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ANALYSIS OF THE IMPACT OF INVENTORY MANAGEMENT PRACTICES ON THE EFFECTIVENESS OF RETAIL STORES IN SOUTH AFRICA

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Analysis of the Impact of Inventory Management Practices on the Effectiveness of Retail Stores in South Africa

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Abstract- The study analyses the impact of inventory management practices on the effectiveness of retail stores in Vhembe District, South Africa. A quantitative research design was adopted for the study. The study used a simple random sampling method to collect data from 30 retail stores. Results from the survey revealed that inventory management tools and techniques like economic order quantity, just-in-time, barcoding and inventory management software have a positive effect on the performance of retail stores. This is because the quality of service delivery to customers was improved, thereby outperforming competitors. Also, sales and turnover increased as over-stocking and under-stocking were effectively managed giving rise to a higher return on investment. The major conclusion drawn from the study was that the adoption of inventory management practices positively affects the retail businesses in Vhembe District. The study recommends that retail stores should invest more in modern inventory management practices because it has a long-term beneficial effect on their effectiveness and performance. More so, continuous on-the-job training should be organised for retail store employees to keep them abreast of the availability and usage of modern inventory management tools and techniques to enhance their skills and performance.

Keywords: *inventory, inventory management, modern management tools, retail store, south africa.*

I. INTRODUCTION

In recent years, consumers have developed a cognitive awareness of market trends and global information. This has influenced the average retailer in offering first-class service delivery and up-to-date information on the availability of offered products, quality and price (Amahalu, 2018). The vast availability of market information has afforded consumers broad-based product choices because consumers can make informed decisions about product needs and purchase decisions. These give way to low transactional costs for consumers (Mwangi, 2016).

Dobler and Burt (2006) argue that inventory alone accounts for as much as 30% of the organisation's invested capital. For this reason, the increased business competition climate has involuntarily coerced

organisations to be more efficient in all processes, in particular, inventory management. Therefore, the main objective of inventory management is to have sufficient quantities of inventory available to serve customers' needs and minimise the costs of carrying the inventory. Furthermore, to ensure continuity and uninterrupted business activity, businesses rely on real-time inventory data that is made accessible through the implementation of inventory management practices.

In their 2015 research article, "Role of Inventory Management Practices on Performance of Production Department," Munyao et al (2015) argues that inventory needs proper monitoring as it is one of the largest assets on the balance sheet at any given time of a business. It should neither be excessive nor inadequate. If inventories are kept at a high level, higher interest and storage costs would be incurred. On the other hand, a low level of inventory may result in a frequent interruption in the production schedule resulting in under utilisation of capacity and lower sales.

The effectiveness of an inventory management system depends on the quality of information it takes in and the capacity of the company's information technology. Improvements in information systems over recent years mean that feedback is more frequent and, in some cases, hence providing real-time control capabilities. As a result, several operating systems are now available for monitoring inventory levels and triggering the placement of orders, with the most popularly used one being Enterprise Resources Planning systems (ERP) (Ballou 2000). The ERP system is based on the principle of Just in time (JIT) and Material Replacement Policy (MRP) to manage the inventory levels in enterprises. The application of these methods allows the executive of inventory to be proactive, accurate and effective. There by producing an overall inventory level that can be measured in terms of an inventory turnover ratio.

a) Objectives of the study

The objectives of the study are to:

1. Examine the effectiveness of inventory management techniques and tools adopted by retail stores; and
2. Investigate whether inventory management practices influence the effectiveness of retail stores.

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II. LITERATURE REVIEW

The earliest scientific inventory management research date back to the second decade of the past century (Vipul, 2013), interestingly, research on inventory management practice has continued to attract modern research focus. Several authors offer definitions for inventory, for instance, Yang, Yang and Wu (2021) offer that inventory refers to any kind of resource having economic value and is maintained to fulfil the present and future needs of the retail store for the ultimate purpose of resale. Adding that, inventory takes the form of raw materials, work-in-progress goods and finished goods that are considered to be the portion of the business's assets that are ready or will be ready for sale (Yang et al., 2021). In concert, International Accounting Standard (IAS) 2 paragraph 8 defines inventories as assets held for sale in the ordinary course of business, in the process of production for sale, or in the form of materials or supplies to be consumed in production or rendering service. Vipul (2013) on the one hand explains inventory management as controlling the business stock or controlling the flow of goods and services as per their demand. On the other hand, the essence of inventory management according to Orga (2006) is therefore to have the quality and quantity of the right goods, at the right place and time.

