Perpetual Inventory Control and Supply Chain Performance of Cement Companies in Rivers State

By:

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Abstract

This study investigated the relationship between perpetual inventory and supply chain performance of cement companies in rivers state. The design of the study was cross-sectional survey. Questionnaires was distributed to the mangers, departmental heads and supervisors of these companies. The study embraced census since the study population was little and known. Questionnaire was the major instrument for data collection. Cronbach's alpha test was used to measure the reliability of the questionnaire with the aid of Statistical Package for Social Sciences. Responses obtain was recorded on a five-point Likert's scale, varying from "Strongly Agree, Agree, Don't know, Disagree, Strongly Disagree. The Spearman Ranking Correlation Coefficient with the aid of statistical package for social science was used to test proposed hypotheses. The study concluded that there is association between perpetual inventory on-time delivery and customer's satisfaction in cement companies in Rivers State.It was recommended that; cement companies should develop contingency plans to effectively manage unexpected disruptions and proactively respond to disruptions, mitigate their impact, and ensure continuity of operations leading to on-time delivery of cement to meet customer satisfaction and preserve supply chain performance.

Keywords

Perpetual Inventory, Supply Chain Performance Customer Satisfaction, On-Time Delivery.

Introduction

Generally, manufacturing companies need more inventory control to surpass customer's expectation and speculation of demand purposes. This make them competitive and maintain costs effectiveness. All manufacturing companies prospers via utilization of sound inventory control techniques, such as economic order quantities (EOQ) Just in Time and vendor management. It is argued that inventory has to be leveled down in order to maximize storage costs and to boost up inventory to the level of customer's demand in the target market (Medard, 2017; Atnafu & Balda, 2018). The planning, implementing and control of inventories at organizational level and its related activities are necessary and essential for the supply chain performance or any manufacturing companiesin the world today. According to Nsikan, Etim and Ime (2015) many organizations have employed the basic inventory control techniques or methods, to enable them perform well and monitor their inventory costs.

According to Miller (2010) inventory involves all activities put in place to make sure that implied customers are satisfy with either services or products desired. It organizes the acquiring, production as well as dissemination functions to catch up with marketing desires and manufacturers wishes of making the products available to the clients. Inventory control is largely involved with stipulating the size in addition to assignment of stocked products. Inventory control is obligatory at diverse locations within a facility or within manifold positions of a supply system to defend the regular as well as planned course of manufacturing against the random commotion of going out of materials.The scope of inventory control likewise involves managing the refill lead time, refill of goods, returns, substandard goods and demand forecasting, inventory carrying costs, forthcoming inventory price prediction, quality management, demand forecasting, inventory visibility, inventory valuation, asset management and available physical space. With a balanced of these requirements, it is possible to reach an optimal inventory level, which is an on-going process as the business needs a shift and react to the wider environment (Ogbo et al, 2014). The different aspect of inventory controlling techniques practiced by most organizations for efficient and effective supply chain performance include, economic order quality model (EOQ), just in time (JIT), vendor manage inventory (VMI), collaborative planning (CP), material requirement planning, agile system, automatic replenishment, forecasting and replenishment etc.

Studies examining the relationship between inventoryand performance was mainly in the area of finance, procurement and economic performance and notsupply chain performance. Majority of these studies focused on external inventory management practices. For instance, Onchoke and Wanyoike (2016) studied the influence of inventory control practices on procurement performance of agrochemicals distributors in Nakuru Central Sub-County, Kenya. Auma, Muturi and Atambo (2017) studied the effect of inventory control methods on the performance of procurement function in sugar manufacturing companies in Western Kenya. Mwachiru and Datche (2015) studied the effects of inventory management system on organizational performance. Mwangangi and Senelwa (2018) studied the influence of inventory control techniques on service delivery in parastatals in Kenya.Mwangi and Nyambura (2015) examined the role inventory management plays in the performance of companies engaged in food processing.

