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Effect of Working Capital Management on Firm Survival: Evidence from Listed Industrial Goods Firms in Nigeria

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ABSTRACT

This study looks at how working capital management affects the survival of Nigerian industrial goods companies that publicly trade on the Nigerian Exchange Group, paying particular emphasis on inventory days (INVD), Receivables Days (RECD), and Payables Days (PAYD). The study employs both descriptive and ex post facto research designs and utilizes panel data for its analysis. It centres on thirteen industrial goods firms that were listed on the Nigerian Exchange Group spanning the period 2014 –2023. From this population, ten firms were purposefully selected as the sample. The study relies on secondary data obtained from the financial statements of these firms over a ten-year period (2014–2023). Regression analysis was used to assess the impact of the selected working capital indicators on firm survival. The findings show that Inventory Days have a significant negative effect on a firm's ability to survive, implying that prolonged inventory holding may heighten the risk of financial instability, while Payables Days has negative and insignificant effect on firm survival indicating delay supplier payments increases the risk of financial distress. On the other hand, firm survival is positively and significantly influence by Receivables Days, implying that, when efficiently administered, the provision of trade credit can contribute to enhanced performance and survival. Firms are encouraged to adopt inventory control strategies, improve receivables collection policies, and manage payables efficiently to reduce financial risks.

INTRODUCTION

The survival of companies in a dynamic and competitive business environment is largely determined by efficient financial management practices, particularly working capital management (WCM). Working capital refers to the short-term assets and liabilities that firms manage daily to ensure liquidity and operational continuity. Effective WCM improves profitability, ensures sufficient cash flow, and enhances survival prospects, especially for industrial goods companies that require significant operational resources (Deloof, 2003 Lazaridis & Tryfonidis, 2006)

Inventory Days (INVD), which measures the average time inventory is held before being sold, plays a critical role in determining a firm's ability to survive in competitive markets. Effective inventory control helps companies maintain sufficient stock to satisfy customer needs while reducing excess inventory and storage costs and capital tied up in unsold goods (Deloof, 2003). Holding excessive inventory increases operational costs, ties up liquidity, and risks obsolescence, which can lead to cash flow shortages (Sharma & Kumar, 2011). Such liquidity constraints may prevent firms from meeting their short-term obligations, pushing them closer to financial distress and bankruptcy. On the other hand, maintaining too little inventory may lead to product shortages, missed sales opportunities, and weakened customer satisfaction negatively impacting revenues (Lazaridis & Tryfonidis, 2006). Therefore, firms that optimize their inventory turnover can improve cash flow, reduce operational inefficiencies, and enhance their chances of long-term survival. The negative coefficient for INVD observed in this study supports this relationship, as prolonged inventory days are associated with reduced firm performance, threatening survival.

Receivables Days (RECD) reflect the average duration a company takes to receive payment from customers after a sale. The management of receivables is directly linked to a firm's cash flow, which is crucial for its survival. Extended receivables days may indicate lenient credit policies or delayed customer payments, which can lead to cash shortages, making it difficult for firms to meet operational and financial obligations (Garcia-Teruel & Martinez-Solano, 2007). Poor cash flow management increases financial distress and the risk of insolvency, particularly for firms with limited access to external financing (Petersen & Rajan, 1997). However, offering credit can stimulate sales and foster customer loyalty, presenting a trade-off between liquidity and revenue generation (Lazaridis & Tryfonidis, 2006). Firms that minimize receivables days while maintaining strong sales performance are better positioned to ensure positive cash flow, meet short-term liabilities, and avoid bankruptcy.

Payables Days (PAYD) measure the average period a company requires to settle its obligations with suppliers. Efficient management of payables is a key factor in maintaining liquidity and firm survival. Extending payables days allows firms to retain cash longer, improving short-term liquidity and freeing up funds for other operational needs (Deloof, 2003). However, excessively delaying payments can damage supplier relationships, resulting in stricter credit terms, disrupted supply chains, or even loss of trade credit, all of which jeopardize firm operations and survival (Ng, Smith, & Smith, 1999). Suppliers may impose penalties or shift to a cash-on-delivery system, which can further exacerbate liquidity issues for distressed firms (Garcia-Teruel & Martinez-Solano, 2007).

The negative relationship between PAYD and firm survival observed in this study suggests that prolonged delays in settling payables may signal financial distress and reduce operational efficiency. Firms that strike a balance by optimizing their payables period can preserve supplier trust, maintain liquidity, and improve their prospects for long-term survival. In Nigeria, the industrial goods sector plays a pivotal role in economic growth by producing essential products such as cement, steel, and building materials. However, the sector has faced challenges such as rising operational costs, liquidity pressures, and macroeconomic instability.

