

## Efficient working capital management and sustainable growth of Nigerian listed firms

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### Abstract

*This study investigated the effect of efficient working capital management on the sustainable growth of Nigerian-listed firms. It employed sustainable growth rate as a dependent variable which is used to measure sustainable growth while cash conversion cycle, debt collection period, inventory conversion period, and creditors payment, period were the independent variables used to measure working capital management. Data were taken from the annual reports and accounts of 13 Nigerian listed companies from 2010 to 2020 because this is a secondary source. The fixed effect panel was used to analyse the data collected to achieve a wholesome analysis. The result revealed that the cash conversion cycle and creditors' payment period have insignificant and negative effects on sustainable growth. The debt collection period and inventory conversion period have a significant and positive effect on sustainable growth. The study recommended that management in the industry should ensure that a shorter cash conversion cycle is maintained to sustain growth based on their ability to generate funds internally, and maintain a lower collection period because the inventory conversion period should be treated as a critical or strategic activity because it is a crucial component of the business's strategic goal, it enables the use of cash to make timely bill payments to benefit from early payment discounts and avoid the expensive necessity of borrowing to fund investment and finally ensure maximum cash flow into its operations by prolonging its obligations a reasonable as possible and maintain positive credit worthiness.*

**Keywords:** 1.Working Capital Management, 2.Cash Conversion Cycle, 3.Debt Collection Period, 4.Inventory Conversion Period, 5.Creditors Payment Period, 6.Sustainable Growth Rate.

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### Introduction

Every business that generates revenue thinks about ways to maintain a level of liquidity that will allow it to survive. Cash is constantly available for the company's daily operations because of liquidity. For a business to

survive, effective working capital management is essential. It guarantees optimal resource utilization, which raises the organization's overall production. According to Angahar and Alematu (2014), effective working capital management is essential to the financial success of businesses of all sizes and serves as a key sign of a company's strong financial health. The maximum expansion that a company may endure without needing to raise further equity or debt is enhanced by effective working capital management (Baldwin and Trigeorgis, 2017 Harhoff (2020), opines that sustainable growth is the maximum amount of growth that a business may achieve while avoiding issues. A company that expands too quickly can have trouble raising the necessary funds, and one that expands too slowly or not at all might stagnate. The ideal growth is what every firm seeks.

The Nigerian economy depends heavily on the agriculture sector's ability to grow sustainably since it provides an alternative to the oil industry, particularly in times of recession and diversification. This industry has the power to eradicate poverty and generate wealth and jobs. The competitiveness, strength, and business viewpoint of an organization are all reflected in this sustained growth, which is a function of managerial effectiveness.

Effective working capital management consequently entails adopting actions to enhance the company's working capital position without having negative effects elsewhere in the processing chain (Alchian and Demsetz,2020). Because of this, they point out that businesses can employ a variety of solutions to support efficient working capital management, both for themselves and for their suppliers or customers. The existence and survival of any business depend to a large extent on efficient working capital management to keep it going and ensure that they are maximally utilized to enhance its profitability and overall growth. However, firms have been experiencing a high debtor's turnover ratio which means that the firm is too strict in its credit policy and has been losing sales as a result, and a low turnover ratio in the case that the firm is too generous in its credit policy and have been losing profits due to bad debt. Again, there has been a high creditor turnover ratio which indicates that the firm is making use of its credit facility from its suppliers which could lead them to problems if the policy is not matched with the debtors' turnover ratio whereas a low creditor's turnover ratio suggests that the company is not taking advantage of all available discounts associated with prompt payment. A low stock turnover ratio denotes the acquisition of slow-moving or obsolete stock, the sale of products at high prices, or a slowdown in trading excess investment in stock. In addition, there has been a high stock turnover, which may be due to a low level of inventory, numerous small orders for inventory replacement, the sale of products at low prices, or the company's status as a fast-moving good business. On the other hand, a high inventory turnover ratio in comparison to other businesses in the sector is frequently viewed as a sign of efficiency. In addition, it has been taking firms a longer time to convert their investment in raw materials into liquid cash but the shorter the time the better for such firms.

However, this calls for the proper articulation to preclude excess cash that hinders the smooth running of the business. The farmers must receive cash to keep producing while the agro-processing industry must avoid over liquidity and under liquidity that can stifle other financial activities of the industry. Ogbeide (2017) found that a large number of business failures in the past have been blamed on the inability of the financial manager to plan and control the working capital of their respective firms. The majority of corporate organizations lack the necessary stocks, debts, and cash, (Stephen,2012), which prevents them from being able to pay their prospective operational needs as well as their maturing short-term obligations. Similar to this, a lack of working capital prevents a business from expanding and increasing sales, which in turn restricts the company's capacity to grow and become profitable.

Lawal, Abiola, and Oyewole (2015) stress that due to poor working capital management, the majority of manufacturing enterprises in Nigeria have gone out of business. They contended that the majority of managers strive to boost profits without taking into account the necessity of accelerating the debtor collection period and delaying the creditor payment term as fairly as feasible to provide the money required to keep the cycle going. Organizations may accumulate debts that could negatively impact their performance

over time because they can find themselves suddenly unable to pay their obligations as they fall due (Eljelly, 2004).