Thus, this study as an area of departure examines the relationship between perpetual inventoryand supply chain performance usingcementmanufacturing companies in Rivers State, Nigeria. According to Bainson and Bainson (2016) stock levels should be carefully received at suitable intervals, such as quarterly, monthly or even weekly and adjusted to meet any changes in circumstances. In a situation, where this is not carried out properly, the original fixed level will be less than expected.
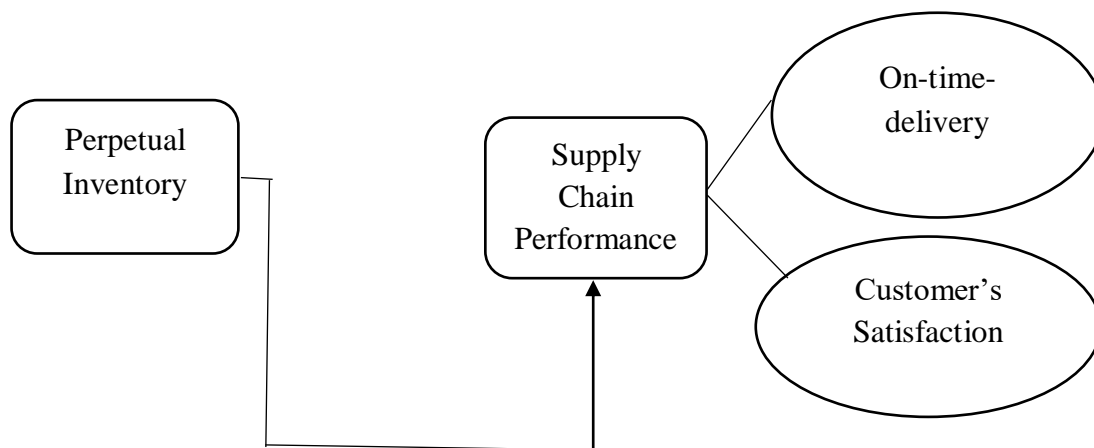

Figure 1: Study Model

Source: Sporta, F.O. (2018), Kiswili, N.E. & Ismail, S.N. (2016).

The purpose of this study is to examine the association between perpetual inventoryand supply chain performance of cement manufacturing companies in Rivers State. The specific objectives of the study includes;

   i.   To examine the relationship between perpetual inventory and on-time-delivery using cement manufacturing companies in Rivers State.
   ii. To examine the relationship between perpetual inventory and customer's satisfactionusingcement manufacturing companies in Rivers State

Based on the foregoing research objectives, the study is set to answer the following questions:

   i.   What is the relationship between perpetual inventory and on-time-delivery using cement manufacturing companies in Rivers State?
   ii. What is the relationship between perpetual inventory and customer's satisfaction using cement manufacturing companies in Rivers State?

Literature Review

Perpetual Inventory System

Perpetual inventory system is a technique that exercise control over inventory. It is also known as automatic inventory system. The basic objective of this system is to make available details about the quantity and value of stock of each item at all times. Thus, this system provides a rigid control over stock of materials as physical stock can be regularly verified with the stock records kept in the stores and the cost office. Smriti Chand (2021) exacts that, with a perpetual inventory system, a running count of goods on hand is maintained at all times in the organization. Perpetual inventory system is largely driven by modern information system; the information system facilitates detailed perpetual inventory and its associated cost tracking in the workplace. Mbugi and Lutego (2022) see perpetual inventory system as the inventory control technique involved in regular updates of stock records and account at any period when goods are collected and traded with customers. The authors opined that perpetual inventory system provides up-to-date stock or inventory information and regarded as the fastest and accurate typology of measuring inventory or stock in an ongoing basis when optimally utilized Wangari & Kagiri, 2015). Thus, perpetual inventory system is very effective and efficient in the long term as it is aided with computer based technology (Dhaalaco, 2022).