This research examines how essential elements of working capital Receivables (RECD), Inventory (INVD), and Payables (PAYD) influence the survival of publicly listed industrial goods firms in Nigeria. This was motivated due to scanty literature on firm survival determination and the agitation by past and current government in Nigeria to diversify the economy from being oil based economy usually referred to as mono based economy. To achieve this, the researchers deemed it fit to investigate the survival status of industrial goods firms so as to provide suitable recommendation to stakeholders which would aid policy formulation and attainment of objectives of the sector so as to improve performance and attain sustainable economic growth and development. The primary aim of this study is to examine how working capital influences the survival of firms, while the specific objectives are to ascertain the effect, inventory days, receivable days and payable days have on listed Nigeria industrial goods firms' survival. In line with the objectives of the study, the following research hypotheses were formulated:

H_{01}: Inventory Days do not significantly influence the survival of industrial goods firms listed in Nigeria.
H_{02}: Receivables Days have no significant effect on the survival of listed industrial goods firms in Nigeria.
H_{03}: Payables Days do not exert a significant impact on the survival of industrial goods firms listed in Nigeria.

LITERATURE REVIEW

Firm Survival

Firm survival denotes a company's capacity to continue and sustain its operations, maintain competitiveness, and prevent financial distress or bankruptcy over time. It is often viewed as the firm's capacity to generate sufficient cash flows, maintain liquidity, and adapt to changes in the business environment (Altman, 1968). A firm's survival is influenced by its financial management strategies, operational efficiency, and ability to navigate both internal and external risks. Firms that effectively manage their resources, optimize working capital, and maintain positive cash flows have stronger prospects for long-term survival (Deloof, 2003). Survival is particularly critical for businesses whether small, medium or large, as they often face challenges related to access to credit and capital. Consequently, firm survival is a key performance indicator in financial studies, as it reflects the company's resilience and sustainability in competitive markets.

Altman (1968) introduced a model that combines five essential financial ratios into a single measure known as the Z-score, which assesses a firm's probability of bankruptcy or continued operation.

Working Capital Management

Working Capital Management (WCM) involves overseeing a company's current assets and liabilities to maintain smooth operations and ensure financial stability. Effective WCM involves optimizing the levels of cash, receivables, inventory, and payables to maximize liquidity and profitability (Sharma & Kumar, 2011). Firms that optimize the management of their current assets and obligations can reduce financing costs, enhance cash flow, and improve overall performance (Lazaridis & Tryfonidis, 2006). The primary components of (WCM) consist of receivables days, inventory days, and payables days, which together determine the cash conversion cycle. Proper management of these components ensures that firms have sufficient working capital to manage short-term debts efficiently while preventing excessive cash holdings that could hinder profitability. Thus, effective WCM contributes significantly to a firm's performance and survival

Inventory Days and Firm Survival

Inventory Days (INVD) reflect the typical timeframe a business entity retains stock before **it is** converted into sales. It is a significant component in the management of working capital, as it reflects the efficiency of inventory control and turnover. High inventory days may indicate poor inventory management, leading to increased storage costs, capital tied up in unsold goods, and risks of obsolescence (Deloof, 2003). Conversely, low inventory days suggest effective inventory turnover but may also increase the risk of stock outs, leading to lost sales and dissatisfied customers (Garcia-Teruel & Martinez-Solano, 2007). Efficient and effective inventory management enables companies to balance keeping sufficient stock, while reducing storage expenses, which is vital for enhancing cash flow and supporting the long-term survival of the firm. Inventory Days influence firm survival by affecting cash flow, operational efficiency, and customer satisfaction. Poor inventory management whether due to excessive or insufficient stock can lead to financial strain or lost business. Efficient inventory turnover strengthens liquidity and operational resilience, supporting the firm's ability to survive in competitive markets.

Receivable Days and Firm Survival

Receivable Days (RECD) refer to the average time it takes for a firm to collect payments from its customers after a sale has been made. It is a critical indicator of a firm's credit management policies and liquidity (Petersen & Rajan, 1997). Longer receivable days suggest lenient credit policies, which may boost sales but can negatively affect cash flow and lead to liquidity problems. In contrast, shorter receivable days indicate efficient credit management, ensuring that cash is collected quickly to meet operational needs (Lazaridis & Tryfonidis, 2006). Firms must strike a balance between offering credit to customers and maintaining cash flow to avoid financial distress. The relationship between receivable days and firm survival is that RECD influence the firm's liquidity, which in turn affects its ability to continue operations and survive in competitive environments. Efficient receivable manaement by minimizing RECD enhances cash availability, reduces financial risk, and strengthens the firm's long-term viability and firm survival.