However, Nigeria has been experiencing food insecurity, non-improvement of the value chain, high cost of production, non-availability of raw materials, limited export opportunities, low volume of production, laying off workers in the industries, and no sustainable growth in the agro-processing industry. It does appear that agro-processing industries are not contributing significantly to the economic growth and development of the country (Olugbenga, 2010). Inadequate working capital management has remained a problem for firms in Nigeria due to the negative impact on their profitability (Oluboyebe, 2009). The curiosity, therefore, is finding out the link between these problems as stated above and inefficient working capital management which this study intends to curtail the gaps in the literature.

## Literature Review

### Working Capital

Working capital is the difference between a company's current assets and its current liabilities otherwise known as net working capital. Working capital is the funds available to meet current and short-term financial obligations. Negative working capital is when a company's current asset is less than its current liabilities while positive working capital is when the current assets are more than the current liabilities. Current assets include cash and cash equivalent, receivables, and inventories; while current liabilities consist of payables, short-term borrowings, and accrued liabilities. Some approaches may subtract cash from current assets and financial debt from current liabilities.

Working capital, according to Schwartz and Zozaya (2017), is the net current assets available for regular business operations. Many successful firms are forced to close their operations because they are unable to pay their short-term debts when they are due. To stay in business, working capital must be managed effectively.

However, several aspects that influence working capital requirements vary from company to company. Both endogenous (the company's size, structure, and strategy) and exogenous (access to and availability of banking services, level of interest rates, type of industry and products or services sold, macroeconomic conditions, and size, number, and strategy of the company's competitors) considerations can be made when determining these variables. Baghai (2019). The cash flow conversion cycle of a business is never perfect. Cash can move in a fast manner from the sale of inventory to accounts receivable to cash on hand. Sales will vary, and not all consumers will make timely payments. Therefore, it is certain when to pay bills, but it may be less certain when to have enough cash on hand to do so. Working capital is a financial statistic that represents the operating liquidity that is available to a company organization or other institution, including governmental entities (Kester, 2020).

Despite having assets and profitability, a business may lack liquidity if its assets are difficult to convert into cash (McDonald & Siegel, 2013). To ensure that a business can continue operating and has sufficient funds to pay off short-term debt and upcoming operational expenses, it has to have positive working capital.

### Working Capital Management

Management of inventories, receivables, payables, and cash are all part of managing working capital. Corporate organizations manage working capital through the use of a variety of policies and methods. These regulations seek to guarantee effective working capital management.

Effective working capital management, however, is a sign of a good company, but expanding companies and high sales will strain cash flow and reduce the working capital balance. Growing a business ironically results

in higher costs and less working capital at a time when cash is most needed. Working capital, according to Harcourt (2020), is a crucial factor in determining the long-term financial sustainability of a company. It also ensures that there is enough cash flow available for immediate obligations. The operating cycle will be optimized, the cost of working capital will be reduced, and the return on current asset investments will be increased through effective working capital management.

Several methods for reducing the scope of how to measure working capital performance are part of the best practices in working capital management (Easton, 2016). While acknowledging that all business owners and entrepreneurs strive to balance their current assets to liabilities and maximize operational efficiency, Kensing (2018) asserts that there are instances in which a business can measure and manage working capital throughout various company activities. However, properly calculating and benchmarking the appropriate working capital metrics through all variables is a complex task that calls for expertise.

Working capital management, according to Nwude (2016), is the simple management of investments or dividends in current assets as well as the growth or decrease in current obligations. Specifically, managing current assets and setting up short-term borrowing to finance the purchase of current assets. The assessment of the optimal working capital level to maintain, monitor, and control the level of each component of working capital to ensure that the optimal level is not exceeded, and providing cash to finance current assets are all part of managing working capital.

### **Cash Conversion Cycle**

The interplay between the elements of working capital and the flow of cash within a corporation is represented by the cash conversion cycle, which is used to measure cash management (Wang, 2002). According to Hussain and Alneface (2016), the cash conversion cycle is the amount of time that elapses between a firm's actual cash outlay to pay for productive resources and cash inflows from account receivables and product sales. According to Muscetteola (2014), the cash conversion cycle measures the amount of time needed from the time merchandise is purchased until it is sold and the associated invoices are paid. The cycle begins as soon as cash is paid for the raw materials purchased and ends when debtors have paid off their debts. The cash conversion cycle is regarded as a significant aspect since it enhances business performance and demonstrates how effectively a company handles bill-paying, payment collection, and inventory sales. The cash conversion cycle is the most important aspect of working capital management since it shows how quickly current assets are transformed into cash, serving as a gauge of how well working capital is managed.

