**Journal of Global Accounting**
Vol. 6 No. 3 September, 2019. ISSN: 1118-6828
www.unizikjga.com

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# INVENTORY TURNOVER AND FIRM PERFORMANCE OF QUOTED CONSUMER GOODS MANUFACTURING FIRMS IN NIGERIA

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## ABSTRACT

*The study examined the relationship between inventory turnover and firm performance of quoted consumer goods manufacturing firms in Nigeria. Inventory management is critical to the success of manufacturing organisations in today's competitive and dynamic business environment. The study specifically examined the relationship between inventory turnover period and two firm performance proxies; the net profit margin and operating cash flow to sales ratio. The study adopted the ex-post facto research design. The population of the study comprised quoted consumer goods manufacturing firms and the sample was delimited to this sector. The study relied on secondary data obtained from annual reports and accounts. The data were analysed using multiple regression technique. The results showed a non-significant negative relationship between inventory turnover period and net profit margin; secondly, a non-significant negative relationship between inventory turnover period and operating cash flow to sales ratio. Based on these, the study recommends amongst others that managers establish deliberate strategies for efficient inventory management; practices such as Demand Forecasting, Just in Time, and Vendor Management Inventory proven to positively impact organizational performance are recommended to ensure a sustainable increase in firm performance.*

**Keywords:** Inventory Turnover Period, Net Profit Margin, Operating Cashflow to Sales Ratio, Firm Performance.



Article Info: **Received** November 30, 2019; **Reviewed** December 28, 2019; **Accepted** December 31, 2019.

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## 1. Introduction

Working capital comprises of current assets and current liabilities. A significant portion of current assets in manufacturing firms is inventory. Inventories represent stocks of resources held for the purpose of future production and/or sales. According to Ogbo, Onekanma, and Ukpere (2014) they are idle resource with economic value. In a typical manufacturing firm there exist several types of inventories based on their individual purposes (Kaen, 1995), they include raw material inventories, work-in-progress inventories, and finished goods inventories. Inventory often accounts for as much as 40% of total invested capital in manufacturing organizations (Moore, Lee, & Taylor, 2003). While, more than 50% of total assets invested in working capital, such as inventory, accounts receivable, and accounts payable (Darun, Roudaki, & Radford, 2015; Beheshti, 2010; Gill, Biger, & Mathur, 2010). The "turnover of inventory represents one of the primary sources of revenue generation and subsequent earnings for the company" (Prempeh, 2015). The significant contribution of inventory to total investments in a firm has necessitated the need for proper inventory management in manufacturing organisations to ensure growth and profitability (Anichebe & Agu, 2013).

Inventory management enables a firm to store and retrieve materials easily, improves sales effectiveness and reduces operational cost (Ogbo, Onekanma, & Ukpere 2014). Inventory management affects major business functions; such as, production/operations, marketing and sales, stores and warehousing, finance, and accounting. Proper inventory management would enable various departments and functional units in an organisation achieve a trade-off in inventory decision-making. Thus, inventory management releases tied up capital for use elsewhere productively (Ghosh & Kumar, 2003). Broadly, speaking inventory is maintained to meet operating demands, flexibility in production scheduling, change in raw material, delivery time and change in economic purchase order size (Inyama, 2006). The goal of inventory management is to have enough and not too much (Coyle, Bardi, & Langley, 2003).
The manufacturing sector is crucial to Nigeria's growth and development. In developed economies, the manufacturing sector accounts for a significant share of the industrial sector (Ajayi, 2007).



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Manufacturing sector refers to those industries involved in the manufacturing and processing of items, which entails either the creation of new commodities or value addition. The final products can either serve as finished goods for sale to customers or as intermediate goods used in the production process. Thus it is therefore inevitable for manufacturing firms to exist without inventories which could either be in finished goods or raw materials or work-in-progress. As at January 2017, the manufacturing 'Purchasing Managers' Index [PMI]' stood at 48.2 index points, indicating a decline in the manufacturing sector. The composite PMI for the manufacturing sector is computed as the weighted average of five diffusion indices: production level, level of new orders, suppliers' delivery time, employment level and raw materials inventory/work in progress (Central Bank of Nigeria [CBN], 2017). This indicated a decline below an average of 50 points which is a reflection of the low level of productivity and growth witnessed in the manufacturing sector in recent times. Despite the attribution to several external factors, such as high exchange rate, unfavourable business policies, etc., the ability of an organisation to manage the internal factors still goes a long way to determine its survival. And a significant internal factor is inventories which are of paramount interest to manufacturing firms. There is evidence that many manufacturing firms still lack in the application of operation research techniques in Nigeria (Ogbo, Onekanma, & Ukpere, 2014), despite several models (both deterministic and stochastic) in use (Akinlabi, 2017).