According to Kafyatfa, (2016) perpetual inventory system is an inventory control technique that is employed to maintain the right level of inventory or stock in a work organization. It is a programme that continuously estimates a company's inventory based on electronic records in contrast to physical stock taking. Joseph, (2014) further emphasized that perpetual inventory system is employed in modern day organization to track and update stock or inventory records after every transaction of goods received or sold by leveraging the use of computer technology.Friday (2015) stressed that, under the perpetual inventory system, inventory accounts are updated automatically and continuously. Advances in computer and network technology make perpetual inventory systems possible, and implementing this type of system requires an extensive technology expense. Point-of-Sale systems tied directly into accounting software packages can update accounting records and other inventory records on the fly using information from barcode scanners, radio frequency identification (RFID) tags or cashier input. Such a system is not only quick and accurate but provides management with continuously updated information on the status of inventory levels to utilize perpetual inventory control, review and accurate tracking of all Stock-Keeping Units is necessary. Perpetual inventory control is implemented through a re-order point and order quantity as it help organizations to maintain a continuous record of the changes to inventory. This means all purchases and sales of goods are recorded directly in the inventory account as they occur. The cost of goods sold is readily available at the end of the period, as the inventory account has been constantly updated Saleemi, (2007). A proper stock recording system helps in deriving the benefits of perpetual stock verification system and indications about the right time, right quality, and right quantity (Burton, 1981). After the material are received into the stores, the storekeeper will arrange for the storing of each item in the allotted rack, bin, shelf

or other receptacles and attach a card (Bincard) to each bin for the purpose of making entries there-in, relating to the receipts, issues and balance. The bin card or the locker card, becomes a perpetual inventory record for each item of stores. If the stores balance is recorded on continuous basis after every receipt and issue, the record is said to be one of perpetual inventory and the method of recording is called the perpetual inventory system. Thus the perpetual inventory is a method of recording store balance after every receipt and issue to facilitate regular checking and to obviate closing down for stock locking.

The perpetual inventory system includes continues stock taking. Stocktaking or stock verification is done mainly with a view to finding out whether the book balances as revealed by the stock records agree with the physical balance. Although, therefore, stock verification is one of the tools of inventory control, and is done for exercising control over the stock of every item, is an integral part of material control for the purpose of preparing the balance sheet, the physical verification of stock must be done at the end of year. Such verification at the end of the year is known as the periodical stock taking as against the continuous stocktaking, which is done throughout the year.

Supply Chain Performance

Performance is the successes or failures recorded by organizations in the light of known quantitative and qualitative factors. Supply chain performance is an aspect of business performance that qualitatively and quantitatively measures the successful flow of goods and services among supply chain collaborating companies including the end customer. It measures the effectiveness and efficiency of the supply chain from pre-production stage to the end user (Sillanpaa, 2011). Thus, supply chain performance is largely driven by facilities, inventory, transportation, information, sourcing and pricing. Importantly, there are several factors which affect supply chain performance. These factors are supply chain structure, inventory control policy, information sharing, customer demand, forecasting method, lead time and review period length (George & Pillai). The optimum selection of parameters of these variables, enhance the supply chain performance.According to Felea and Albastraiu (2013) supply chain performance could be defined as the integration of activities and processes among organizational members of the supply chain which successfully direct the flow of goods, services and information from the raw material state to the end customer of the product, service or idea. Supply chain performance is defined as the entire chain's ability to meet end-customer needs through product availability and responsive, on-time delivery.

Customer Satisfaction: The concept of customer satisfaction is about the relationship between the customers, products/services and the providers of the market offering (s). A satisfied customer gets significant added value through goods and services purchased with their resources (Cengzi, 2010). The customers are considered profitable assets to the firm because no business can exist without them. These assets according to the New York Times, May 22nd 2010, are difficult to put a precise value on. Concurring, Kabu & Soniya, (2017) submit that fulfilled customers are scarce resources and they often rebound, purchase more and network to reach other prospects by sharing positive experiences (Hague & Hague,

2016). Customer satisfaction researchers insist that the goal of the marketing concept is to satisfy profitable customers by determining and fulfilling their needs, wants, preferences, tastes, etc. (Raymond & Clifford 1985). Gundersen, Heide & Olsson, (1996) describe customer satisfaction as a post-consumption evaluative judgment concerning a specific product or service. Oliver (1997) considers customer satisfaction as the result of an evaluative process that contrasts repurchase expectations with perceptions of performance during and after the consumption experience.