### **Debt Collection Period**

The average time needed to turn business receivables into cash is referred to as a debt collection period. It demonstrates how rapidly receivables or debtors are transformed into cash (Husan and Alneface, 2016). A company's time to collect receivables from customers is measured using a debt collection period. It is determined by taking the accounts receivable to sales ratio and dividing it by 365 days. Receivables management is a significant part of every organization's working capital management (Divya, Sirmran, and Vartika, 2017). The credit policy and collection practices of a company have a big impact on how receivables are managed (Okpe and Duru, 2015). According to Berry and Jarvis (2006), organisations should consider the following factors for effective account receivable management: the trade-off between the security of sales and profits and the amount of opportunity cost and administrative expense associated with the rising account receivables. Second, is the amount of risk the company is willing to assume when offering credit to a customer who might not make their payment when it's due. Third, the investment in managing debt collection. A high account receivables ratio can have a detrimental impact on profitability. This is because a company may find it difficult to pay off its short-term financial obligations if it has a lot of debt (Okpe and Duru, 2015).

### **Inventory Conversion Period**

The inventory conversion period is referred to as the time required to convert inventory into cash (Husain and Alneface, 2016). The inventory conversion period measures the average number of days or length of time it takes a firm in holding the inventory. It is the number of days inventory remains in the store before being sold and replaced (Nwude, 2016). Inventory constitutes a significant part of current assets, particularly in manufacturing and trading firms. Mittal, 2014, opined that because of the significant proportion of inventory to current assets, manufacturing companies committed huge financial resources to it. Effective and efficient inventory management helps in the control of pilferage, and wastage and ensures availability of material at all times required. A reduced inventory level may boost profitability, according to Banos - Caballow, Garcia - Teruel, and Martineze - Solano (2010), because money stored in inventory can be invested elsewhere or put in a bank to generate interest.

According to Teece (2017), effective inventory management entails balancing two competing goals: minimizing inventory investment on the one hand and maintaining a steady supply of raw materials for production and sale on the other. The financial manager must therefore determine the amount of inventory at which these discrepancies are resolved.

### **Creditors Payment Period**

The creditors' payment period is defined as how long a firm or company can pay their account payable (Gill, 2010). It describes how long it takes a company to pay its invoices from trade creditors such as suppliers. Husain and Alneface (2016), defined it as the average length of time required by the firm for the settlement of purchase bills. The creditors' payment period is used to measure the average number of days or length of time it takes a firm to pay trade creditors. It is computed by dividing accounts payable by the cost of sales multiplied by 365.

Nasreen, Khanem, and Pirazada (2014) assert that creditors' payment period is the duration of time the company is clever to postpone payments on a variety of recourses buy.

Furthermore, account payable management is the ability of a firm to use short-term financing to fund its operational activities efficiently. It is the major source of short-term finance available to a firm for a short period, usually less than a year. According to Okpe and Duru 2015, account payable is one of the major secured short-term financings. The amount of time on average it takes for a business to pay its trade creditors is known as the deferment period of accounts or trade payable (Uyar, 2009). Account payables are a result of trade credit that is given by a business's suppliers, typically as part of routine business operations. According to Nordhaud (2013), the appropriate balance between early payment and commercial debt should be struck. Early payments might unnecessarily reduce the available liquidity, which could be used in more beneficial ways. A high level of commercial debt could lower the company's creditworthiness, while late payments could damage the company's reputation and business relationships.

### **Sustainable Growth Rate**

Sustainable growth, according to Baldwin and Trigeorgis (2017), is the highest rate of growth a business can achieve without increasing its equity or debt. It shows yearly sales growth in line with the firm's financing strategy. The highest internal growth rate that a company may maintain without developing new or additional equity concerns is referred to as a sustainable growth rate. According to Harhoff (2020), sustainable growth in terms of a business is the growth that a company might reasonably achieve and maintain without encountering issues. A company that expands too quickly can struggle to finance the expansion, and one that expands too slowly or not at all might stagnate. The objective is to determine the ideal growth rate. A high sustainable growth rate is typically indicative of a company's ability to maximise sales efforts, concentrate on high-margin products, and effectively manage inventories, accounts payable, and

accounts receivable. For businesses, maintaining a high growth rate over the long term can be challenging for a variety of reasons, such as increased market competition, shifting economic conditions, and the need to invest more in R&D. The highest growth rate that a business may maintain without increasing financial leverage is referred to as its sustainable growth rate. Finding a company's sustainable growth rate essentially provides the answer to the question of how big the company can get before having to borrow money.

Kumaraswamy (2020) states that calculating sustainable growth makes three assumptions: the firm must raise sales as quickly as the market will allow, it must maintain a target dividend payment ratio, and it must maintain a target capital structure without issuing new stock. Since most businesses dislike issuing new shares of stock.

## **Theoretical Review of working capital management**

### **Pecking Order Theory**

According to Palombin and Nakamera's (2012) pecking order hypothesis, businesses should prioritise internal financing sources due to their lower cost of capital over external ones like loans and share issuance. Because companies who issue new shares typically do so because they lack internal resources and are unable to do so with new debt, issuing new shares may send a bad signal. The ability of a company to make a profit is intimately tied to the availability of internal finance.

