Impact of Inventory Management Practices on Small and Medium Enterprises Manufacturing Subsector In Oyo State, Nigeria

Kareem, Thompson Sola

Department of Purchasing and Supply, The Polytechnic, Ibadan, Nigeria.

Author’s contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

ABSTRACT

This study examines the impact of inventory management practices on the performance of SMEs manufacturing sub-sector in Oyo State, Nigeria. A survey of 129 randomly selected from three (3) cities such as Ibadan, Ogbomoso and Oyo town. The data collection instrument was a structured questionnaire designed for the study. Data were analyzed with the aid of descriptive statistics such as simple percentage and mean. Results reveal that inventory management practices have positive and significant impact on the performance of SMEs manufacturing sub sector. Furthermore, results also reveal that delay in delivery of materials, use of manual inventory management system/lack of technology, lack of professional personnel, holding too much/too little inventory, purchase of materials with a near expiration date, insufficient funds for procurement and use of outdated storage facilities are the major factors affecting effective inventory management practices in SMEs manufacturing sub-sector in Oyo State, Nigeria. Subsequently, the study recommends that SMEs operators/managers should be encouraged to adopt information technology in inventory management. Also, SMEs operators and managers should be encouraged to constantly attend conferences, seminars and workshops in Nigeria and abroad in order to improve their skills on inventory management.
Keywords: Inventory; management; EOQ; costing analysis; just-in-time; SMEs; Nigeria.

1. INTRODUCTION

Small and Medium Enterprises (SMEs) have been identified as one of the driving forces of modern economies, mainly due to their contributions to job creation and innovation in both developed and developing countries. [1] notes that SMEs constitute more than 95% of all firms, contribute approximately 50% of GDP, and account for 60% to 70% of total employment. [2] also affirms that SMEs play a vital role in the United States economy, representing 99.7% of all employer firms in the United States and employing half of U.S. workers while Jobs in SMEs account for 67% of total employment in Europe. In Iran, SMEs number around 92% of all businesses and account for 63% of employment [2]. According to [3], the small and medium enterprises (SMEs) sector in South Africa accounts for 40% of GDP and 60% of the workforce in the formal employment. In the same vein, [4] notes that SMEs are responsible for about 60% of China's industrial output and employ about 75% of the workforce in China's cities and towns. However, SMEs in Nigeria have failed in terms of significant contribution to economic growth and development, in spite of government efforts to make SMEs solidified and wax stronger among its peers in Africa countries. To support this revelation, [5] argue that most SMEs in Nigeria die within their first five years of existence. Equally [6] reiterate that many SMEs in Nigeria could not reach the growth stage of their life cycle.

Inventory management practices have been well researched and documented in the management literatures. Scholars, researchers and professionals acknowledged that inventory management remains a serious concern for businesses wishing to remain competitive and survive in the marketplace [7,8]. [9] argues that inventory management plays a crucial role in inventory of business firms in enhancing effectiveness and efficiency. It has been of sympathy toward numerous years to business firms around the world. Inventory management aim is holding inventories at the most reduced conceivable cost, given the goals to guarantee continuous supplies for progressing operations. According to [10], inventory management comprises various actions taken by the management to reduce cost, maintain production, continuous supply and reduce loss.

1.1 Statement of the Problem

In today's globalized world, SMEs are facing challenges generated by mismanagement of resources as no proper control over the inventory. World Bank report (2014) shows that approximately 5% of global Gross Domestic Product (GDP) disappear through mismanagement of resources as there is no proper control over the inventory as the result economy of most countries especially to less developed countries like Nigeria fails to grow at the reasonable and preferable percentage [11]. Therefore, it is crucial for SMEs to keen in managing their inventories and the means associated with inventory management practices.

There are plethora studies on inventory management in European and Asian countries; thus very limited research has been done in the context of Africa, particularly in Nigeria. Those conducted in Nigeria such as [12,13,14] did not focus on SMEs. Thus their findings may not be applicable to SMEs. Therefore, the study intends to fill the gap in knowledge by examining the impact of inventory management practices on SMEs performance of manufacturing sub-sector in Oyo State, Nigeria.