On-time Delivery: On-Time Delivery is the metric used to measure supply chain efficiency. This KPI shows whether or not an organization is meeting its goals in regards to promised delivery times, and is critical for both measuring carrier performance and maintaining customer satisfaction.Delivery performance is the extent to which products and services supplied by an organization meet the customer expectation. It provides an indication of the potentiality of the supply chain in providing products and services to the customer. This metric is most important in supply chain management as it integrates (involves) the measurement of performance right from supplier end to the customer end. After critical review of several research articles on supply chain performance measurement, it has been identified that the focus was mostly on a few one dimensional key performance indicators. In most of the cases, the models developed were more specific in nature with a goal of optimizing the objective function (constrained or unconstrained) of limited scope in a particular setup. The focus was narrow to make profit / improvement in performance for a single organization or particular industry under consideration as a case. The limitations of these models will not lend them to be used in any kind of industry setup or any supply chain in a generic sense to make profits to all companies along the supply chain.

Theoretical Framework

Thisstudy incorporated the theory of constraints introduced by Goldratt, (1984) in his book titled "The Goal", it is a management philosophy that aids the investigation of core conventional assumptions, industrial rules, policies, and processes (Stein, 1997). Dr. Eliyahu Goldratt conceived the Theory of Constraints (TOC), and introduced it to a wide audience through his bestselling 1984 novel, "The Goal". Since then, TOC has continued to evolve and develop, and today it is a significant factor within the world of management best practices. Akinlabi, (2017) opined that a constraint is any hurdle that prevents a system from achieving its goals and objectives. Goldratt introduced two types of constraints; internal and external constraints. An internal constraint is a physical or policy hurdle which occurs when a system is unable to maximize its internal resources to produce and deliver adequate satisfaction to its target market. While an external constraint occurs when a system generates and provides more than its market expectations.

The theory of constraints (TOC) proposes that a firm is a system, and every system has at least one constraint restraining it from accomplishing its set goals and objectives. And to enhance companies' performance, these constraints must be recognized, understood and remedial measures taken (a prescription) (Nwokah, 2022). According to Lakshmii &

Ramakrishna, (2012) the theory of constraints (TOC) offers a global system approach that promotes the achievement of organizational goals and objectives because identifying the constraints helps the firm to concentrate its resources on profitable goals. Goldratt indicate that there are three ways organizations can achieve its goals and objectives, they include: throughput (T), inventory (I) and operating expenses (OE).

Throughput is the degree to which the firm achieves its goals and objectives through exchange and production. Inventory is only considered an asset when it adds value through exchange. Operating expenses (OE) include all the resources used to transform inventory into throughput. Simatupang, Wright and Sridharan, (2004) used the theory of Constraints (TOC) to detect problems in the logistics management system and proposed the solution of integrating different managers from various organizations to collaborate in improving the overall performance of the companies. Conversely, Cyplik, Hadaś & Domański, (2009) indicate that the theory of constraints (TOC) approach could be used to guide an organization to focus and exploit its resources to minimize logistics cost along the supply chain. On the other hand, Goldratt, Eli & Carol, (2000) conceptualized performance measures to maintain trust amongst members of the firm in order to achieve a higher level of performance (Wangari, et *al.*2015). One of the appealing characteristics of the Theory of Constraints is that it inherently prioritizes improvement activities. The top priority is always the current constraint. In environments where there is an urgent need to improve, TOC offers a highly focused methodology for creating rapid improvement.A successful theory of constraints implementation will have the following benefits in the cementmanufacturing industry; Increased Profit which is the primary goal of TOC for most companies, Fast Improvement as a result of focusing all attention on one critical area – the system constraint, Improved Capacity that optimizes the constraint to enable more product to be manufactured, Reduced Lead Times by optimizing the constraint results in smoother and faster product flow as well as reduced Inventory by eliminating bottlenecks which means there will be less work-in-process. Therefore, all the value chain members in the supply chain needs to put force together, integrate and act as a homogenous entity, to enhance performance throughout the entire chain as the matching of supply and demand improves profit (Fisher, 1997).