### **Cash Conversion Cycle Theory**

In essence, the operating cycle of an organisation is related to the cash conversion cycle idea. The time gap between the company's inflow of cash from receivables or sales and its outflow of payables for raw materials, wages, and other expenses is determined by the sequential movement of cash in the business operation. As a result, it gauges how long currency is in circulation within an organisation at any given moment.

Richard and Laughlin (1980) were the first to operationalize the cash cycle concept into cash conversion cycle theory for analyzing firm's working capital management efficiency. The cash conversion cycle asserts that, if other factors remain constant, a company will perform better if it manages its working capital effectively.

This study is anchored on the cash conversion cycle theory because it is concerned with the integral relationship between components of working capital such as Debtors, Inventory, Cash, and Creditor on sustainable growth.

## **Empirical Review**

### **Cash Conversion Cycle on Sustainable Growth**

Working capital management's potential to boost sustainable growth through asset use was examined by Apriani et al. in 2020. The annual reports of 165 manufacturing companies listed on the Indonesian Stock Exchange from 2010 to 2017 were the source of the data for the study. The data were analysed using panel data regression and fixed effect regression models.

The finding revealed that the cash conversion cycle has a statistically significant and positive effect on sustainable growth.

Pambayun et al. (2019) looked into how working capital management affects profitability and long-term growth. The annual reports of 136 manufacturing companies listed on the Indonesian Stock Exchange from 2010 to 2017 were the source of the data for the study. The data was analysed using the data panel regression with a fixed estimation model. The outcome showed that the cash conversion cycle has a statistically significant detrimental impact on long-term expansion.

Rahim (2017) examined the performance of businesses and sustainable growth rates. 226 manufacturing companies listed on the Malaysia Stock Exchange from 2005 to 2015 were the source of the study's data, which was taken from their annual reports. The gathered data were analysed using data panel regression.

The results showed a favourable association between sustainable growth rate and business performance that was statistically significant.

#### **Debt Collection Period on Sustainable Growth**

Fekadu (2020) studied working capital management and its impact on firms' performance. The data for the study were chosen from 164 exporting firms in the Ethiopia Ministry of trade. The multiple linear regression model was used to analyse the data collected. The study revealed that the account receivable period has a statistically significant and positive effect on firm performance.

Uguru et al (2018) studied how working capital management affected a company's profitability. The information for the study was taken from the Guinness Nigeria Plc and Nigerian Breweries Plc annual reports for the years 2006 to 2014. The gathered data was analysed using the ordinary least squares model. They discovered that the profitability is statistically significantly and favourably impacted by the account receivable period.

The effect of working capital management on the performance of manufacturing businesses was examined by Alchain and Demtze (2020). The study's data came from an annual report covering 68 manufacturing sectors listed on the Nigerian stock exchange between 2008 and 2018. Panel data regression was utilized in the study to analyse the information gathered. According to the study, the period spent collecting debt has a statistically significant detrimental influence on performance.

#### **Inventory Conversion period on Sustainable growth**

Sani and Nwite (2020) explored how working capital management affects a company's profitability. Ashaka Cement Nigeria Plc selected the data for the study from 2015 to 2019. Multiple regressions were used for the analysis of the data collected. The finding revealed that the Inventory collection period has a statistically significant and positive impact on profitability.

Oyedele et al (2017) studied the effect of working capital management on the financial performance of the firm. The data for the study was obtained from the audited annual report of the Nigerian brewery from 2011 – 2016. The study employed multiple regression to analyze the data collected. The study found on the other hand that the Inventory conversion period has a statistically significant and negative effect on financial performance.

#### **Creditors Payment Period on Sustainable Growth**

Alchain and Demtze (2020) focused on how working capital management affected the industrial sector's performance. The study's data came from an annual report covering the 2008–2018 period for eight manufacturing sectors listed on the Nigerian Stock Exchange. Panel data regression was utilized in the study to analyse the information gathered. According to the study, the time it takes for creditors to make payments has a statistically minor but detrimental impact on how well a business performs. This was consistent with what Sani and Nwite had discovered.

Working capital management's impact on the agriculture and food industries' profitability was researched by Hussain et al. (2016). An annual report of 18 manufacturing companies registered on the Tadawul Stock Exchange from 2009 to 2014 was used to choose the study. The data were analysed using regression and correlation (OLS). The average payment term has a statistically insignificant and detrimental impact on profitability, according to the study.

In their 2014 study, Osundina and Osundina examined how working capital management affected the market value of publicly-traded food and beverage manufacturing companies. The study's data came from an annual report of food and beverage manufacturing companies that were listed on the Nigerian Stock Exchange between 2003 and 2013. The impact was assessed using multiple regression analysis and Pearson product-

moment correlation. According to the study, market value is positively and statistically significantly impacted by the account payment period.

Mohammed and Iram (2017) studied the effect of working capital on the profitability of manufacturing firms. An annual report of 30 manufacturing companies registered on the Pakistan Stock Exchange from 2008 to 2016 was used as the source of the study's data. The study employed multiple regression analysis and the outcome revealed that the account payment period had a statistically significant and positive impact on gross operating profit.