1.2 Objectives of the Study

The general objective of this study is to examine the effect of inventory management practices on organizational performance with specific reference to the selected manufacturing companies in Oyo State, Nigeria. Other specific objectives were to;

i. find out inventory management techniques applied by SMEs manufacturing sub-sector.

ii. determine the effect of inventory management practices on the performance of manufacturing sub-sector.

iii. identify factors that affect inventory management practices in manufacturing sub-sector.

1.3 Research Questions

The following questions are the focus of this study

i. Which inventory management techniques are applied in SMEs manufacturing sub-sector?
ii. What is the effect of inventory management practices on SMEs manufacturing sub-sector?

iii. What are the factors that affect inventory management practices in SMEs manufacturing sub-sector?

2. LITERATURE REVIEW

2.1 Definition of Inventory Management

[15] define inventory as raw materials, work-in-progress, finished goods and supplies required for creation of a company’s goods and services. It is also the number of units and/or value of the stock of goods a company holds. [16] also defines inventory as “the stock of any item or resource used in an organization”. In a broader context, inventory can include inputs such as financial, energy, human, equipment, and physical items such as raw material; inputs such as parts, components, and finished goods; and interim stages of the process, such as partially finished goods or work-in-progress. [17] postulate that inventory management refers to the entire activities involved in developing and managing the inventory levels of raw materials, semi-finished materials (work-in-progress) and finished good so that adequate supplies are available and the costs of over or under stocks are low. Inventory management is the process of effectively overseeing the constant flow of units into and out of an existing inventory [18]. This process usually involves controlling the transfer of the units in order to prevent the inventory from becoming too high, or dwindling to levels that could put the operation of a business into jeopardy. Effective inventory management seeks to control the costs associated with the inventory, from the perspective of the opportunity cost of the capital tied up in the inventory, the holding cost and the ordering costs.

2.2 Inventory Management Practices

According to [19], Economic Order Quantity (EOQ), Just in Time (JIT), ABC Analysis and Rules of Thumb are major inventory management practices. [20] argues that Automatic Replenishment, Activity Based Costing (ABC) Inventory Model, Just-In Time (JIT) Inventory, Economic Order Quantity EOQ and Vendor Managed Inventory are inventory management practices, while [21] also assert that Re-Order Level, Economic Order Quantity, Just-In-Time, Vendor Managed Inventory and Activity Based Costing Analysis are main inventory management. For the purpose of this study, the inventory management practices discussed are Activity Based Costing Analysis, Just-In Time (JIT) Inventory, Economic Order Quantity EOQ and Vendor Managed Inventory.

2.2.1 Activity based costing analysis

ABC analysis is where stocks are classified into three categories namely: A – stock items that are of high value and material to the organization but low volume B – stock items which are of medium value and medium volume; C – stock items baring minimal value but are of great volume [21]. According to [22], ABC analysis helps allocate money and time thus allowing firms to deal with multitude of Stock-keeping Units (SKU) and multiple product lines.

2.2.2 Just-In-Time (JIT) inventory

This is a system of stock control that endeavors to decrease levels of stock by planning free market activity by the point where the sought thing touches base for utilize in the nick of time [15]. [23] notes that the Just-In-Time (JIT) System ties to eliminate waste by maintaining just enough inventories at the right place at the right time to make just the right amount of product. Stock and Lambert (2001), further explained that in Just in time (JIT) System, anything over the minimum amount necessary for a task is considered wasteful. Thus, Just-In-Time (JIT) attempts to minimize inventories through the elimination of safety stock [23].

2.2.3 Economic Order Quantity (EOQ)

This is the optimal ordering quantity for an item of stock that minimizes cost [17]. According to [23], Economic Order Quantity approaches have proven to be effective inventory management technique when the demand and lead time are relatively stable, as well as when significant

<table>
<thead>
<tr>
<th>Company category</th>
<th>Employees</th>
<th>Turnover</th>
<th>Balance sheet total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-sized</td>
<td>&lt; 250</td>
<td>≤ € 50 m</td>
<td>≤ € 43 m</td>
</tr>
<tr>
<td>Small</td>
<td>&lt; 50</td>
<td>≤ € 10 m</td>
<td>≤ € 10 m</td>
</tr>
<tr>
<td>Micro</td>
<td>&lt; 10</td>
<td>≤ € 2 m</td>
<td>≤ € 2 m</td>
</tr>
</tbody>
</table>

Source: (European Commission, 2014)
variability and uncertainty exist. [24] also argue that Economic Order Quantity (EOQ) focuses more on minimizing inventory cost rather than minimizing the inventory itself.