The problem still remains that most managers lack strategies for efficient inventory management. Thus, the inadequacies among financial managers, in the form of high bad debts, high inventory costs etc., have adversely affected operating performance of most firms (Egbide, 2009). These problems have negatively affected the production runs and delivery of finished goods to customers, such that many factories are either temporarily or completely shut down (Atseye, Ugwu, & Takon, 2015). This was substantiated in the study by Adeyeye, Ogunnaike, Amaihian, Olokundun, and Inelo (2016), when they noted that most manufacturing firms still find it extremely difficult to maintain optimum inventory levels. Despite the abundance of studies on inventory management; there is a wide acknowledgement that findings are inconsistent. From a global perspective, Demeter (2003) reported a positive effect of inventory turnover on organization performance (proxied by return on sales), using dataset from International Manufacturing Strategy Survey (IMSS), of over 700 companies in 23 countries. Vastag and Clay-Whybark (2005) using a sample of



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1,222 world-wide organizations drawn from the Global Manufacturing Research Group (GMRG) database, concluded that inventory turnover had no direct relationship with organization performance. The wide variations in results may also be attributed to country specific differences, for instance, studies by Ramachandran and Jankriaman (2009) in India; Pong and Mitchell (2012) in the U.K.; and, Elsayed (2015a) in Egypt reported a positive relationship between inventory efficiency and financial performance.

In the Nigerian context mainly studies have focused on the joint effect of working capital components or the cash conversion cycle; while documenting the effect of inventory turnover period as an outcome. Majorly studies have focused on profitability ratios, such as ROA, ROE, etc. Few studies, which include studies by Amahalu, Egolum, Ezechukwu, and Obi (2018), used information from annual reports and accounts examined the effect of inventory turnover period on growth proxied by sales growth; however, the study was limited to only firms in the brewery sector. Other studies, include Kareem (2018) focused on SMEs using survey methodology; Akinlabi (2017) focused on flour mills companies; Agu, Obi-Anike, and Eke (2016) focused on three companies and used survey methodology; Ogbo, Onekanma, and Ukpere (2014) a case study of 7up Bottling Company and survey methodology; Anichebe and Agu (2013) focused on three companies and used survey methodology; and, Oliomogbe (2002) a case study of Nigeria Breweries Plc. and Nigeria Bottling Company Plc. Thus, the literature is filled with studies mainly based on survey methodology and fixed effect regression techniques. To address this gap in the literature, the study examined the relationship between inventory turnover and firm performance of quoted consumer goods manufacturing firms. The study further explores the relationship between inventory turnover and firm performance using the Panel Estimated Generalised Least Squares (EGLS) approach to address methodological weakness in prior studies. The study formulates the following hypotheses in the null form as follows:

$Ho_1$: There is no significant relationship between inventory turnover period and net profit margin of quoted consumer goods manufacturing companies.

$Ho_2$: There is no significant relationship between inventory turnover period and operating cash flow to sales ratio of quoted consumer goods manufacturing companies.



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## 2. Review of Related Literature

### 2.1 Conceptual Review

#### 2.1.1 Inventory Turnover

Inventory is an accounting term for the value or quantity of raw materials, components, assemblies, consumables, work-in-progress and finished stock that are kept or stored for use as the need arises (Lysons & Farrington, 2006). It includes the tangible materials /assets of a company other than the fixed assets; it comprises raw - materials, all the items to be incorporated into the finished products, components, work in progress, finished items or saleable products, that are stored for use as the need arises. Different types of inventories are used to satisfy different purposes (Kaen, 1995). Raw materials are basic inputs/parts of a product yet to be converted through a manufacturing or transformational process (Pandey, 1995). Raw material inventories are used to make production scheduling easier, to take advantage of price changes and quantity discounts, and to hedge against supply shortages. Pandey (1995) defined work-in-progress as semi-finished manufacturing products that are at various stages of completion in a production process.Work-in-progress inventories make the production process smoother and efficient by providing a buffer between the various production processes. Finished goods are products that have passed the various stages of production and awaiting distribution (Kothari, 2004). Finished goods inventories help to meet up with immediate needs of customers, serve customers on a continuous basis and meet fluctuating demands (Scherr, 1989).

Another category of inventories is the MRO 'Maintenance, Repair and Operating' Supplies, which consists of items consumed in the process of production, but which do not become part of the product, e.g. lubrication oil, soap, machine repair parts (Oliomogbe, 2002). Inventories provide a significant link between production and sales; and, also constitute a large proportion of the cost of production (Ogbo, Onekanma, & Ukpere, 2014). Inventory management is a science based art of ensuring that just enough inventory stock is held by an organization (Coleman, 2000; Jay & Barry, 2006) to meet both external and internal demand (Lewis, 1995). An inventory system is a set of policies to control and monitor inventory levels and determine what level should be maintained, orders to be placed and amount of stock to be replenished (Ogbo, Onekanma, & Ukpere, 2014).



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Inventory management refers to the process to define right inventory levels at various nodes within a supply chain network to minimize stock out; wastage of material due to expiry; optimize investment in inventory and storage facilities as per the available budget (Okanda, Namusonge, & Waiganjo, 2016). According to Kotler (2002), inventory management entails all the activities involved in developing and managing inventory levels of raw materials, semi-finished materials (working-progress) and finished goods so that adequate supplies are available and the costs of over or under stocks are low. Inventory management involves planning, organizing, and controlling the flow of materials from initial purchase through internal operations to the service point through distribution (Smaros, Lehtonen, Appelquist, & Holmstrom, 2003). Inventory management consists of three basic issues, namely: the number of units of inventory items a firm should hold in stock; units ordered or produced at a given time; and, point at which inventory should be ordered or produced.