Payable Days and Firm Survival

Payable Days (PAYD) measure the average time a firm takes to pay its suppliers. It reflects the firm's ability to manage its trade credit and short-term liabilities. Delaying payments can improve a firm's liquidity by allowing it to use supplier funds for operational purposes (Ng *et al.,* 1999). However, excessively long payable days may strain relationships with suppliers, leading to unfavorable credit terms, disrupted supply chains, or loss of trade credit (Garcia-Teruel & Martinez-Solano, 2007). Conversely, shorter payable days may indicate strong cash flows but could result in the firm missing opportunities to use trade credit as a source of financing. Optimal management of payable days helps firms maintain positive supplier relationships while improving cash flow and ensuring long-term survival. Payable Days affect firm survival through their impact on liquidity and supplier relations. Effective management ensures sufficient cash flow while preserving access to trade credit and reliable supply chains key elements for sustaining firm survival and navigating competitive business environments

Empirical Review

Ibrahim and Yusuf (2024) analysed the effect of working capital management on financial resilience in Nigerian hospitality firms during the period 2021 to 2023. The study employed a quantitative approach focusing on hospitality firms in Abuja. A sample of 60 firms was selected through stratified random sampling. Data collection was conducted using financial reports, and analysis involved panel regression. Findings indicated that firms with efficient payable and receivables management showed greater financial resilience. The study recommends that managers should adopt strategic working capital policies that optimize each component of accounts receivable, accounts payable, and inventory in order to sustain survival

Adebanjo and Ogunleye (2024) investigated the impact of accounts payable management on Firm survival in Nigerian Manufacturing Firms during the period 2020 to 2023. This research used a case study approach targeting firms in Lagos State. A sample of 50 firms was selected using purposive sampling. Data was gathered via structured interviews and from financial reports, and the analysis was carried out using regression techniques. Findings revealed that effective accounts payable management significantly enhanced firm survival. The key recommendation of the study was that Firms should negotiate favorable payment terms that allow for extended payment periods without incurring penalties. This strategy can improve liquidity and provide additional working capital for operations.

Bello and Ahmed (2023) examined the role of inventory management in enhancing the survival of Nigerian SMEs during economic uncertainty for the period 2020 to 2022. This study used a cross-sectional survey targeting SMEs in Kano State. A sample of 90 firms was selected through random sampling. Structured questionnaires were used for data collection, and data was analyzed using regression analysis. Findings revealed that proper inventory control minimized financial distress during economic uncertainty. Utilizing technology for real-time inventory tracking and monitoring of stock movements so as to reduce errors, enhanced informed decisions regarding reordering and stock management was recommended for SMEs in Nigeria

Okafor and Uche (2023) conducted research to investigate how cash flow management influenced the survival of startups in Nigeria from 2019 - 2023. The study used a mixed-method approach, focusing on startups in Lagos and Abuja, with a sample size of 100 startups selected through convenience sampling. Data collection involved interviews and financial statement reviews, while

analysis was performed using descriptive and regression analysis. Findings showed that startups with efficient cash flow management had higher survival rates. The study recommends that startups should always create a cash reserve fund to cover unforeseen expenses or revenue shortfalls

Singh and Pandey (2023) carried out research exploring the influence of working capital on the financial sustainability of firms in India. The study employed a quantitative method and concentrated on publicly listed Indian companies. A systematic random sampling technique was used to select 150 companies, and financial data obtained from annual reports was analyzed using multiple regression techniques. The findings showed that firms with efficient working capital cycles demonstrated improved financial sustainability and lower risk of bankruptcy. It was recommended that India firms should adopt the utilization of working capital management software that can aid in real-time tracking, forecasting, and analysis, leading to more informed financial decisions that will ensure sustainability

Kipngetich and Nyaberi (2022) examined how working capital management influences the survival of agro-businesses listed in Kenya. The research adopted a cross-sectional survey design, and a sample of 80 firms were selected through a convenience sampling technique. Both primary and secondary data were collected via interviews and from financial statements, while data analysis was performed using descriptive statistics and regression analysis. The study found that firms maintaining shorter cash conversion cycles and optimising receivables were more likely to survive, though seasonal cash flow variations posed significant challenges. Agro-businesses should implement effective credit control systems to ensure timely collection of receivables, and also establish clear credit policies, conduct thorough credit assessments of customers.