Inventory management is essentially the process through which materials of the correct quantity and quality are made available when required with due regard to storage costs, ordering costs and working capital.

In the current business climate, increasing competition exerts pressure on the retail store to reduce cost and improve effectiveness, hence managers look for areas where they can improve their inventory management by reducing unnecessary costs without negatively impacting the level and quality of service delivery and product offered (Mwangi, 2016). Therefore, knowledge about inventory management in academia and the business environment is vital for effective cost management, enhancing product and service quality, and improving competitive ability and operational flexibility through different relevant inventory models and techniques such as pull systems and lead time reduction. These systems are often described in the operations management literature as arising from initiatives such as JIT or lean production (Yang et al., 2021).

a) *Activities of Inventory Management*

Inventory management covers a wide variety of activities in retail store management processes that range from carrying adequate stock to avoid stock out, ensuring optimum level of stock so that total inventory cost is minimised, to ordering sufficiently higher quantity at a time so that repeated ordering and costs incurred in

such manner can be reduced (Nirmala, Vijila & Gnanaraj 2022).

b) *The Purpose of Inventory Management*

According to Wild (2002), the purpose of inventory management in the retail store is first, to provide both internal and external customers with required service levels in terms of quantity and quality order rate fill, to ascertain present and future requirements for all types of inventories and to avoid stocking while avoiding bad in production and lastly to keep the cost to a minimum by variety reduction economical lot sizes and analysis of costs incurred in obtaining and carrying inventories. Thus, the basic objective of inventory management is to maximise customer service by maintaining appropriate levels of inventory at minimum cost.

c) *Types of Inventory System*

There are two types of inventory systems that aid the effectiveness of inventory management practice. Ile (2002) identified the following:

i. *Perpetual Inventory System*

This system controls the movement of each item of inventory as it goes in and out of stock and shows the current balance at hand.

ii. *Physical Inventory System*

According to the physical inventory system, some discrepancies between inventory records and quantities at hand cannot be ruled out. An actual count of all items at hand is periodically necessary for effective inventory control.

In sum, the method selected between perpetual and physical inventory methods, depends upon the size and diversity of stock, the degree to which the work process is standardised and the processing methods employed in a particular plant.

d) *Tools of Inventory Management*

On the one hand, Nirmala et al (2022) identified two tools related to inventory management through inventory classifications.

ABC analysis: The ABC analysis categorises products based on importance. Once the ranking factor is chosen, breakpoints are chosen for classes A,B,C and so on. The systems ensure that products are ranked according to their strategic importance, therefore, not all product items receive equal logistics treatment (Nirmala et al., 2022)

Critical value analysis: The CVA pays more attention to the C items. Although it ranks products similarly to ABC, CVA analyses products based on stock-out rates. Stock-out rates are assigned subjectively to each category.

Furthermore, Rajeev (2008) identified other inventory management tools including barcoding, radio frequency identification (RFID) and inventory software.

e) *Inventory Management Techniques*

Modern inventory management practices are based on well-recognized inventory techniques. Though these techniques were developed many years ago, they still perform well from a theoretical and application point of view. Inventory techniques such as economic order quantity (EOQ) and just-in-time (JIT) are popularly used in conjunction with other techniques, for instance, material replacement planning (MRP) and bin card systems to improve the efficiency of inventory management practice. EOQ and JIT techniques are discussed in the section below due to their significant contribution to the rationalisation of inventory management approach and assisting in the formulation of control policies

i. *Economical Order Quantities*

The technique determines the optimum order size for individual inventory items, which minimises both total stock holding and ordering costs (Langfield-Smith, Thorne & Hilton, 2006). A benefit of the EOQ technique is that it is robust as it gives satisfactory answers even with substantial variation existing in its parameters.