The objective of inventory management is to make sure that an organisation does not lose sales by having too little inventory or lose money by investing in too much inventory (Mathur, 2002). Therefore both excess and inadequate investment in inventories is un-desirable (Fabozzi & Peterson, 2003). Hence, firms' should operate within the two danger points. Inventory management helps to hold the costs of ordering and carrying inventories to the lowest possible level. The key objectives of inventory management/control is to inform managers on how much inventory to re-order, when to reorder, how frequently orders should be placed and the appropriate safety stock, in order to avoid stock-outs (Ogbo, 2011). There are three key motives for holding inventories: (1) transaction, (2) precautionary, and (3) speculative motives. The transaction motive occurs when there is a need to hold stock to meet production and sales requirements. A firm might also decide to hold additional amount of stock to cover the possibility that it may have under estimated its future production and sales requirements. This represents a precautionary motive, which applies only when future demand is uncertain. The speculative motive for holding inventory might entice a firm to purchase a larger quantity of materials than normal in anticipation of making abnormal profits. Hill and Sartoris (1992) further elaborated on the motives for holding inventory, to include *viz.* contractual, speculative, precautionary, and transaction motives.



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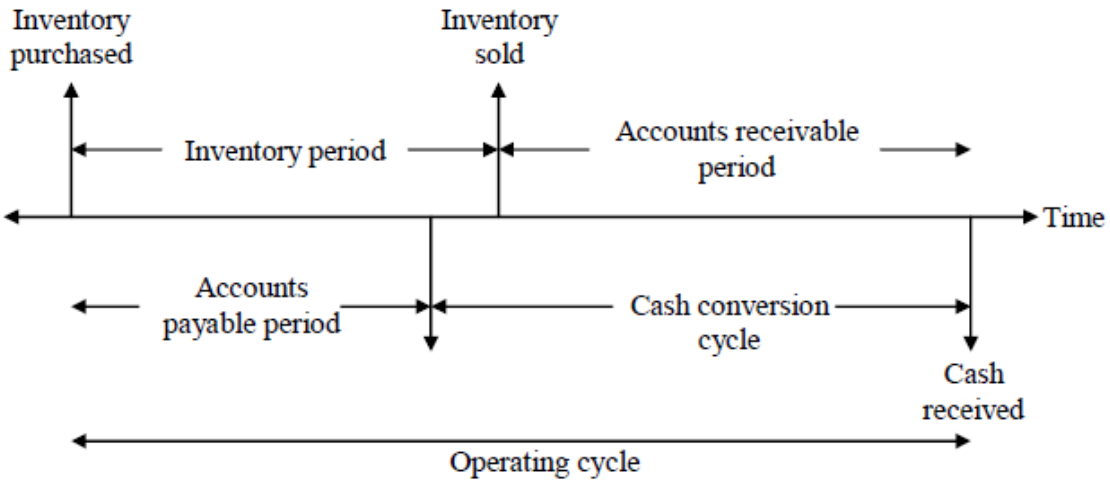
The motives are determined influenced by a range of factors; such as, the pattern of sales, type of business (manufacturing, wholesaling or retailing), length of the production process, dependability of supply sources, seasonality of sales, predictability of sales, (Madura & Veit, 1988) economic, political, and other macroeconomic factors, the opportunity costs of finance, ordering, transport, storage, insurance, obsolescence, spoilage, theft and the opportunity cost of tying up funds in inventory (Kallberg & Parkinson, 1984; Kamath, 1989). According to Banjoko (2004, p.192) the seven reasons for holding inventories by manufacturing firms are:

1. To enhance uninterrupted flow of production.
2. To meet variations in product demand.
3. To allow flexibility in production scheduling.
4. To decouple successive stages of operations.
5. To level production activities.
6. To provide a means of hedging against future prices and delivery uncertainties.
7. To provide a means of obtaining economic lot size and gaining quantity discounts.

Chase and Aquilano (1973, p. 547) enumerated five reasons for holding inventories. They are:

1. To maintain independence of operations.
2. To meet variations in product demand.
3. To allow flexibility in production scheduling.
4. To provide a safeguard for variation in raw material delivery time.
5. To take advantage of economic purchase order size.

**Figure 1: The cash conversion cycle showing the inventory turnover period**




Source: Jordan (2003)



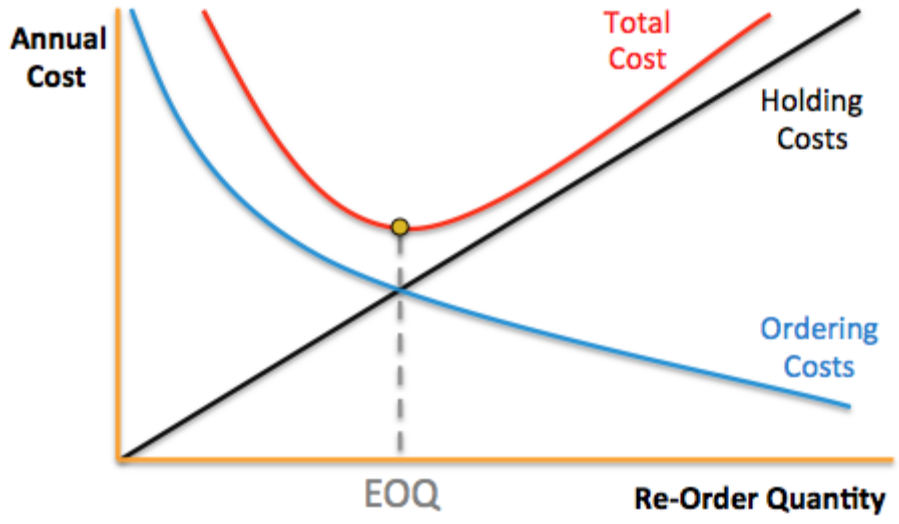
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There are several advantages of holding inventory in a manufacturing organisation; such as, to ensure continuity of supplies of materials needed in production; to meets customers anticipated needs; to meet production requirements in times of raw materials scarcity; to prevent operational delays; to guard against temporary shutdown of manufacturing (that is, buffer between demand and supply); to reduce the risk of shortages through existence of safety stocks; and, to enjoy benefits of quantity discounts (Adedayo, Ojo, & Obamiro, 2006).