2.2.4 Vendor managed inventory

This is a supply chain method whereby the vendor or supplier is given the duty of managing the purchaser’s inventory [25]. [26] assert that Vendor Managed Inventory (VMI) is one of the maximum extensively discussed partnering tasks for improving company deliver chain performance and that it is also referred to as continuous replenishment or supplier-managed inventory (SMI). According to [21], vendor managed inventory saves an organization immense time and finance since the supplier will be able to monitor its customer’s levels of inventory and make a point of replenishing them.

2.2.5 Definition of SMEs

There is no universal acceptable definition of SMEs. The definition therefore varies from country to country. According to the European Union an SME is defined by its number of employees and its turnover; the Table 1 identifies three different categories.

[27] medium enterprises are conceived as enterprises which have at most 300 employees and an annual turnover not exceeding 15 million US dollars. Further to the above, there is the distinction of small enterprises having fewer than 50 staff members and up to 3 million US dollars turnover while micro-enterprises have up to 10 persons and $100,000 turnover. In the UK, sections 382 and 465 of the Companies Act 2006 define an SME for the purpose of accounting requirements. According to this, a small company is one that has a turnover of not more than £5.6 million, a balance sheet total of not more than £2.8 million and not more than 50 employees. A medium-sized company has a turnover of not more than £22.8 million, a balance sheet total of not more than £11.4 million and not more than 250 employees.

In Nigeria, Small and Medium Sized Development Agency of Nigeria (SMEDAN) defines SMEs as based on the following criteria: a micro enterprise as a business with less than 10 people with an annual turnover of less than ₦5,000,000.00, a small enterprise as a business with 10-49 people with an annual turnover of ₦5 to 49,000,000.00; and a medium enterprise as a business with 50-199 people with an annual turnover of ₦50 to 499,000,000.00. National Council of Industries also sees SMEs as business enterprises whose total costs, excluding land, are not more than two hundred million naira (₦200,000,000.00) [28]. Also, the Central Bank of Nigeria defined SMEs as any enterprise with a maximum asset base of two hundred million Naira excluding land and working capital with its employees ranging between ten and three hundred.

3. EMPIRICAL REVIEW

Previous studies on inventory management and organization performance have convergent views that positive relationship exist between inventory management practices and organization performance. For instance, [12] investigate the linkage between the determinants of inventory Management and customer satisfaction within the context of supermarkets in Nigeria. Data was analyzed using Cronbach’s a internal consistency and Spearman’s ranking correlation statistic. Results show that lean inventory management system emerged as the most significant positive impact on customer satisfaction. In another study, [29] examine the impact of inventory management practices on the financial performance of sugar manufacturing firms in Kenya. The research survey was conducted in all the eight operating sugar manufacturing firms from the period 2002-2007. Descriptive statistics was used to test the impact of inventory management practices and Correlation analysis was used to determine the nature and magnitude of the relationship among inventory management variables. Results indicate that there exists a positive correlation between inventory management and organization performance.

[30] also examine the effect of inventory management on performance of the procurement function of sugar manufacturing companies in the western sugar belt. The study makes use of structured questionnaires that were self administered to the respondents. Data was analyzed with the aid of descriptive and inferential statistics. Results reveal that there is significant relationship between inventory management practices and performance of the procurement function of sugar manufacturing companies in the western sugar belt. In the same vein, [13] examine
the extent at which inventory control affect the productivity of selected manufacturing firms. Data were analyzed with the aid of Pearson Product Moment Correlation Coefficient and simple Linear Regression statistical tools. The findings indicate that inventory control significantly affects productivity of selected manufacturing firms.

[14] also examine inventory management practices in flour milling manufacturing firms and their effects on operational performance. Structured questionnaire was the major instrument for the collection of relevant primary data while mean and standard deviation was used to analyze descriptive data. Results indicate that inventory management strategies have significant impact on performance. In a similar study, [31] assess inventory management practices and its effect on the financial performance of SMEs in the Northern Region of Ghana. The study adopted a descriptive cross-sectional survey research design which allowed the collection of primary quantitative data through structured questionnaires. The data was analyzed using both descriptive and inferential statistics. Results reveal that SME financial performance was positively related to efficiency of inventory management.