**Data and Methods of Analysis**

**Source and sample of data**

For this study, the 2011–2020 audited annual reports and accounts of Nigerian listed companies were used. Precisely, the data from this study were extracted from the database of machameratros® available on the webpage [www.machameratros.com](http://www.machameratros.com). The sample of the study was chosen from 13 listed firms selected using the sample filtering technique based on the criteria that the firm must have continuous data from 2010-2020, and should be listed on the Nigeria stock exchange as of December 2020. The 13 listed firms consist of 130 firm-year observations that met the criteria for inclusion in the sample size.

**Method of Analysis**

The study used an ex-post-facto research design to conduct an extensive investigation of the relevant issue. After that, descriptive statistics, rectification, and pooled ordinary least square (OLS) regression analysis were used to assess the panel data. Descriptive statistics showing the mean, standard deviation, minimum and maximum, were employed to show the direction of investigating the explanatory and predictable variables of interests, as well as verify data normality. The connection between the variables was further examined using correlation analysis. Panel regression analysis was also employed to investigate the cause-effect relationship between the predictable and explanatory variables, and in addition to test the hypotheses. To check for inconsistencies with the basic assumption of the OLS regression, diagnostic tests such as multi-collinearity, heteroscedasticity, fixed and random-effect, and in addition to the Hausman specification tests, were carried out.

**Table 1;Description of research variables**

| Type of variable     | Variable                             | Measurement   |
|----------------------|--------------------------------------|---|
| Dependent variable   | Sustainable growth rate (SGR)        | $\frac{\text{Net income} \times (1 - \text{dividend payout ratio})}{\text{Total equity}}$ |
| Independent variable | 1) Cash conversion cycle (CCC)       | Account payable period + Inventory holding period - account payable period                |
|                      | 2) Debt collection period (DCP)      | $\frac{\text{Account receivable} \times 365 \text{ days}}{\text{Sales}}$                  |
|                      | 3) Inventory conversion period (ICP) | $\frac{\text{Inventory} \times 365 \text{ days}}{\text{cost of sales}}$                   |
|                      | 4) Creditors Payment Period (CPP)    | $\frac{\text{Account payable} \times 365 \text{ days}}{\text{Cost of sales}}$             |
| Control variables    | Firm sizes (FSZ)                     | Ln (Total asset)  |
|                      | Firm Age (FIRA)                      | Ln (number of years since inception)  |
|                      | Sales growth (SALESGR)               | $\frac{(\text{Sales}_t - \text{Sales}_{t-1})}{\text{Sales}_{t-1}}$                        |
|                      | Leverage (LEV)                       | $\frac{\text{Total Liabilities}}{\text{Total asset}}$                                     |

Source – Researchers Compilation 2022

**Model Modification**

The researcher developed a model from the work of Pambayun et al, (2019) with slight modifications to suit the purpose of this study.

$$SGR = \alpha + \beta_1(CCC)_{it} + \beta_2(DCP)_{it} + \beta_3(ICP)_{it} + \beta_4(CPP)_{it} + \beta_4(FSZ)_{it} + \beta_4(FIRA)_{it} + \beta_4(SalesGr)_{it} + \beta_4(Lev)_{it} + \pi_i + \varepsilon_{it}$$

Where:

- SGR = Sustainable Growth Rate
- CCC = Cash Conversion Cycle
- DCP = Debt Collection Period
- ICP = Inventory Conversion Period
- CPP = Creditors Payment Period
- FSZ = Firm Size
- FIRA = Firm Age
- SALESGR = Sales growth
- LEV = Leverage
- $\pi_i$  = Unobserved specific effect
- $\varepsilon_{it}$  = Error disturbance
- I = represents the agro-processing industry in the sample.
- t = represents the period of the study

**Data Presentation**

The following is a summary of the analysis and the results obtained, along with their corresponding interpretations of working capital management and sustainable growth of Nigerian listed agro-processing firms.

**Table 1: Descriptive Statistics Summary**

| VARIABLES | MEAN     | SD       | MIN     | MAX      | NO OBS |
|-----------|----------|----------|---------|----------|--------|
| SGR       | -0.171   | 1.853796 | -15.722 | 3.146034 | 130    |
| CCC       | 19.541   | 151.2601 | -267.46 | 1037.139 | 130    |
| DCP       | 59.964   | 68.20824 | .0328   | 532.5519 | 130    |
| ICP       | 135.171  | 183.8364 | 15.1967 | 1891.192 | 130    |
| CPP       | 175.5947 | 151.3063 | 7.1543  | 888.9747 | 130    |
| FSZ       | 7.577248 | .6380279 | 6.1911  | 8.6836   | 130    |
| FIRA      | 30.9615  | 13.18468 | 3       | 48       | 130    |
| SALESGR   | 18.63978 | 80.41775 | -90.702 | 721.512  | 129    |
| LEV       | 55.3116  | 27.88227 | -129.97 | 99.5096  | 130    |

Source: Author (2022)

According to the descriptive statistics in table 1 above, the average values for sustainable growth (SG), cash conversion cycle (CCC), debt collection period (DCP), inventory conversion period (ICP), creditor payment period (CPP), firm size (FSZ), firm age (FIRA), sales growth (SGR), and lev are, respectively, -0.1711, 19.54049, 59.96411, 135.171, 175.5947, 7.577248, 30.96154, 18.63978 and 55.3116. The standard deviation shows that Cash conversion cycle (CCC), Inventory conversion period (ICP), Debt collection period (DCP),

Creditor payment period (CPP) and Sales Gr are the most volatile while Lev, Firm Age, firm size, and sustainable growth (SG) are the least volatile.