Consequent upon the above, the relevance of the theory of constraint to this study is the belief that perpetual inventory management and supply chain performance of cementcompanies in River State are weighed down with some internal and external constraints and bottlenecks, that needs to be identified and solved.

Perpetual Inventory System and Supply Chain Performance

Perpetual inventory control system is concerned with regular updating inventory records and accounts at any time when inventory Items are collected, traded from inventory, transported as of one area to alternative, retrieved from inventory, and discarded. (En-kanselu 2008). The author further points out that, some establishments prefer perpetual inventory control systems because they deliver up-to-date inventory information and better hold negligible manual

inventory counts. They are also chosen to because they are considered fast an accurate in capturing inventory on continual basis when they are they are properly utilized and managed (En-Kanselu, 2008). For the matter of emphasis, Chopra (2015) adds that perpetual inventory control performs better when used together with a database of inventory amounts by storeroom staffs using barcode scanners. In spite of the importance, they have for the better performance of the organization, perpetual inventory control systems have observed short comings. First, these systems are technologically dependent as it is impossible to maintain them manually. Instead, they require technical equipment and software, which results in a large rate of execution, particularly for businesses with a great number of locations or warehouses.

In addition, they need necessary periodic maintenance and upgrades, which also add extra cost. Second, because they do not employ a consistent inventory system, a perpetual inventory system may cause recorded inventory to differ from real inventory over time. Third, since so much time occurs between physical inventory counts, they make it problematic to discover where inconsistencies in inventory amounts arise when employing a periodic inventory management system (Enkanselu, 2008). As a result, inaccuracies, stolen products, and inadequately scanned objects have an impact on the inventory that is recorded creating an expected deviation from the actual inventory counts. Therefore, the choice and use of any inventory control system need careful consideration considering strengths and weaknesses it has, and on top of this its impact on an organizational performance.

Perpetual inventory system adopted by an organization ensures adequate information on a firm's level of stock on real time and bring about supply chain performance. This foregoing is highly supported with empirical studies. Mbugi and Lutego (2022) investigated the effect of inventory control management systems on organizational performance in the context of Tanzania manufacturing industry. Specifically, the study was domesticated in the food and beverages industry in the city of Mwanza, Tanzania. The study adopted qualitative research paradigm with content analysis. The research employed nuivo qualitative analysis software and the findings are that the organizations employed different types of inventory management systems ranging from economic order quantity, perpetual inventory control systems, barcode inventory control system etc. These system minimizes inventory total cost, gives information on the state of the firm's inventory on an ongoing basis respectively and brings about organizational performance in terms of effectiveness, efficiency and profitability. Furthermore, the above findings are corroborated with the works of Waithaka (2015), the scholar investigated the impact of inventory management system on supply chain performance in the context of public hospitals in Nairobi, Kenya. The study employed chi square and linear regression analysis for the test of significance. The finding of study is that inventory management systems and levels of integration adopted impact positively and significantly on supply chain performance in the context of public hospitals in Nairobi Kenya. Again, the study also discovered significant relationship between inventory management system and supply chain integration and supply chain performance. Thus, inventory management systems and supply chain integration significantly and positively influence supply chain performance. The study also revealed significant and positive correlation between inventory management systems and supply chain performance. The

research concluded that inventory management system and the integration of supply chain are laudable in driving supply chain performance.

Moreso, inventory control techniques implemented by the workplace brings about organizational performance. This position is supported with the works of Sporta (2018), the scholar evaluated the effect of inventory control techniques on organizations performance in a context specific of Kenya medical supplies agencies. The study employed mixed research methods and the findings of the study is that inventory control techniques positively and significantly improves organizational performance of medical supplies agencies in Kenya. This finding is corroborated with the study findings of Ogbo, Onekanma and Wilfred (2014), the scholars examined the relationship between effective system of inventory management and organizational performance in the context of seven up bottling company in Enugu. The study employed the non-parametric statistic of chi square analytical tool and the findings is that inventory control management flexibility significantly improves organizational performance.