Ajayi and Adeoye (2022) analyzed the relationship between working capital efficiency and business continuity in Nigerian Retail Firms" over the period 2019 to 2021. The research utilized a case study approach focusing on retail firms in Abuja. A sample size of 50 firms was selected using purposive sampling. Data collection involved financial statement reviews and in-depth interviews. The analysis was conducted using descriptive statistics and thematic analysis techniques. Findings showed that efficient inventory, payables, receivables and cash flow management ensured business continuity. The study recommend that key performance indicators (KPIs) such as the current ratio, quick ratio, and cash conversion cycle should be monitored consistently.

Adebayo and Salami (2022) investigated the impact of working capital management on firm performance and survival in the Nigerian Oil Sector during the period 2018 to 2022. The study adopted a quantitative research approach, focusing on oil firms located in the Niger Delta region. The study used a sample of 75 firms selected via systematic random sampling. Data was collected from annual reports, and analyze using regression. Results indicated that effective working capital cycles positively affected firm performance and survival. The study recommended that firms should negotiate favorable payment terms with suppliers to extend payables periods without incurring penalties and ensure efficient inventory and receivables management to enhances liquidity and reduces the risk of bad debts.

Oluwaseun and Babajide (2021) examined the effect of working capital management on the financial stability of Nigerian agro-based firms over the period 2018 to 2020. The study used a cross-sectional survey design focusing on agro-based firms in Northern Nigeria. The sample consisted of 100 firms selected through convenience sampling. Multiple regression was used to analyze the data collected via structured questionnaire. Results showed that shorter cash conversion cycles significantly enhanced financial stability. However, the study's focus on agro-based firms limits applicability to other sectors. While the findings are relevant, the use of secondary data could provide additional validation. The study recommend efficient optimization of payment terms with Suppliers**,** maintaining strong supplier relationships and effective Monitoring of accounts payable turnover

Eze and Nwankwo (2021) examined the effect of working capital components on the Survival of Small Enterprises in South-Eastern Nigeria during the period 2017 - 2021. A quantitative research design was employed by the study, while simple random sampling technique was used to select 80 enterprises targeting small enterprises in Enugu State. Data collection involved structured interviews, which was analyse using correlation and regression analysis. The study revealed that effective accounts receivable and inventory management were critical for survival. The study recommends the implementation of efficient inventory management system, automated invoicing and offering multiple payment options to expedite collections.

Enqvist et al (2021) assessed how working capital management impact on firm survival during economic downturns. The study adopted a longitudinal research design and focused on manufacturing firms in the United States. A random sampling technique was used to select 250 firms. Secondary data was analyze using regression and correlation analysis. The findings indicated that effective management of working capital components, especially inventory, plays a critical role in helping firms remain solvent and competitive during economic downturns. It was recommended that manufacturing firms should explore multiple income sources so as to reduce reliance on a single revenue stream, thereby stabilizing cash flow and enhancing resilience against market fluctuations and economic downturns

Akinyele and Afolabi (2020) conducted a study on the effect of working capital management practices on the sustainability of Nigerian manufacturing firms for the period of five years (2016 to 2020). The study adopted a mixed-method approach, targeting manufacturing firms in South-West Nigeria. The study used a sample size of 120 firms selected through purposive sampling. Primary data was collected through interviews and questionnaires, while secondary data was obtained from financial reports. Data analysis involved panel regression and thematic content analysis. Findings revealed that inventory management practices played a

critical role in firm sustainability. The key recommendation of the study was that manufacturing firms in Nigeria should adopt inventory control techniques such as Just-In-Time (JIT) and Economic Order Quantity (EOQ) to maintain optimal stock levels, reduce holding costs, and prevent stock outs, thereby ensuring uninterrupted operations

Deloof and Heughebaert (2020) examined the effect of working capital on Corporate Survival of financially distressed firms in Europe. The research used a mixed-method approach and targeted financially distressed firms in Europe. A sample of 200 firms were selected through stratified sampling. Data was collected using financial reports and interviews with financial managers, and the study employed panel data regression and content analysis. The study found that effective working capital management, particularly optimizing cash conversion cycles, significantly helps financially distressed firms regain stability and survive. The study recommends the adoption of a shorter cash conversion cycles by firms because it enhances liquidity and reduces reliance on external financing.