ii. *Just in time (J.I.T)*

Just in time inventory management technique helps in reducing inventory costs by avoiding holding excess inventories and mishandling raw materials. Its goal is to maintain just enough material in the right place and at the right time ensuring that just the right amount of the product is available at any given time (Anichebe & Agu, 2013). It is essentially an inventory management technique where inventory is acquired only when required in the business for the production process to improve the return on investment of the business by reducing in-process inventory and its associated costs (Sushma & Bhupesh, 2007). For the just-in-time technique to work successfully, the quality of the parts must be very high because defective materials could halt the operations of the assembly line, there must be dependable relationships and smooth cooperation with suppliers.

f) *Theoretical Framework*

This study is underpinned by three theories namely adaptive structuration theory, stock diffusion theory and scientific management theory.

i. *Adaptive Structuration Theory (AST)*

Structuration theory was first proposed by Anthony Giddens in his constitution of the society in 1984, which was an attempt to reconcile social systems and the micro/macro perspective of organisational structure. Dimitrios (2008) borrowed from Giddens to propose AST and the rise of group decision support systems.

AST provides the model whereby the interaction between advancing information technologies (IT), social structures, and human interaction is described, and

social structures, rules, and resources are provided by IT as the basis for human activity. AST is a viable approach to studying how IT affects inventory management because it examines the change from distinct perspectives.

AST is relevant in today's inventory management practice due to the expanding influence that advancing technologies have had concerning the human-interaction aspect of AST and its implication on socio-biologically inspired structuration in the security software application.

Ramakrishna (2005) AST's appropriation process, therefore, provides a good model to analyse the utilisation and penetration of new technologies in retail stores.

ii. *Stock Diffusion Theory*

The stock diffusion theory was pioneered by Braglia, Gabbrielli and Zammori (2013) with the intention of deriving the probability distribution of the stock consumption and that of the reorder time. There are three considerations of the stock diffusion theory which are the storage space requirement, how quickly inventory is sold and how to avoid inventory from becoming outdated before it is sold. These considerations can prevent shortages and wasteful spending which in turn reduces the operational cost of the store and increases its profit (Braglia et al., 2013).

iii. *Scientific Management Theory*

The theory consists of the works of Fredrick Taylor who started the era of modern management in the late nineteenth and early twentieth centuries. Taylor consistently sought to overthrow management by the rule of thumb and replace it with actual timed observations leading to the one best practice (Watson, 2002). Taylor advocated for the systematic training of workers in the one best practice rather than allowing them personal discretion in their tasks. He further argued that the workload would be evenly distributed between the workers and management with management performing the science and the workers performing the labour, each group doing the work for which it was best suited. Taylor's strongest positive legacy was the concept of breaking a complex task down into several sub-tasks and optimising the performance of the subtasks, hence, his stopwatch measured time trials (Ogbo, Onekanma & Ukpere, 2014). As a result, Taylor proposed three underlying principles of management.

Firstly, there is a need to develop a science of work to replace old rule-of-thumb methods, pay and other rewards linked to the achievement of optimum goals, measures of work performance and output. Failure to achieve these would in contrast result in a loss of earnings. Second, workers should be scientifically selected and trained on the recent method of inventory management strategies and models to achieve the best

results. Finally, work and responsibilities are to be divided equally amongst workers and management cooperating in close interdependence.

According to Watson (2002), scientific management is essential in effective store management as it aims to improve methods of storage and distribution and remove wastage and inefficiency in undertaking storage activities. This is relevant in formal business settings where there is a constant demand for uniformity of goods, regularity of customer patronage and accountability for operations.

III. DATA AND METHODOLOGY

According to Obadire (2022), research methodology encompasses the entire strategy of the study from the identification and assessment of the problem to the final phase of data analysis, interpretation, conclusion, and recommendations. He further argued that research methodologies are the principles underpinning the researcher's choice of a broad approach to conduct research.