### 2.1.2 Inventory Management Models

The most widely applicable inventory management model is the Economic Order Quantity [EOQ]. EOQ is the quantity which minimizes the balance of costs between inventory holding costs and re-orders costs. It refers to the optimal ordering quantity for an item of stock that aids in the minimization of costs (Munyao, Omulo, Mwithiga, & Chepkulei, 2015). The primary goal of economic order quantity is to determine the optimal number of units to reorder so that the total cost associated with the purchase, delivery and storage of the product are minimized (Fritsch, 2014). Holding costs include such costs as interest on capital invested in the stock, storage charges, lightening, heating, refrigeration, rent, handling costs, auditing, stock taking or perpetual inventory costs, insurance and security deterioration, obsolescence and pilferage, etc. The formula goes back to 1913, when Ford W. Harris wrote an article called "How Many Parts to Make at Once" (Boyd, 2018).

**Figure 2: The EOQ Graph**




Source: Fritsch (2014)



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The EOQ is calculated using the formula:

**EOQ = square root of [(2 x demand x ordering costs) ÷ carrying costs]**

The EOQ calculation is based on a number of assumptions; which includes (Ogbo, 2011):

1) That there is a known, constant, stock holding costs;
2) That there is a known, constant ordering costs;
3) That the rate of demand are known
4) That there is a known constant price per unit;
5) That replenishment is made instantaneously, that is, the whole batch is delivered at once; and,
6) No stock-outs are allowed

**Economic production quantity models**

Economic Production Quantity model (EPQ) determines the quantity a company or retailer should order to minimize the total inventory costs by balancing the inventory holding cost and average fixed ordering cost (Ziukov, 2015). The EPQ model was developed by E.W. Taft in 1918 (Taft, 1918). This method is an extension of the EOQ model.

### 2.1.3 Inventory Turnover Period

Inventory turnover, according to Rao and Rao (2009, p. 42), refers to "the number of times that an inventory "turns over" or cycles through the firm in a year". The inventory turnover period computes the time required for conversion of raw materials into finished goods. It is calculated as [(inventory/cost of goods sold*365]. According to Levy and Weitz (2009), inventory turnover can be increased in two ways: Firstly, by reducing the number of merchandise categories, the number of stock keeping units (SKU) within a category or the number of items within a stock keeping unit, which means narrowing the range that can cause a decrease in sales of goods. Secondly, by means of buying merchandise more often and in smaller quantities, which reduces the average inventory without reducing the sales, but by buying smaller quantities the gross profit margin decreases (buyers cannot take advantage of quantity discounts and transportation economies of scale) while operating expenses of trading business increase (higher costs of placing orders and monitoring deliveries).

Edwards (2009) cited in Amahalu, Egolum, Ezechukwu, and Obi (2018) observed that inventory turnover period is directly related to the cash conversion cycle. Therefore an



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increase in the time it takes to convert inventories into sale also means an increase in the time to complete the cash conversion cycle. Thus, there will be more liquidity risk in the level of inventory and as a result, the business has to liquidate the inventory in order to complete cash conversion cycle (Amahalu, Egolum, Ezechukwu, & Obi, 2018).

### 2.1.4 Inventory Turnover and Firm Performance

Firm performance may be reflected in a variety of indices; such as productivity and profitability. Productivity is an index that measures output (goods and services) relative to the input (labor, materials, energy, and other resources) used to produce it (Ngumi, 2015). It is measured by comparing the quantity of output with the quantity of one or more inputs used to produce that output, expressed as the ratio of output to input (Jurison, 1997). Jurison (1997), broadly classifies productivity measures as single factor productivity measures (relating a measure of output to a single measure of input), multifactor productivity measures (relating a measure of output to a bundle of inputs), and total productivity measures (relating a measure of output to all inputs).

Profitability is the ability of a business to earn a profit, i.e., the ability to make profit from business activities (Nishanthini & Nimalathasan, 2013). Profit means as an absolute measure of earning capacity, while profitability is relative measure of earning capacity (Nishanthini & Nimalathasan, 2013). Profitability measures management efficiency in the use of organisational resources in adding value to the business (Mohamed, 2013). Profitability is determined by both internal and external factors. Internal determinants of profitability are firm specific while the external factors are industry related. Internal factors of size, liquidity, leverage and financial assets of the firm have been found to have a major impact on profitability (Khawaja, Bhutto, Butt, & Abbas, 2011). The effect of inventory management on profitability and productivity which leads to improved firm performance was established by Peterson and Joyce (2007) through the following:

1. Less dependence on importation through producing inventory needed by a firm itself.
2. Inventory control systems minimize inventory cost and maximize profit margins.