[32] in their study of 23 Indian Consumer Electronics Industry firms affirm that inventory management policies are major predictors of profitability performance. Also, [9] in his study of 91 Indian Machine Tool Enterprises establishes that effective inventory management practices have positive impact on the performance of business organization.

4. METHODOLOGY

A survey of 129 randomly selected SMEs in the three cities such as Ibadan, Ogbomoso and Oyo town. The choice of these cities is based on the fact that they have highest number of registered SMEs. The study sample was drawn from SMEs engaging in manufacturing. The data collection instrument was a questionnaire designed for the study. In order to establish the reliability of the research instrument, a test - retest method was used. To ascertain the face and content validities of the instrument, it was given to experts for verification. Data were analyzed with the aid of descriptive statistics such as percentage and mean.

5. DATA ANALYSIS, RESULTS AND DISCUSSION

Question 1: Which inventory management techniques are applied in SMEs manufacturing sub-sector in Oyo State, Nigeria?

From Table 2, it can be deduced that 53(41.2%) majority of Operators-Managers of SMEs sampled, reveal that they only use Economic Order Quantity to a very great extent, while other techniques such Vendor Managed Inventory, Just-In Time (JIT) Inventory and Activity Based Costing Analysis are use to no extent. This implies that benefits, embedded in Vendor Managed Inventory, Just-In Time (JIT) Inventory and Activity Based Costing Analysis are yet to be explored.

Question 2: What is the effect of inventory management practices on SMEs manufacturing sub-sector in Oyo State, Nigeria?

Table 3 shows that respondents agree with the items used to measure the effect of inventory management practices on SMEs performance. Table reveals that the mean of responses are more than the criterion mean of 3. This shows that respondents agree that the inventory management practices have significant effect on SMEs performance. Furthermore, results reveal that inventory management reduces production costs in SMEs Manufacturing sub sector has highest mean of 4.992. Followed by inventory management contriutes greatly to the performance of SMEs Manufacturing sub sector with mean of 4.876, inventory management prevents shortages and stock out costs in SMEs Manufacturing sub sector with mean of 4.768 and inventory management reduces delivery lead time in SMEs Manufacturing sub sector with mean of 4.662.

The study is consistent with previous studies that inventory management practices have significant effect on performance of business organizations [30,13,14,31,32]

Question 3: What are the factors affecting inventory management practices in SMEs manufacturing sub-sector in Oyo State, Nigeria?

In Table 4, the grand mean of 4.29 which is above the criterion mean of 3 shows that respondents agreed that the above listed items are the factors affecting inventory management practices in SMEs manufacturing sub-sector in
Oyo State, Nigeria. Furthermore, a grand mean of 4.29 indicates the level of acceptance of the items as factors affecting inventory management practices in SMEs manufacturing sub-sector in Oyo State, Nigeria. This indicates that delays in delivery of materials leading to insufficient inventories, use of manual inventory management system/Lack of technology, lack of professional Personnel, holding too much/too little inventory, purchase of materials with a near expiration date, insufficient funds for procurement and use of outdated storage facilities are the factors affecting inventory management practices in SMEs manufacturing sub-sector in Oyo State, Nigeria.

**Table 2. Inventory management techniques are applied in SMEs manufacturing sub-sector in Oyo State, Nigeria**

<table>
<thead>
<tr>
<th>Activity based costing analysis</th>
<th>No extent (31%)</th>
<th>Little extent (23%)</th>
<th>Moderate extent (19%)</th>
<th>Great extent (17%)</th>
<th>Very great extent (10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just-In Time (JIT) inventory</td>
<td>50 (38%)</td>
<td>29 (22%)</td>
<td>22 (17%)</td>
<td>20 (15.5%)</td>
<td>8 (6.5%)</td>
</tr>
<tr>
<td>Economic Order Quantity (EOQ)</td>
<td>9 (6.9%)</td>
<td>15 (11.6%)</td>
<td>21 (16.3%)</td>
<td>31 (24%)</td>
<td>53 (41.2%)</td>
</tr>
<tr>
<td>Vendor managed inventory</td>
<td>55 (42.6%)</td>
<td>49 (38%)</td>
<td>23 (17.8%)</td>
<td>16 (12.4%)</td>
<td>7 (5.2%)</td>
</tr>
</tbody>
</table>