Alagathurai and Anojan (2019) conducted a study on the impact of working capital management on survival of small and medium enterprises. The study adopted a quantitative research design and focused on Small and Medium Enterprises (SMEs) in Sri Lanka. A sample of 100 SMEs was selected using a purposive sampling technique. Data was collected through structured questionnaires distributed to SME managers, and the data analysis involved descriptive statistics and multiple regression analysis. The findings revealed that effective working capital management significantly contributes to SME survival, with optimized inventory levels, accounts receivable, and cash flow enhancing long-term sustainability. The study recommend that SMEs should leverage technology for working capital and Financial Management

Okoro and Adebayo (2019) examined the effect of working capital management on the survival of SMEs in Nigeria during the period 2017 - 2019. Quantitative research design was employed by the study focusing on SMEs in Lagos State. A stratified random sampling technique was employed to select a sample of 150 SMEs, while primary data was collected through structured questionnaires and analyzed using multiple regression analysis. The findings revealed that efficient cash management and receivable optimization significantly enhanced SME survival. The study recommends that SMEs should strive to minimize Cash Conversion Cycle by accelerating receivables collection, efficiently managing inventory levels, and negotiating favorable payment terms with suppliers.

García-Teruel and Martínez-Solano (2007) conducted an empirical investigation into the impact of working capital management on the profitability of Spanish small and medium-sized enterprises (SMEs) using panel data from 8,872 firms over the period 1996–2002. The study found a significant negative relationship between the cash conversion cycle and firm profitability, indicating that firms that manage their working capital more efficiently tend to achieve higher returns on assets. Specifically, reductions in inventory days and accounts receivable days were associated with increased profitability, while extending accounts payable days also contributed positively, though cautiously, due to potential trade-offs with supplier relationships. The authors employed robust econometric techniques to address endogeneity and confirmed that effective working capital management is crucial for enhancing SME performance, especially given their typically constrained access to external finance. Based on these findings, the study recommends that SME managers pay close attention to the optimization of inventory levels, credit policies, and payment timing in order to improve profitability and maintain financial health

METHODOLOGY

This study adopted a descriptive and ex post facto research design. The population comprised thirteen industrial goods companies listed on the Nigerian Exchange Group as of December 31, 2023. Using purposive sampling, a selection of 10 firms was made based on specific criteria the companies needed to have complete financial data for the study periods and must have been listed on or before January 1, 2014. The research relied on secondary data obtained from the financial statements and annual reports of these firms, covering a decade from 2014 to 2023. To analyze how components of working capital management Receivable Days (RECD), Inventory Days (INVD), and Payable Days (PAYD) affect the survival of these listed industrial goods companies, multiple regression analysis was employed. This method was chosen because it effectively assesses the influence of several independent variables on a single dependent outcome.

Measurement of Variables

Table 1: Measurement of Variables

S/N	Dependent Variables	Measurement	Source
1	Altman Z -Score	1.2*(working capital / total assets) + 1.4*(retained earnings / total assets) + 3.3*(earnings before interest and tax / total assets) + 0.6*(market value of equity / total liabilities) + 1.0*(sales / total assets).	Yusuf and Alhassan, 2020): Kanapickiene and Marcinkevicius (2014)
2	Receivable days	Trade receivables/ revenue x 365 days	Kipngetich and Nyaberi (2022), Okoro and Adebayo (2019), Eze and Nwankwo (2021)
3	Inventory days	inventory / cost of sales x 365 days	Enqvist *et al.*, (2021), Akinyele and Afolabi

			(2020), Eze and Nwankwo (2021)
4	Payable days	Trade payables / cost of goods sold x 365 days	Adebanjo and Ogunleye (2024), Ibrahim and Yusuf (2024)
5	Firm size	Log of total assets	Makini (2015)

Source: Developed by the Researcher Based on Literature

Model Specification

The model formulated below was estimated using the multiple regression technique to analyze the relationship between the dependent, independent and control variables. The model adapted from the work of Ibrahim and Yusuf (2024), with modification as stated in equation (1)

$ROAit = \beta_0 + \beta_1 INVTit + \beta_2 ARTit + \beta_3 CCCit + \beta_4 Levit + £_{it}$……..(1)

ALTZ = f(RECD, INVD, PAYD, FSIZ) ……..(2)

$ALTZ_{it} = \alpha_0 + \beta_1 RECD_{it} + \beta_2 INVD_{it} + \beta_3 PAYD_{it} + \beta_4 FSIZ_{it} + U_{it}$ ……..(3)

