefore, the null hypothesis is not rejected

H_{O2}: Account Receivable Period has no significant effect on the performance of quoted manufacturing companies in Nigeria

The decision rule states that when the p-value is less than the level of significance of 0.05, the null hypothesis is rejected, and the alternate hypothesis is accepted. However, if the p-value is greater than 0.05, we cannot reject the null hypothesis and must reject the alternative. The p-value for the Account Receivable Period in Table 5 is 0.7520, which exceeds the level of significance of 0.05. As a result, we fail to reject both the null hypothesis and the alternate hypothesis, concluding that the Account Receivable Period has

no significant effect on the performance of quoted manufacturing companies in Nigeria.

4.2 Discussions of Findings

From the first hypothesis tested, it was observed that the inventory turnover period has no significant effect on the performance of quoted manufacturing companies in Nigeria. This outcome is at variance with the work of Sunusi *et al.* (2020) whose study found that the inventory turnover period significantly affects Nigeria conglomerate companies, also in the same vain, Abdul-Khadir, Abdul, and Aliyu (2020) agreed that there is a significant effect of inventory turnover period on financial performance (ROA, ROE, and ROI) of quoted conglomerate firms in Nigeria while Yakubu *et al.* (2020) and Abdillah (2020) found out that Inventory Turnover Period has no significant effect on the financial performance of quoted firms in Nigeria. In the case of the second hypothesis, it was found that account receivable period has no significant effect on the performance of quoted manufacturing companies in Nigeria. From this result, it was in variance with Dan (2020) and Adejuwon and Rasheed (2022) whose study revealed that the account receivable period significantly affects return on asset of quoted manufacturing firms in Nigeria.

5. Conclusion and Recommendations

This study examined the effect of WCM on the performance of quoted manufacturing companies in Nigeria. A panel regression (fixed effect) econometric technique was used to achieve the desired objectives. The findings of the study showed that Inventory Turnover Period (ITP) and Return on Asset (ROA) are positive and statistically insignificant and Account Receivable Period (ARP) and Return on Asset (ROA) are negative and statistically insignificant. The study concluded that manufacturing firms in Nigeria have not adequately improved on the management of inventory, and account receivable periods on the other hand takes too long. This study recommended that the manufacturing firms should put in place an inventory management system that maximizes inventory turnover period to ensure that investments in working capital is optimized by reducing the length of time from the actual outlay of cash for purchases and the number of days inventory are to be sold. Also manufacturing firms should be mindful of credit period to allowed and receivable period. This is critical to the corporate sustainability of companies in order to improve their financial performance.

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