The study by Atnafu and Balda (2018) on a sample of Micro and Small Enterprises (MSEs) in Ethiopia using Structural Equation Modelling indicated that higher levels of inventory



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management practice lead to enhanced competitive advantage and improved organizational performance. Similarly, in Kenya the study by Naliaka and Namusonge (2015) showed that inventory management affects competitive advantage of manufacturing firms. Effective inventory management provides opportunities to create sustainable competitive advantage and enhance competitiveness (Atnafu & Balda, 2018). This can result in boosting the productivity of the enterprise in the long-run. Poor inventory management system would negatively affect the profitability of an organization (Atnafu & Balda, 2018). Lieberman and Demeester (1999), showed a positive relationship between inventory reduction and productivity growth. Specifically, they showed that 10% reduction in inventory was responsible for 1% gain in labor productivity.

## 2.2 Theoretical Framework

### 2.2.1 Liquidity Preference Theory

Liquidity preference theory was developed by economist John Keynes in 1936. The theory argues that when all other things are kept constant, investors prefer liquid investments to illiquid ones and will always demand a premium for investments that have longer maturity periods (Too, Kubasu, & Langat, 2016). According to the theory, money is the most liquid asset. The more quickly an asset is converted into money, the more liquid the asset. When an asset is easily converted into cash, it provides liquidity for the company in its day-to-day operations. The demand for liquidity is determined by three motives which are transactionary, speculative and precautionary motives (Mandiefe, 2016): (i) the transactions motive-to bridge the gap between receipt of income and planned expenditures; (ii) the precautionary motive-to provide a reservoir of purchasing power that can be used to finance unanticipated expenditures, and (iii) the speculative motive-to satisfy the desire to hold wealth in the most liquid form if one express interest rates on alternative assets to rise, thereby causing capital losses (Keynes, 1936).



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## 2.3 Empirical Review

**Table 1: Summary of Empirical Review**

| S/N | Author(s) Surname | Year | Country | Period | Methodology | Key Findings |
|---|---|---|---|---|---|---|
| 1 | Amahalu, Egolum, Ezechukwu, and Obi | 2018 | Nigeria | 2010-2016 | Descriptive + Multiple regression technique | The results showed that inventory conversion period has a significant positive relationship with ROA; and, firm growth. However, there was a non-significant positive relationship between inventory conversion period and ROE. |
| 2 | Atnafu and Balda | 2018 | Ethiopia | 2018 | Descriptive + Structural equation model + Multiple regression technique | The results showed that inventory management practices (ABC Analysis, Economic Order Quantity, Demand Forecasting, Just in Time, and Vendor Management Inventory) had a direct positive impact on organizational performance and competitive advantage. |
| 3 | Kareem | 2018 | Nigeria | 2018 | Descriptive + Multiple regression technique | The results showed that inventory management practices had a positive significant impact on performance of SMEs. |
| 4 | Bawa, Asamoah, and Kissi | 2018 | Ghana | 2007-2016 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The results showed a negative insignificant relationship between ROA and inventory conversion period; also, a positive insignificant relationship between Operating Cashflow and inventory conversion period. |
| 5 | Akinlabi | 2017 | Nigeria | 2017 | Cross-sectional survey + Pearson Product Moment Correlation + Multiple regression technique | The results showed that inventory shrinkage had a significant negative effect on customers' satisfaction; inventory investment had significant positive influence on competitive advantage |
| 6 | Agu, Obi-Anike, | 2016 | Nigeria | 2016 | Survey + Pearson Product | The results showed that inventory control had a significant effect on productivity; there was also a positive relationship between |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | and Eke | | | | Moment Correlation + Multiple regression technique | demand management and customer satisfaction; and, Just-in-Time had a significant effect on growth of the studied manufacturing firms. |
| 7 | NdiranguKung'u | 2016 | Kenya | 2009-2014 | Descriptive + Pearson Product Moment Correlation + Simple regression technique | The regression results also confirmed a positive significant influence of inventory control practices on profitability of manufacturing firms in Kenya. |
| 8 | Öner | 2016 | Turkey | 2005-2014 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The average collection period and days of inventory outstanding had significant negative relationship with profitability; while, average payment period had a significant positive relationship. |
| 9 | Oseifuah and Gyekye | 2016 | South Africa | 2003-2012 | Descriptive + Multiple regression technique | The results showed a negative relationship between working capital management and ROA; a negative relationship between inventory conversion period and ROA; a negative relationship between accounts receivables conversion period and ROA; and, a positive relationship between accounts payable deferral period and ROA. |
| 10 | Khan, Ayaz, Waseem, Abbasi, and Ijaz | 2016 | Pakistan | 2008-2013 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The results showed that inventory and accounts payable had negative impact on gross profit; while, accounts receivable had a positive impact. |
| 11 | Too, Kubasu, and Langat | 2016 | Kenya | 2008-2013 | Descriptive + Pearson Product Moment Correlation | The results showed that there was a significant negative correlation between payables period, receivable period and inventory period with profitability. This was also confirmed by the regression |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | + Multiple regression technique | results. |
| 12 | Sitienei and Memba | 2015 | Kenya | 1999-2014 | N/A + Pearson Product Moment Correlation + Multiple regression technique | The results showed a negative relationship between inventory turnover, inventory conversion period and storage cost with profitability; while, the inventory level had a direct relationship with firm size and storage cost. |
| 13 | Ngumi | 2015 | Kenya | N/A | N/A + Pearson Product Moment Correlation + Multiple regression technique | The results showed that inventory management practices (ABC, Just-in-Time (JIT), Economic Order Quantity (EOQ), Materials and Requirements Planning, Vendor Managed Inventory, Distributions Requirements Planning, and Radio Frequency Identification) had a significant positive effect on firm productivity; however, bar coding had positive non-significant effect. |
| 14 | Naliaka and Namusonge | 2015 | Kenya | N/A | N/A + Multiple regression technique | The results showed that information technology, inventory control systems, inventory lead time and inventory control practices were important factors for the attainment of competitive advantage by manufacturing firms in Kenya. |
| 15 | Prempeh | 2015 | Ghana | 2004-2014 | N/A + Pearson Product Moment Correlation + Multiple regression technique | The results showed that raw materials inventory management had a significant positive effect on profit. |
| 16 | Ogbo, Onekanma, and Ukpere | 2014 | Nigeria | N/A | Descriptive + Pearson Product Moment Correlation + Multiple regression | The results showed that inventory control management reduces operational cost. |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | technique | |
| 17 | Anichebe and Agu | 2013 | Nigeria | 2013 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The results showed that there was significant relationship between good inventory management and organizational effectiveness. |
| 18 | Majeed, Makki, Saleem, and Aziz | 2013 | N/A | 2006-2010 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The results showed that average receivables collection period, average inventory conversion period, and cash conversion cycle had negative relationship with firm performance [ROA, ROE, and EBIT]. However, average payment period had positive relationship with ROE and EBIT. |
| 19 | Owolabi and Alu | 2012 | Nigeria | 2012 | Descriptive + Multiple regression technique | The results showed that inventory conversion period and debtors' collection period had a negative non-significant effect on return on total asset; while, creditors' payment period and cash conversion period had positive non-significant effect as well. |
| 20 | Khawaja, Bhutto, Butt, and Abbas | 2011 | China, Japan, India, Pakistan, Bangladesh, Iran and Korea | 2006-2010 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The results showed a negative significant relationship between receivable collection period, Inventory turnover period, and payment period with profitability (gross operating profit). |
| 21 | Gill, Biger, and Mathur | 2010 | USA | 2005-2007 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The results showed that the effect of accounts receivable is negative and significant; accounts payable is negative and not significant; while, inventory turnover period had positive non-significant effect on gross operating profit. |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 22 | Kithii | 2008 | Kenya | 2001-2006 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique (Pooled least square) | The results showed that there was a significant negative relationship between working capital management (cash conversion cycle, average collection period and inventory turnover in days) and profitability (gross operating profit); however, average payment period had a positive relationship. |
| 23 | Raheman and Nasr | 2007 | Pakistan | 1999-2004 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The results showed a significant negative effect of average collection period, inventory turnover in days, average payment period, cash conversion cycle on profitability (net operating profitability). |
| 24 | Deloof | 2003 | Belgium | 1992-1996 | Descriptive + Pearson Product Moment Correlation + Multiple regression technique | The regression results showed that net operating income, days inventories were positive but not significant; days accounts payable and days accounts receivable were negative and significant; however, cash conversion cycle was positive and statistically significant. |