**Correlation Analysis**

The study employed the Pearson correlation coefficient (correlation matrix) to examine the relationship among the variables and the results are presented in Table 2 below

**Table 2: Pearson correlation matrix of the panel variables**

| Variables | SGR     | CCC     | DCP     | ICP     | CPP     | FSZ     | FIRA    | SalesGR | Lev    |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| SGR       | 1.0000  |         |         |         |         |         |         |         |        |
| CCC       | 0.0758  | 1.0000  |         |         |         |         |         |         |        |
| DCP       | 0.0558  | -0.1991 | 1.0000  |         |         |         |         |         |        |
| ICP       | 0.0949  | 0.5880  | -0.0538 | 1.0000  |         |         |         |         |        |
| CPP       | 0.0266  | -0.2584 | 0.4247  | 0.3085  | 1.0000  |         |         |         |        |
| FSZ       | 0.1974  | -0.3477 | -0.0075 | -0.2681 | 0.1141  | 1.0000  |         |         |        |
| FIRA      | 0.0594  | -0.0969 | -0.1564 | -0.1583 | 0.1026  | 0.2818  | 1.0000  |         |        |
| SalesGR   | -0.5402 | -0.0326 | -0.0383 | 0.0705  | 0.0239  | -0.1564 | -0.1242 | 1.0000  |        |
| Lev       | -0.2370 | 0.0423  | 0.0883  | -0.1109 | -0.0803 | 0.1309  | 0.0908  | 0.2231  | 1.0000 |

*Author's computation (2022) using STATA version 17*

According to the aforementioned data, there is a weak but positive association between sustainable growth (SG) and cash conversion (CCC) (SG/CCC = 0.0758). Sustainable growth and the length of the debt collection process have a slight but favourable association (SG/DCP = 0.0558). There is a strong and positive correlation between sustainable growth and the inventory conversion period (SG/ICP = 0.0949). Sustainable development and the credit payment term have a slight but favourable link (SG/ CPP = 0.0266). The connection between sustainable growth and firm size for the control variables is minor but positive (SG/FSZ = 0.1974). Sustainable growth and firm age have a marginally favourable association (SG/FIRA = 0.0594). The association between sustainable growth and sales growth is poor and negative (SG/SalesGR = -0.5402), while the relationship between sustainable growth and leverage is likewise weak and negative (SG/LEV = -0.2370). The correlation as indicated above is considerably mild and suggest that there is no collinearity among the variable. We however need regression results to test our hypotheses since correlation doesn't tell us about the cause and effect relationship.

**Panel Regression Analyses**

Panel regression analysis is employed to investigate the cause and effect relationship between one dependent variable and a series of other independent variables and also test the hypotheses formulated. Panel regression analysis is used because it has both cross-sectional (143 listed agro-allied firms) and time series (2010 to 2020) properties. The table below is a summary of the panel data regression and the pooled OLS result.

**Table 3: Summary of Regression Result**

|                                     | <b>SG Model<br/>(Pooled OLS)</b> | <b>SG Model<br/>(FIXED Effect)</b> | <b>SG Model<br/>(RANDOM Effect)</b> |
|-------------------------------------|----------------------------------|------------------------------------|-------------------------------------|
| <b>C</b>                            | -3.583<br>{0.062}                | -2.319<br>{0.752}                  | -6.255<br>{0.006} ***               |
| <b>CCC</b>                          | 0.001<br>{0.623}                 | -0.001<br>{0.519}                  | 0.0003<br>{0.829}                   |
| <b>DCP</b>                          | omit<br>{omit}                   | 0.648<br>{0.043} **                | 0.377<br>{0.192}                    |
| <b>ICP</b>                          | 0.000<br>{0.943}                 | 2.897<br>{0.007}***                | 1.217<br>{0.106}                    |
| <b>CPP</b>                          | -0.006<br>{0.791}                | -0.522<br>{0.417}                  | -0.467<br>{0.345}                   |
| <b>FSZ</b>                          | 0.591<br>{0.021}***              | 0.375<br>{0.739}                   | 0.616<br>{0.011}***                 |
| <b>FIRA</b>                         | -0.008<br>{0.505}                | -3.620<br>{0.124}                  | 0.107<br>{0.839}                    |
| <b>SALESGR</b>                      | -0.011<br>{0.000} ***            | -0.009<br>{0.000} ***              | -0.011<br>{0.000}***                |
| <b>LEV</b>                          | -0.010<br>{0.099}                | -0.192<br>{0.001}***               | -0.011<br>{0.046}**                 |
| <b>F-statistics/Wald Statistics</b> | 8.96 (0.00) ***                  | 8.94 (0.00)***                     | 68.43 (0.00) ***                    |
| <b>R- Squared</b>                   | 0.34                             | 0.40                               | 0.35                                |
| <b>VIF Test</b>                     | 3.96                             |                                    |                                     |
| <b>Heteroscedasticity Test</b>      | 2.53 (0.32)                      |                                    |                                     |
| <b>Hausman Test</b>                 |                                  | 19.04 (0.0146) ***                 |                                     |