Achevi, Juma and Otinga (2021) studied the influence of inventory control techniques on performance of procurement function in the context of referral hospital in Vitiga country in Kenya. The study employed multiple regression analysis and the findings of the study is that inventory control techniques significantly improves the performance of procurement functions. The study specifically discovered that inventory control techniques such as just-in-time system, economic order quantity and ABC analysis significantly but relatively influence the performance of procurement functions in the context of referral hospitals in Vitiga country in Kenya.

Inventory management practices at work improve organizational performance. Mochama and Muturi (2019) evaluated the effect of inventory management practices on supply chain performance in the context of soft drinks manufacturing companies in Western Kenya. The study employed a quantitative research method. Specifically, descriptive statistics and inferential statistics were employed and the findings of the study is that improved production is one of the effect of inventory practices on supply chain performance in the context of soft drinks manufacturing organizations in Western region of Kenya. Again, quality service delivery positively and significantly influence demand projections, improves supply chain performance, bring about inventory and storage reduction, enhancement of profitability and driving overall business performance (Mochama & Muturi, 2019).

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Atnafu, Balda and Liu (2018) studied the impact of inventory management practice on companies' competitiveness and organizational performance in the context of SMEs in Ethiopia. The study employed structural equation modeling and the findings of the study are that higher levels of inventory management practices improve organizational competitiveness and competitive advantage. Again, inventory management practices also significantly improve organizational performance. These findings are in line with the empirical works of Mankazana, Silase and Molefe (2018). The scholars investigated the influence of inventory management techniques and supply chain management on organizational performance of manufacturing industries in Johannesburg, South Africa. The study made use of mixed research method and the findings of the study is that inventory management and supply chain have positive and significant impact on the performance of companies in the manufacturing industries in Johannesburg, South Africa. According to Irene Rotech, Charles and Kagai (2015) investigated Effect of inventory management on business performances using questionnaires the result indicated that access to credit, Mobilization and training in small enterprises investment was on average satisfactory to the entrepreneurs.

In a study done by Kolias (2011) in order to test inventory-performance link using construction companies listed in Bursa Malaysia, it was found that there is a positive correlation between inventory turnover and capital intensity as a result of the nature of investments. A study by Fullerton et al (2003) provides empirical support that manufacturing companies that implement higher degrees of modern inventory management techniques

should outperform competitors; it was found that a positive relationship exists between firm's profitability and the degree to which waste reducing production practices such as reduced set up times, preventive, maintenance programs, and uniform workloads are implemented. These findings indicate that manufacturing enterprises employing modern inventory management techniques are consistently more profitable than their counterparts.

Another study suggesting a positive relationship between inventory management and performance was Eroglu and Hofer (2011), which used the Empirical Leanness Indicator (ELI) as a measurement for inventory management. They argued that inventory leanness is the best inventory management tool. Lean production considers inventory as a form of waste that should be minimized and has become synonymous with good inventory management Their study on USA manufacturing companies covering the period 2003-2008 found that leanness affects profit margins. According to Eroglu and Hofer (2011), companies that are leaner than the industry average generally see positive returns to leanness. They found that the effect of inventory leanness on firm performance is positive and generally non-linear. Their study also implies that the effect of inventory leanness is concave which is in line with inventory management theory that there is an optimal degree of inventory leanness beyond which the marginal effect of leanness on financial performance becomes negative.

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None of these studies clearly relate perpetual inventory to the study measures, therefore, the following hypotheses:

H_{O1}: There is no significant association between perpetual inventory and on-time delivery of cement companies in Rivers State.

H_{O2}: There is no significant association between perpetual inventory and customer satisfaction of cement companies in Rivers State.