Source: Authors' Compilation, 2019

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## 3. Design and Methodology

The study adopts the *ex post facto* research design. The ex post facto research design is a systematic empirical inquiry, in which the observer has no direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulated. The population of the study consists of consumer goods manufacturing firms quoted on the floor of the Nigerian Stock Exchange (NSE) as at Dec 2018. The study used the purposive sampling method in selecting sampled companies. The final sample for the study comprised of twenty one firms for a seven (7) year period spanning from 2011-2017 who filed their annual reports. The study is based on secondary data; obtained from annual reports of selected companies for the period. The data were analyzed using multiple regression technique with the aid of *E-view 9.* The study used a panel data method, the choice of this method is because, panel data is more useful in studying the dynamics of adjustment and is better able to identify and measure effects that are simply not detectable in pure cross-sections or pure time - series data (Kithii, 2008).

### 3.1 Model Specification

$$NPM_{(i,t)} = \alpha + IT_{(i,t)} + FS_{(i,t)} + LEV_{(i,t)} + AGE_{(i,t)} + SG_{(i,t)} + \mu \ldots\ldots\ldots\ldots\ldots 1$$

$$OCFR_{(i,t)} = \alpha + IT_{(i,t)} + FS_{(i,t)} + LEV_{(i,t)} + AGE_{(i,t)} + SG_{(i,t)} + \mu \ldots\ldots\ldots\ldots\ldots 2$$

Where:

| | | |
|---|---|---|
| NPM | = | Net Profit Margin |
| OCFR | = | Operating Cash Flow to Sales ratio |
| IT | = | Inventory Turnover |
| FS | = | Firm Size |
| LEV | = | Leverage |
| AGE | = | Firm Age |
| SG | = | Sales Growth |
| α | = | Constant |
| μ | = | error term |



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**Table 2: Description of variables**

| Variable | Proxy | Description |
|---|---|---|
| Net Profit Margin | NPM | Net Profit/Revenue |
| Operating Cashflow | OCFR | Operating Cash Flow/Revenue |
| Inventory Turnover | IT | Inventory Turnover – [(inventory/cost of goods sold) * 365] |
| Firm Size | FS | Natural logarithm of total assets |
| Leverage | LEV | Debt/Equity |
| Sales Growth | SG | [(current year's revenues/last year's revenues) – 1] x 100% |
| Firm Age | FA | Natural logarithm of number of years since incorporation |