Where:

$ALTZ_{it}$ = Altman Z-score for company i for time t, $RECD_{it}$ = Receivable days for company i for time t, $INVD_{it}$ = Inventory days for company i for time t, $PAYD_{it}$ = Payable days for company i for time t, $FSIZ_{it}$ = Firm Size of for company i for time t.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 2: Descriptive Statistic Result

variable	obs	mean	std. Dev.	Min	max
recd	100	81.98162	125.0661	.03	1356.92
invd	100	95.1644	60.24476	10.01	515.72
payd	100	183.9324	215.0772	6.41	2070.08
fsiz	100	7.311583	1.001975	5.24	9.38
altz	100	1.518885	1.412002	-9.6	6.37

Source: Results produced by STATA 17 Software

Table 2 shows the descriptive statistics for the study variables. RECD (Receivable) has an average value of 81.98162 and a standard deviation of 125.0661. The average values of RECD indicate that it takes the listed Industrial Goods firm 81 days to collect amount own by customers. The standard deviation suggest large spread in the RECD among the sample firms. Also, IVND (Inventory turnover) has a mean value of 95.1644, and standard deviation of 60.25. This suggests that the listed Industrial Goods firm convert their inventory to cash within 95 days. The minimum and maximum IVND are 10 and 515 days respectively. In addition, the mean value for PAYD is 183.93, meaning that firms in the industrial goods sector has about 183 payable period which is quite long and good for the firm. However, the minimum PAYD is about 6 days and for some firms in the sectors it extend to a maximum value of 2070 days.

The average FSIZ (firm size) is 7.31, with a standard deviation of 1.00 which indicate a low variation in the size of the listed industrial good firm in Nigeria. The size ranges from 5.24 minimum to 9.38 as the maximum. In addition, the mean values for the dependent variable ALTZ, is 1.518885. The ALTZ score suggested that the listed Industrial Goods firm are in the gray zone and need to exercise caution in their financial dealings. However, the standard deviation shows a slight variation in the likelihood of financial distress for firms in the sector.

Correlation Analysis

Table 3: Correlation Analysis Result

Variables	ALTA	RECD	INVD	PAYD	FSIZ
ALTZ	1.000				
RECD	0.0210	1.000			
INVD	-0.1212	0.2284	1.000		
PAYD	-0.3140	-0.1881	-0.0339	1.000	
FSIZ	-0.1526	-0.1808	0.0056	-0.1031	1.000

Source: Results produced by STATA 17 Software

Table 3 presents the correlation results, which are used to evaluate the relationships among the study variables and to identify any potential multicollinearity issues. The result suggests that there is a weak positive relationship between RECD and survival (ALTZ) of listed industrial goods firms in Nigeria, as indicated by the correlation coefficient of 0.0210. This suggests that a rise in

RECD is associated with an improvement in the survival prospects (ALTZ) of industrial goods firms listed in Nigeria. In contrast, the table revealed that there is a weak negative correlation between INVD, PAYD, FSIZ and Survival (ALTZ) of listed industrial goods firms in Nigeria with coefficients of -0.1212, -0.3140, and -0.1526 respectively. This suggests that the likelihood of survival of listed industrial goods firms in Nigeria decreases with an increase in INVD, PAYD, and FSIZ, holding other factors constant. The pairwise correlation also suggested the absence of a perfect relationship among the explanatory variables of the study.

Multicollinearity Test

Table 4: Variance Inflation Factor (VIF) Result

Variable	VIF	1/VIF
recd	2.27	0.439803
payd	1.87	0.535258
invd	1.19	0.838732
fsiz	1.07	0.938087
Mean	VIF	1.60

Source: Results produced by STATA 17 Software

The results of the multicollinearity test which is used to detect the presence and severity of multicollinearity in a multiple regression model is presented in table 4

In addition, the variance inflation factor (VIF) was utilized to test for multicollinearity, guaranteeing that the explanatory variables don't display perfect correlation between or among each other. The tolerance value and the VIF for each explanatory variable are less than 1 and 5, respectively. As a result, the study concluded that there is no evidence of multicollinearity among the independent variables.