METHODOLOGY

The study embraced a cross sectional survey design to acquire responses from respondents of 4 cement manufacturing companies in Rivers State. The mangers, departmental heads and supervisors of these companies totalling 22 respondents were the study population. The study embraced census since the study population was little and known. Questionnaire was the foremost instrument for data collection. The singular firm sample size was scientifically determined as well as disseminated for each of the 4cement manufacturing companies separately using Bowley (1964). The nature of the data was quantitative.Questionnaires were distributed to the 4cement manufacturing firm'sunderstudy. The reliability of the study instrument was verified using the Cronbach alpha. Spearman Ranking Correlation Coefficient with the aid of Statistical Package for Social Science was used to test proposed hypotheses.

Table 1: Result of Reliability Analysis

Variables	No of items	Alpha value
Perpetual Inventory Control	3	0.714
On-Time delivery	3	0.712
Customer Satisfaction	3	0.744

Source: SPSS output (2024)

Results and Discussion

A total of 22 questionnaires were distributed to the respondents. All 22 were duly filled and returned, representing a 100% response rate. All responses were measured on a five-level rating, ranging from "strongly disagree to strongly agree". The demographic profile of respondents is exhibited in Table 2 above. The educational qualification of respondents' analysis revealed that, the highest percentage of participants (31.8%) holds a Higher National Diploma (HND), degree. This is followed by participants with a Master's degree (M.Sc/MBA) accounting for 27.3% of the total sample. Participants with a Bachelor of Science (B.Sc) make up 22.7%, while those with a Ph.D. represent 18.2% of the total sample. The analysis also revealed that the highest percentage of participants (45.5%) are within the age bracket of 36-45 years. This is followed by participants within the age bracket of below 25years, accounting for 18.2% of the total sample. Participants within the age bracket of 26-35years make up 18.2%, while those within the age bracket of above 45years represent 18.2% of the total sample. The analysis indicated that the 5 participants (22.7% of the total sample) have worked in the company within 1 – 10 years of employment. This is followed by 7 participants (31.8% of the total sample) working for 11-20 years. The remaining participants are split between the 21 – 30 years (6 participants, 27.3%) and a 30 years and above (4 participants, 18.2%).

Table 2 Demographic Profile of Respondents

Variables	Classification	Percentage%
Age	36-45	45.5
	25	18.2
	26-35	18.2
	45 and above	18.2
EducationalQualification	HND	31.8
	M.Sc/MBA	27.3
	B.Sc	22.7
	PhD	18.2
Experience of Respondents	1-10	22.7
	11-20	31.8
	21-30	27.3
	30 and above	18.2

Source: SPSS output (2024)

Table 3: Correlation Result ofPerpetual Inventory and On-Time-Delivery

Correlations

			Perpetual Inventory	On-Time delivery
Spearman's rho	Perpetual Inventory Control	Correlation Coefficient	1.000	.723**
		Sig. (2-tailed)	.	.000
		N	22	22
	On-Time delivery	Correlation Coefficient	.723**	1.000
		Sig. (2-tailed)	.000	.
		N	22	22

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 reveals that the Spearman's rho correlation coefficient between perpetual inventory control and On-Time delivery is .723. This implies a strong positive association between the two variables. The positive correlation coefficient of .723 suggests that there is indeed relationship between perpetual inventory techniques and On-Time delivery in cement companies in Rivers State. More sore, the correlation coefficient (.723) being greater than zero suggests that as the use of perpetual inventory techniques increases, on-time delivery improve.

Table 4: Correlation Result of Perpetual Inventory Control and Customer's Satisfaction

Correlations

			Perpetual Inventory	Customer Satisfaction
Spearman's rho	Perpetual Inventory	Correlation Coefficient	1.000	.788
		Sig. (2-tailed)	.	.002
		N	22	22
	Customer Satisfaction	Correlation Coefficient	.788	1.000
		Sig. (2-tailed)	.002	.
		N	22	22

Source: 2024 SPSS Output.

As shown in Table 4, The Spearman's rho correlation coefficient of .788indicates a very strong positive correlation between perpetual inventory control and customer satisfaction. This means that there is a tendency for companies with higher perpetual inventory control to have better customer satisfaction. The correlation coefficient of .788is a very strong correlation. This means that companies that have good Perpetual Inventory Control are more likely to be able to manage their customer satisfactorily.