**Note:** (1) bracket {} are p-values  
 (2) \*\*, \*\*\*, implies statistical significance at 5% and 1% levels respectively

As seen in Table 3 above, the OLS pooled regression revealed that the independent and control variables in the models, respectively, jointly explained around 34% of the systematic fluctuations in sustainable growth in the pooled companies from 2010 to 2020. Other independent factors that could have an impact on sustainable growth but were included in the error term were excluded from the analysis, which is what caused the sustainable growth to be partially unexplained. According to the F-statistic value of 8.96 and its corresponding probability value of 0.00, the OLS regression model is statistically significant overall at the 1% level. The regression model is thus legitimate and suitable for statistical inference.

**Fixed and Random Effect Regression**

Fixed and random effect regression have corresponding F-statistic and Wald-statistic values of 8.94 (0.00) and 68.43 (0.00), which demonstrate that both models are legitimate for drawing inference because they are both statistically significant at 1%. The independent and control variables in the models described jointly [40%;35%] systematic fluctuations in sustainable growth, according to the coefficient of determination (R-squared). More of the variation in sustainable growth was explicated when compared to the OLS pooled

regression, according to the comparison. In the two-panel regression estimation, the Hausman specification test was employed to support the selection of the more efficient model over the less efficient but consistent model. The fixed effect model is preferred to the random effect model, which is the basis of the test. Use random effects if the probability value  $> 2$  is greater than 0.05; alternatively, use fixed effects if the probability value  $< 2$  is less than 0.05. In light of table 3 above, the p-value for the Hausman test (0.0146) indicates that we should accept the alternative hypothesis that the fixed effect model is consistent and reject the null hypothesis. Because the fixed effect regression model is statistically more appealing than the random effect model, we utilize it to estimate the parameters for this investigation.

## **Test of Hypotheses**

### **Hypothesis One**

The agro-processing business in Nigeria is not significantly impacted by the cash conversion cycle in terms of sustainable expansion.

### **Interpretation and Decision**

The cash conversion cycle has a beta coefficient of -0.001 and a probability value of 0.519 (52%) which is higher than the 5 percent criterion of significance, according to Table 3 above. The alternative hypothesis is rejected, and the null hypothesis is accepted. This suggests that the cash conversion cycle has a negative and statistically insignificant effect on sustainable growth. Hence cash conversion cycle has no significant effect on the sustainable growth of the agro-processing industry in Nigeria.

### **Hypothesis Two**

The debt collection period has no significant effect on the sustainable growth of the agro-processing industry in Nigeria.

### **Interpretation and Decision**

We found from the result in table 3 above that the debt collection period has a beta coefficient of 0.648 with a probability value of 0.043 (4.3%) which is less than the desired 5% level of significance, we reject the null hypothesis and accept the alternative hypothesis. The result suggests that the debt collection period is statistically significant and has a positive relationship with sustainable growth. As such debt collection period has a significant effect on the sustainable growth of the Agro-Processing industry in Nigeria.

### **Hypothesis Three**

The inventory conversion period has no significant effect on the sustainable growth of the agro-processing industry in Nigeria.

### **Interpretation and Decision**

The inventory conversion period has a beta coefficient of 2.897 and a probability value of 0.007 (0.7 percent), which is far below the level of significance of 5%, as shown in Table 3 above. The alternative hypothesis is accepted, whereas the null hypothesis is rejected. This suggests that the inventory conversion phase is statistically important and influences favourably sustained growth. As a result, the inventory conversion period significantly affects the processing industry's ability to grow sustainably in Nigeria.

### **Hypothesis Four**

Creditors' payment period has no significant effect on the sustainable growth of the agro-processing industry in Nigeria.

### Interpretation and Decision

The result in table 3 above demonstrates that the creditor's payment time has a beta coefficient of -0.522 and a p-value of 0.417, or about 42 percent, which is significantly higher than the intended level of significance of 5 percent. The alternative hypothesis is disregarded, and the null hypothesis is accepted. This suggests that while negatively affecting sustainable growth, the payment terms of creditors are negligible. Therefore, the length of the creditors' payment period has little bearing on Nigeria's agro-processing industry's sustainable expansion.