Source: Author's Compilation (2019)

## 4. Data Presentation and Results

### 4.1 Descriptive Statistics

The table below shows the computed statistics of the data utilised for the study for the period of seven (7) years. The results are presented and analyzed below:

**Table 3: Summary statistics of the operational variables**

| | OCFR | NPM | IT | FS | LEV | AGE | SG |
|---|---|---|---|---|---|---|---|
| Mean | 0.424102 | 0.075339 | 66.88722 | 24.67564 | 0.255845 | 46.42105 | 0.203836 |
| Median | 0.223620 | 0.069720 | 54.00000 | 24.96618 | 0.198660 | 51.00000 | 0.010300 |
| Maximum | 2.019350 | 1.304240 | 299.0000 | 27.01342 | 1.580840 | 94.00000 | 13.53549 |
| Minimum | -0.279990 | -3.279220 | 0.000000 | 20.77778 | -3.485560 | 5.000000 | -0.968860 |
| Std. Dev. | 0.456412 | 0.400095 | 49.17989 | 1.437928 | 0.547893 | 20.76974 | 1.685139 |
| Skewness | 0.887221 | -3.919334 | 1.690583 | -0.764217 | -3.496413 | -0.293390 | 6.386759 |
| Kurtosis | 3.065322 | 40.48988 | 6.640119 | 3.320821 | 26.23865 | 3.047548 | 45.20654 |
| Jarque-Bera | 17.47237 | 8129.270 | 136.7836 | 13.51634 | 3263.678 | 1.920583 | 10776.07 |
| Probability | 0.000161 | 0.000000 | 0.000000 | 0.001161 | 0.000000 | 0.382781 | 0.000000 |
| Sum | 56.40563 | 10.02007 | 8896.000 | 3281.861 | 34.02740 | 6174.000 | 27.11021 |
| Sum Sq. Dev. | 27.49720 | 21.13007 | 319263.3 | 272.9282 | 39.62462 | 56942.42 | 374.8397 |
| Observations | 133 | 133 | 133 | 133 | 133 | 133 | 133 |

Source: E-Views 9.0

The table presents the descriptive statistics of the independent variables of the study; the mean inventory turnover is 66.86, which means that the average number of days it takes for inventory to be sold within most of the companies is 67 days, the minimum value is 0 days and the maximum number of days it takes for inventory to be sold within most of the companies is 299 days. The mean leverage is 0.256, which means that the average leverage within most of the companies is 0.256, the minimum value is -3.486 and the maximum leverage within most of the companies is 1.581. The average firm size (i.e., Log of Closing Assets) is 24.68.



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The mean firm age is 46.42, which means that the average age of firms amongst most of the companies is 46 years, the minimum value is 5 years and the maximum age of firms amongst most of the companies is 94 years. The mean sales growth is 0.204, which means that on average firms included in the sample had a growth rate of 20% in revenue within the study period, the minimum value is -0.969 and the maximum observed value was 13.535.

### 4.2 Correlation Matrix

**Table 4: Correlation analysis of selected variables**

| | IT | FS | LEV | AGE | SG |
|---|---|---|---|---|---|
| IT | 1.000000 | | | | |
| FS | -0.068243 | 1.000000 | | | |
| LEV | -0.022910 | 0.106366 | 1.000000 | | |
| AGE | 0.142343 | -0.078136 | 0.037956 | 1.000000 | |
| SG | -0.012463 | 0.149726 | -0.051314 | -0.251877 | 1.000000 |

Source: E-Views 9.0

The table presents the correlation matrix of the independent and control variables of the study; inventory turnover is positively related to firm age and negatively related to leverage, firm size and sales growth. Firm size is positively related to leverage and sales growth but negatively related to firm age. Leverage is positively related to firm age and negatively related to sales growth. Finally, firm age is negatively related to sales growth.

### 4.3 Test of Hypotheses

#### 4.3.1 Hypothesis One

Ho: There is no significant relationship between inventory turnover period and net profit margin of quoted consumer goods manufacturing companies.

**Table 5: Regression output showing the effect of IT on NPM**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.345836 | 0.172395 | 7.806714 | 0.0000 |
| IT | -2.88E-05 | 7.24E-05 | -0.397385 | 0.6919 |
| FS | -0.041791 | 0.007203 | -5.802245 | 0.0000 |
| LEV | -0.035355 | 0.019860 | -1.780253 | 0.0778 |
| AGE | -0.004921 | 0.001555 | -3.164342 | 0.0020 |
| SG | 0.000661 | 0.005247 | 0.125935 | 0.9000 |

| | | | |
|---|---|---|---|
| R-squared | 0.593115 | Mean dependent var | 0.296846 |
| Adjusted R-squared | 0.507259 | S.D. dependent var | 0.419348 |
| S.E. of regression | 0.280063 | Sum squared resid | 8.549442 |
| F-statistic | 6.908219 | Durbin-Watson stat | 1.687314 |
| Prob(F-statistic) | 0.000000 | | |

Source: E-Views 9.0



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The Adjusted R squared, i.e., coefficient of determination, tells us the variation in the dependent variable due to changes in the independent variables. From the findings in the table above, the value of adjusted R squared was 0.507, an indication that there was a variation of approximately 51% on the net profit margin of quoted consumer goods manufacturing firms were attributed to the explanatory variables. The F statistic (ratio of the mean regression sum of squares divided by the mean error sum of squares) showed a value of 6.908; p value <.05; therefore, the hypothesis that all the regression coefficients are zero is rejected. However, the coefficients revealed that, the t statistic of our variable of interest (IT) representing hypothesis one is -0.397 and prob. = .6919 (i.e., $p>.05$), confirming that inventory turnover period has a negative but not statistically significant relationship with net profit margin; thus, the alternate hypothesis is rejected and null accepted. Therefore, there is no significant relationship between inventory turnover period and net profit margin of quoted consumer goods manufacturing companies.