Finding Summary

Hypothesis		Decision	Basis for decision	Remark
$H_{01:}$	There is no significant association between perpetual inventory and on-time-delivery	The null hypothesis was rejected	Relationship was significant (rho=.723; *p*=.000).	Strong positive relationship
$H_{02:}$	There is no significant association between perpetual inventory and customer's satisfaction	The null hypothesis was rejected	Relationship was significant. (rho =.788; *p*=.002).	Strong positive relationship

Relationship between perpetual inventory and on-time delivery.

As indicated in Table 3, after testing of the hypothesis one, it was discovered that a positive significant relationship between perpetual inventory and on-time delivery of cement companies exist at (r = .723, p=.000<0.05). This implies that when the levels of perpetual inventory are high it will lead to better and well controlled on-time delivery. This is supported by the works of Mochama and Muturi (2019) which highlights the importance of adopting efficient perpetual inventory systems for streamlining supply chain operations, improving customer satisfaction, and achieving a competitive edge in the market. By recognizing the implications of this relationship, companies can make informed decisions to optimize their inventory practices and enhance overall performance.

Relationship between Perpetual Inventory and Customer Satisfaction

The current study, Hypothesis 2, which posits that there is no significant association between perpetual inventory and customer satisfaction of cement companies in Rivers State, has been evaluated. Table 4 presents the results of the correlation analysis between perpetual inventory and customer satisfaction. The table reveals a strong positive correlation between perpetual inventory and customer satisfaction among cement companies in Rivers State. The correlation coefficient of .788 signifies a very strong relationship between the two variables. With p=.002<0.05 the relationship is significant. This finding indicates that companies with efficient perpetual inventory systems tend to have higher levels of customer satisfaction. The results are consistent with previous research by Sporta (2018), Achevi, Juma, and Otinga (2021), who also highlight the importance of perpetual inventory management for enhancing customer satisfaction and overall performance in various industries. An effective perpetual inventory system enables companies to maintain optimal stock levels, respond to customer demands promptly, and minimize stockouts or overstocking issues, all of which contribute to higher customer satisfaction. The positive correlation between perpetual inventory and customer satisfaction has significant implications for cement companies in River State.

By streamlining supply chain operations through perpetual inventory, companies can enhance their overall performance, gain a competitive edge, and improve customer loyalty. It reinforces the notion that adopting efficient inventory practices positively impacts customer satisfaction, leading to improved business outcomes. This result aligns with the research conducted by Sporta (2018), Achevi, Juma, and Otinga (2021), underscoring the significance of efficient perpetual inventory management in achieving customer satisfaction and overall success in the industry. Cement manufacturing companies in Nigeria should consider the implications of this relationship and make informed decisions to optimize their inventory practices to enhance customer satisfaction

Conclusion

The study investigated the association between inventory control techniques and supply chain performance of cement companies in Rivers State. The study found that perpetual inventory techniques and stock level techniques are all positively associated with On-Time delivery and customer's satisfaction (supply chain performance). These findings have important implications for cement companies in Rivers State. By implementing these inventory control techniques these companies can improve their on-time delivery and customer's satisfaction and ultimately their overall business performance.

Recommendations

i.   Cement companies should develop contingency plans to effectively manage unexpected disruptions and proactively respond to disruptions, mitigate their impact, and ensure continuity of operations leading to on-time delivery of cement to meet customer satisfaction, and preserve supply chain performance.
ii. Cement companies should conduct research to explore new inventory control techniques to stay updated with industry advancements for better supply chain performance.

Limitations of the Study and areas for Further Studies

The study focused on cement companies in Rivers State. The results of the study may not be generalizable to other industries or regions. The study used self-reported measures of supply chain performance. This means that there is a risk of bias in the results.Despite these limitations, the study provides some valuable insights into the factors that influence supply chain performance using cement companies in Rivers State.

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