### Discussion of Results

The study's findings revealed a statistically insignificant but potentially negative impact of the cash conversion cycle on long-term growth. A lengthier cash conversion cycle will probably have a potential negative impact on sustainable growth by 0.001, according to the negative correlation between the cash conversion cycle and sustainable growth. We accept the null hypothesis and rule out competing hypotheses, as was already mentioned. It supports the claim that businesses with shorter cash conversion cycles can boost their financial performance by being able to raise money internally, which could lessen their reliance on borrowing or the expensive and time-consuming issue of shares as external financing (Pambayun et al. 2019). In addition, it has been taking firms a long time to convert their investment in raw materials into liquid cash but the shorter the time the better for the firm. The evidence of this study is at variance with Apriani et al (2020), Pambaym et al (2019), and Rahim (2017).

The results from the fixed effect regression model show that the length of debt collection had a statistically significant and favourable effect on the long-term expansion of the agro-processing sector. The positive coefficient of 0.648 between the debt collection period and sustainable growth of the industry listed in Nigeria indicates that an increase in the debt collection period will increase sustainable growth by 65%. As already mentioned, we reject the null hypothesis and accept the alternative hypothesis. It means that a unit increase is expected to cause a corresponding unit increase in the sustainable growth of the industry in Nigeria. The evidence of this study is consistent with Fekadu (2020) and Uguru et al (2018) but contradicts AlchainDemtze (2020).

The outcomes of the fixed effect regression model show that the inventory conversion period has a statistically significant and favourable impact on the long-term development of the Nigerian agro-processing sector. The positive coefficient of 2.897 between the inventory collection period and sustainable growth of the industry in Nigeria indicates that an increase in the inventory collection period will increase sustainable growth by 289.7 or 290%. As mentioned above, we reject the null hypothesis and accept the alternative hypothesis. It follows that a low stock turnover ratio suggests the purchase of slow-moving or obsolete stock or the sale of products at high prices or a slowdown in trading or excess investment in stock. On the other hand, a high stock turnover ratio suggests the acquisition of slow-moving or obsolete stock or the sale of products at high prices or is a fast-moving business. However, a high inventory turnover ratio in comparison to other businesses operating in the same sector is frequently viewed as a sign of efficiency. The data from this study support Sani Nwite (2020) and Uguru et al. (2018), although they disagree with Oyedele et al (2017).

The evidence obtained from the fixed effect regression model shows that creditors' payment period found a statistically insignificant and negative effect on the sustainable growth of the agro-processing industry in Nigeria. The negative coefficient of -0.522 between creditors' payment period and sustainable growth implies that an increase in creditors' payment period by 1% will decrease sustainable growth by 52.2%. As already mentioned, accept the null hypothesis and reject the alternative hypothesis. In other words, waiting longer to settle purchases usually results in losing discounts for early payment, or delaying payments may force a business to incur interest charges, which could negatively impact profitability and liquidity due to debt

defaults. Again, high creditors turnover ratio indicates that the firm is not making use of its credit facility from its suppliers which could lead them to problems if the policy does not match the debtor's turnover ratio whereas a low creditor's turnover ratio suggests that the company is not taking advantage of all available discount associated with prompt payment. Based on the evidence of this study, it was agreed with Alachain and Demtze (2020) and Hassen et al (2016). Conversely, the findings of Mohammed and Iram (2017) and Osundina and Osundina (2014) disagreed with the findings of this study.

### **Conclusion**

The study explores how effective working capital and its elements, including the cash conversion cycle, debt collection period, inventory conversion period, and creditor's payment time, affect the agro-processing industry's ability to grow sustainably in Nigeria. In light of the results, this supports the claim that businesses with shorter cash conversion cycles are better able to achieve sustainable growth through their capacity to raise money internally, potentially reducing their reliance on expensive external sources of funding like borrowing or issuing new securities.

Regarding the debt collection period, however, a shorter debt collection period is better for sustainable growth because it enables the use of cash to pay bills on time to receive discounts for making early payments and because it saves businesses from having to incur the high cost of borrowing to finance investments in their clients.

Similarly, taking into account the results, the cause of this is that a reduction in the inventory holding duration might also promote sustainable growth through control of the inventory holding expenses, including insurance, warehousing, storage, inventory theft, and rotting costs, among others. Similar to the previous point, the conclusion suggests that postponing payments forces businesses to pay the expense of charging interest for late payments, which may negatively impact profitability and liquidity due to debt defaults.

The study's final finding was that the control variables included in the analysis are crucial factors in the sustainable development of Nigeria's agro-processing sector.

To sustain growth based on their capacity to create funds internally, the study advises that a shorter cash conversion cycle be maintained. This might lessen their dependency on external finance, which frequently tends to be expensive. A shorter debt collection period should be kept in place since it enables businesses to avoid expensive borrowing for investment funding and allows for prompt bill payments to take advantage of early payment incentives. This could be achieved through the formulation of sound credit policies and the collection procedure of a firm. Though, an aggressive collection approach can affect the company's turnover by creating conflict between sales and collection. The inventory conversion period should be treated as a critical or strategic activity of the agro-processing industry because it constitutes part of the business's strategic objective. Finally, shorter creditors' payment period be maintained for positive credit worthiness.

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