### 4.3.2 Hypothesis Two

Ho: There is no significant relationship between inventory turnover period and operating cash flow to sales ratio of quoted consumer goods manufacturing companies.

**Table 6: Regression output showing the effect of IT on OCFR**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 3.415335 | 0.895058 | 3.815768 | 0.0002 |
| IT | -0.000335 | 0.000420 | -0.797926 | 0.4266 |
| FS | 0.120898 | 0.029421 | 4.109182 | 0.0001 |
| LEV | -0.074896 | 0.022547 | -3.321772 | 0.0012 |
| AGE | -0.127816 | 0.011702 | -10.92270 | 0.0000 |
| SG | 0.002036 | 0.006687 | 0.304460 | 0.7614 |

| | | | |
|---|---|---|---|
| R-squared | 0.690142 | Mean dependent var | 0.503684 |
| Adjusted R-squared | 0.624759 | S.D. dependent var | 0.535636 |
| S.E. of regression | 0.303183 | Sum squared resid | 10.01925 |
| F-statistic | 10.55541 | Durbin-Watson stat | 1.750486 |
| Prob(F-statistic) | 0.000000 | | |

Source: E-Views 9.0

The Adjusted R squared, i.e., coefficient of determination, tells us the variation in the dependent variable due to changes in the independent variables. From the findings in the table above, the value of adjusted R squared was 0.625, an indication that there was a variation of approximately 62.5% on the operating cash flow to sales ratio of quoted consumer goods manufacturing firms were attributed to the explanatory variables. The F



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statistic (ratio of the mean regression sum of squares divided by the mean error sum of squares) showed a value of 10.555; p value <.05; therefore, the hypothesis that all the regression coefficients are zero is rejected. However, the coefficients revealed that, the t statistic of our variable of interest (IT) representing hypothesis two is -0.797 and prob. = .4266 (i.e., $p$>.05), confirming that inventory turnover period has a negative but not statistically significant relationship with operating cash flow to sales ratio; thus, the alternate hypothesis is rejected and null accepted. Therefore, there is no significant relationship between inventory turnover period and operating cash flow to sales ratio of quoted consumer goods manufacturing companies.

### 4.4 Discussion of Findings

The thrust of the current study is to ascertain the relationship between inventory turnover period and firm performance of quoted consumer goods manufacturing firms in Nigeria. More specifically, the study found a non-significant negative relationship between inventory turnover period and net profit margin of quoted consumer goods manufacturing companies**.** This is consistent with the study by Bawa, Asamoah, and Kissi (2018) in Ghana found a negative insignificant relationship between ROA and inventory conversion period. The study by Owolabi and Alu (2012) in Nigeria found that inventory conversion period and debtors' collection period had a negative non-significant effect on return on total asset. Also, the study by Öner (2016) in Turkey found that average collection period and days of inventory outstanding had a significant negative relationship with profitability; while, average payment period had a significant positive relationship. However, inconsistent with the study by Amahalu, Egolum, Ezechukwu, and Obi (2018) that found a non-significant positive relationship between inventory conversion period and ROE. Another study by NdiranguKung'u (2016) in Kenya found a positive significant influence of inventory control practices on profitability of manufacturing firms in Kenya.

The second hypothesis reported a non-significant negative relationship between inventory turnover period and operating cash flow to sales ratio of quoted consumer goods manufacturing companies. This finding is inconsistent with the study by Bawa, Asamoah, and Kissi (2018) in Ghana that found a positive insignificant relationship between operating cash flows and inventory conversion period.



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## 5. Conclusion and Recommendations

The study concludes that negative relationship exists between inventory turnover and firm performance of quoted consumer goods manufacturing firms. Prior studies have shown that inventory turnover plays a significant role in the performance of a firm. Anchoring the study on liquidity preference theory the study specifically evaluates the effect of inventory turnover period on net profit margin and operating cash flow to sales ratio. The study employs firm size, leverage, firm age and sales growth as control variables. The two hypotheses however showed a negative non-significant effect of inventory turnover period on the firm performance proxies. Based, on these the study makes the following recommendations:

1. Managers should step up and embrace more advanced technology in inventory management. Globalization and technology advancement has increased global competition and thus affected the profitability of most companies more especially in Africa and other Least Developed Economies. It is therefore highly recommended that practices such as Demand Forecasting, Just in Time, and Vendor Management Inventory proven to positively impact organizational performance be used to boost the competitive advantage of the firms.
2. Managers should in addition to formulating strategies for efficient inventory management undergo pre-acquaintance with best practices from periodic training in order to ensure the deployment of techniques best suited to a firm and industry in order to prevent stock out and increase customer satisfaction.



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