**Tables 3. Effect of inventory management practices on SMEs manufacturing sub-sector in Oyo State, Nigeria**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Observation</th>
<th>Mean</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory management enhances continuous production in SMEs manufacturing sub-sector</td>
<td>129</td>
<td>4.091</td>
<td>Accepted</td>
</tr>
<tr>
<td>Inventory management reduces production costs in SMEs Manufacturing sub sector</td>
<td>129</td>
<td>4.992</td>
<td>Accepted</td>
</tr>
<tr>
<td>Inventory management reduces delivery lead time in SMEs Manufacturing sub sector</td>
<td>129</td>
<td>4.762</td>
<td>Accepted</td>
</tr>
<tr>
<td>Inventory management contributes greatly to the performance of SMEs Manufacturing sub sector</td>
<td>129</td>
<td>4.876</td>
<td>Accepted</td>
</tr>
<tr>
<td>Inventory management helps in inventory planning and scheduling in SMEs Manufacturing sub sector</td>
<td>129</td>
<td>4.712</td>
<td>Accepted</td>
</tr>
<tr>
<td>Inventory management minimizes scrap and rejects in SMEs Manufacturing sub sector</td>
<td>129</td>
<td>4.219</td>
<td>Accepted</td>
</tr>
<tr>
<td>Inventory management prevents shortages and stock out costs in SMEs manufacturing sub sector</td>
<td>129</td>
<td>4.768</td>
<td>Accepted</td>
</tr>
</tbody>
</table>

**Table 4. Factors affecting inventory management practices in SMEs manufacturing sub-sector in Oyo State, Nigeria**

<table>
<thead>
<tr>
<th>Obs</th>
<th>Mean</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delays in delivery of materials leading to insufficient inventories</td>
<td>129</td>
<td>4.54</td>
</tr>
<tr>
<td>Use of outdated storage facilities</td>
<td>129</td>
<td>4.29</td>
</tr>
<tr>
<td>Use of manual inventory management system/Lack of technology</td>
<td>129</td>
<td>4.49</td>
</tr>
<tr>
<td>Lack of professional Personnel</td>
<td>129</td>
<td>4.45</td>
</tr>
<tr>
<td>Holding too much/too little inventory</td>
<td>129</td>
<td>4.42</td>
</tr>
<tr>
<td>Bureaucratic process in procurement</td>
<td>129</td>
<td>4.11</td>
</tr>
<tr>
<td>Stealing and pilfering</td>
<td>129</td>
<td>4.12</td>
</tr>
<tr>
<td>Weak management system</td>
<td>129</td>
<td>4.21</td>
</tr>
<tr>
<td>Conflict of interest</td>
<td>129</td>
<td>4.09</td>
</tr>
<tr>
<td>Insufficient funds for procurement</td>
<td>129</td>
<td>4.32</td>
</tr>
<tr>
<td>Purchase of materials with a near expiration date</td>
<td>129</td>
<td>4.40</td>
</tr>
<tr>
<td>Overstocking/under stocking</td>
<td>129</td>
<td>4.13</td>
</tr>
<tr>
<td><strong>Grand Mean</strong></td>
<td><strong>4.29</strong></td>
<td></td>
</tr>
</tbody>
</table>


6. CONCLUSION

This study examines the impact of inventory management practices on SMEs manufacturing sub-sector in Oyo State, Nigeria. The study establishes that most SMEs in Oyo State use Economic Order Quantity while other latest techniques are yet to be implemented. Furthermore, the study affirms that inventory management practices have positive and significant impact on SMEs Manufacturing sub-sector performance in terms of production costs reduction, prevention of shortages and stock out reduction in delivery lead time. The study also confirms that delays in delivery of materials leading to insufficient inventories, use of manual inventory management system/Lack of technology, lack of professional Personnel, holding too much/too little inventory, purchase of materials with a near expiration date, insufficient funds for procurement and use of outdated storage facilities are the factors affecting inventory management practices in SMEs manufacturing sub-sector in Oyo State, Nigeria.

7. RECOMMENDATIONS

Subsequently, the study recommends that SMEs operators/ mangers should be encouraged to adopt information technology in inventory management. Automation assists procurement function in stock control by setting stock control levels and calculating the amount of stocks to hold and dispatch, thus improving the performance of the procurement function. Also, SMEs operators and managers should be encouraged to constantly attend conferences, seminars and workshops in Nigeria and abroad in order to improve their skills on inventory management.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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