Post Estimation Tests

Table 5: Results of Heteroskedasticity Test, Hausman Test, LM test and Autocorrelation

Heteroskedasticity Test		Hausman Test		LM test for random effects		Wooldridge test for autocorrelation	
Chi^2	P-value	Chi^2	P-value	Chi^2	P-value	Chi^2	P-value
0.11	0.7409	14.98	0.0596	118.59	0.0000	0.068	0.7958

Source: Results produced by STATA 17 Software

Table 5 shows the results of Heteroskedasticity test for the models. From the result in table 5 above ALTZ, with a chi2 values of 0.11, and a corresponding P value of 0.7409, which is greater than 5% indicate the absence of heteroskedasticity in the model. Also the Hausman specification test results (chi2 = 14.98, p = 0.0596) suggest that the random effects model is preferable to the fixed effects model for this study. The table also presents the results of the Breusch-Pagan Lagrange Multiplier (LM) test, which helps determine whether the random effects model or Ordinary Least Squares (OLS) is more suitable. The null hypothesis of the LM test asserts that there is no significant variation across entities, indicating the absence of panel effects. The test outcomes strongly support the adoption of the random effects model over the OLS model as evidenced by the probability value of 0.0000. Furthermore, the autocorrelation test indicated the absence of first-order autocorrelation, as shown by a statistic of 0.068 and a p-value of 0.7958.

Regression Results

Table 6: Random effect Regression Result

Independent variables	Coefficient	P-value
CONST	4.50570	0.000
RECD	0.00023	0.027
INVD	-0.00344	0.013
PAYD	-0.00085	0.069
FSIZ	-0.34706	0.015
R^2	0.2081	
F-statistic	80.00	
P value	(0.0000)	

Source: Results produced by STATA 17 Software

The random effect regression results used to explain the relationship between the dependent and independent variables and accept or reject the hypotheses are presented in table 6

The regression results presented in table 6 reflect the model constructed for this study, which incorporates key working capital management indicators such as RECD, INVD, and PAYD. The R-squared value of 0.2081 reveals that about 20.81% of the dependent variable are explained by the independent variables. This means that additional influential variables not included in the model accounts for 79.19% changes in the dependent variable The F-statistic, used to assess the overall significance of the model, shows a value of 80.00 with a corresponding p-value of 0.0000. This result confirms that the regression model is statistically significant, suggesting that at least one of the predictors meaningfully contributes to explaining variations in the dependent variable.

The findings reveal that receivable days have a favourable impact on the survival of listed industrial goods firms in Nigeria. This is revealed by a coefficient of 0.00023 and a corresponding p-value of 0.027, signifying a statistically significant relationship at the 5% confidence level. A coefficient of 0.00023 for RECD implies that for every additional unit increase in receivable days, the survival of the firm improves by approximately 0.00023 units. INVD exhibits a significant negative impact on the survival of industrial goods firms listed in Nigeria, as indicated by a coefficient of -0.00344 and a p-value of 0.013. This indicates that for each additional unit increase in Inventory Days (INVD), the survival likelihood of industrial goods firms listed in Nigeria decreases by 0.00344 units. The coefficient for PAYD is -0.00085, which is statistically not significant at the 5% level, as shown by the P value of 0.069, implying that an increase of one unit in Payables Days (PAYD) corresponds to an estimated decrease of about 0.00085 units in the survival rate of industrial goods firms.

DISCUSSION OF FINDINGS

The study examined the effect of working capital management on the survival of listed industrial goods firms in Nigeria, using receivable days (RECD), inventory days (INVD), and payable days (PAYD) as independent variables. The results provided insights into the significance of these variables and their implications for firm survival.

The regression analysis revealed that receivable days (RECD) has a positive and significant effect on firm survival (p-value = 0.027). This suggests that firms with higher receivable days tend to have better survival prospects. This finding aligns with Ibrahim and Yusuf (2024) and Singh and Pandey (2023) who found that offering trade credit can boost sales and strengthen customer relationships, ultimately enhancing financial stability and survival. However, this result contradicts that of Garcia-Teruel and Martinez-Solano (2007), who argued that excessive receivables days could strain cash flow, increasing financial distress risk. The divergence in findings may be attributed to industry-specific factors, as industrial goods firms often rely on trade credit to maintain sales volume. The positive effect of RECD implies that firms can enhance survival by strategically offering credit to customers. However, firms must balance credit extension with effective collection strategies to prevent liquidity shortages. Adopting digital invoicing, early payment discounts, and strict credit policies can ensure that receivables do not become a financial burden.

The results also revealed that inventory days (INVD) has a negative significant effect on firm survival (p-value = 0.013). This indicates that an increase in inventory holding periods reduces a firm's likelihood of survival. The finding is consistent with Akinyele and Afolabi (2020): Deloof (2003): Bello and Ahmed (2023): and Eze and Nwankwo (2021), who found that inventory days has a significant effect on firm survival. That is prolong inventory lead to higher holding costs, liquidity constraints, and potential stock obsolescence. Conversely, Enqvist *et al*. (2021) suggested that holding inventory for longer periods can act as a buffer against supply chain disruptions, particularly in industries with volatile demand. However, the negative coefficient in this study suggests that industrial goods firms face increased risks when inventory turnover is slow. The negative impact of INVD implies that firms must minimize inventory holding periods to enhance liquidity and operational efficiency. Strategies such as Just-in-Time (JIT) inventory, Economic Order Quantity (EOQ), and real-time inventory tracking can help firms reduce excess stock while ensuring continuous production.

The study found Payable Days (PAYD) has no significant effect on firm survival (p-value = 0.069). This suggests that firms taking longer to pay suppliers are at a higher risk of financial distress. The result supports Adebanjo and Ogunleye (2024), who found that excessive delays in supplier payments could lead to strained relationships, reduced credit access, and supply chain disruptions. However, this contradicts Garcia-Teruel and Martinez-Solano (2007), who found that extending payables can provide liquidity benefits, allowing firms to allocate resources elsewhere. The conflicting results may be due to differences in industry practices, as some sectors benefit from extended trade credit, while others suffer from supply chain inefficiencies. The negative relationship between PAYD and firm survival implies that firms must balance payment extensions with maintaining strong supplier relationships. Negotiating favorable credit terms, ensuring timely payments, and leveraging supplier discounts can improve both liquidity and supplier trust

CONCLUSION AND RECOMMENDATIONS

The results from the random effects regression provide important insights into how elements of working capital management affect the survival of industrial goods firms listed in Nigeria. Specifically, Receivable Days (RECD) show a positive and statistically significant relationship with firm survival, indicating that granting customer's longer payment periods may support business continuity due to repeated patronage which will lead to increase sales and market share in a competitive landscape. When firms effectively balance credit extension with strong credit control, they can boost liquidity and maintain stable operations.

In contrast, Inventory Days (INVD) have a negative and significant impact, implying that holding inventory for longer periods diminishes a firm's survival prospects. These reflects inefficient inventory practices that tie up essential working capital in unsold stock, leading to higher storage and holding costs. Excess inventory can thus reduce overall profitability and threaten the firm's long-term survival. Lastly, Payables Days (PAYD) show a negative but statistically insignificant influence on firm survival. These suggests that postponing payments to suppliers may harm supplier relationships or cause supply chain interruptions, especially when suppliers expect prompt payment. While delaying payables can temporarily ease cash flow pressures, excessive dependence on this strategy may undermine the firm's survival in the long run

Based on the findings of the study, the following recommendations are proposed to ensure long-term survival through effective working capital management. Firms should adopt efficient inventory management practices to minimize the number of days inventory is held while ensuring that customer demand is adequately met. Excessive inventory days (INVD) were found to negatively impact firm performance and survival, likely due to increased holding costs and liquidity constraints. Firms are encouraged to implement inventory control techniques such as the Just-in-Time (JIT) **system,** Economic Order Quantity (EOQ)**,** and inventory optimization software. These strategies can reduce storage costs, free up working capital, and improve operational efficiency. By closely monitoring inventory turnover, firms can strike a balance between minimizing holding costs and meeting demand.

The positive coefficient for receivable days (RECD) suggests that while offering credit terms can stimulate sales, firms must ensure efficient collection processes to avoid liquidity shortages. Firms should establish clear credit policies, set reasonable credit limits, and conduct creditworthiness assessments for customers to minimize delays in payments. Additionally, strategies such as offering early payment discounts, imposing penalties for late payments, and adopting digital invoicing systems can help reduce receivable days and improve cash flow. Maintaining a healthy balance between customer satisfaction and timely cash collection is critical for firm survival.

Firms should carefully manage their payables days (PAYD) to optimize trade credit without jeopardizing supplier relationships. While extending payables days can improve liquidity, the negative relationship observed in this study suggests that excessively delaying payments may signal financial distress or harm supplier trust. Firms should negotiate favorable credit terms with suppliers and leverage trade credit as a short-term financing tool. However, payments should be made within agreed time frames to maintain strong supplier relationships, secure discounts, and avoid supply chain disruptions. Maintaining a reputation for timely payments can also provide firms with greater negotiating power for future credit terms.

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