Obadire (2018) argued that a research design is an overall plan for obtaining answers to questions being studied and handling difficulties encountered during the research. Numerous conceivable research designs can be utilised as a part of the research. Hofstee (2006) suggests that the most popular designs used by researchers are extended literature reviews, comparative analysis, content analysis, survey-based research, evaluative research (appraisals), case -studies, action research and theory development. This study used a survey-based research design. In a survey-based research design, information is collected from individuals who are presumed to have the information that is required, and who are willing to communicate this information to the researcher, while being considered as representing a larger group (Obadire, 2022). A well-structured questionnaire was used to ensure the relevance and reliability of the data-gathering process.

This study was carried out in Thohoyandou because of the large number of retail stores well informed for the study. Thohoyandou is a location in the Vhembe district, Limpopo province of the Northern part of South Africa. The population is the formal retail stores, that is; the stores that keep proper records of their sales, procurement, storage and general operation such as groceries stores, supermarkets, pharmaceutical stores, home-ware stores, and frozen stores to mention a few. The participants are made up of the managers and the procurement officer of the store as they are in the right position to provide the required information needed for the study.

According to Obadire (2022), sampling means taking a portion of an entire population, to make inferences about such a selected population. Simple random sampling was used for the study as only the

formal retail stores are considered to have a total population of 100. Scholars do not agree on the exact proportion of the accessible population that should form the sample size. Mugenda and Mugenda (2003) suggest that in descriptive studies thirty percent (30%) of the survey population is representative enough to generalise characteristics being observed. Thus, the sample size was estimated to be 30% of the total population of 100 yielding 30 stores.

The two major available sources of data collection that were used for the research purpose are primary and secondary sources. Also, the data validity and reliability were of utmost importance in the study. Validity entails how well a research instrument measures what it is designed to measure, thus reliability refers to the degree to which the instrument accurately and consistently measures what it intends to measure (Obadire, 2018). Hence, fundamental to the validity and reliability of this instrument the questionnaire was designed with the help of relevant consultation with industry experts for expertise and experience to measure what it is purported to measure. A pilot study was conducted on the sampled population to test the degree to which the instrument consistently and accurately measures the participant's view. The obtained data were analysed using descriptive statistics such as frequency and distribution Tables using Statistical Package for Social Sciences SPSS version 21. Inferential statistics were performed in testing the hypothesis formulated in the study using the Chi-square technique to test the effect of inventory management techniques and tools adopted on the effectiveness of retail stores and its influence on retail store performance. The Chi-square test and other descriptive tests were considered appropriate because of the non-parametric nature of the data that was used in the study.

IV. RESULTS AND DISCUSSION OF FINDINGS

This section presents the analyses of the data collected under the two hypotheses formulated in the study.

a) *Inferential Testing of Hypotheses*

Two hypotheses were raised at their null form for the study, tested at 0.05 significant levels.

H_{01} : The inventory management techniques and tools adopted by retail stores are not effective.

The results shown in Table 1 depict that the Chi-Square value for the economic order quantity technique adopted by the retail store is effective as it produces a value of 22.533 which is significant at the 99% confidence level. Also, the Chi-Square value for the just-in-time technique used by the retail store is more effective as it produced a higher value of 26.133 which is equally significant at the 99% confidence level.

Table 1: Chi-Square Test Results

	Economic Order Quantity technique	Just-in-time technique	ABC Analysis tool	Bar Coding Tool	Inventory Software tool
Chi-Square	22.533***	26.133***	2.133	22.533***	22.533***
df	1	1	1	1	1
P-value	0.000	0.000	0.144	0.000	0.000

*** denotes that Chi-square is significant at a 99% confidence level.

Source: Authors Compilation

Similarly, barcoding and inventory software tools adopted by these retail stores were also found to be significant as they produce a Chi-Square value of 22.533 for both tools. However, the ABC analysis tool appears to be statistically insignificant depicting no effectiveness in its adoption by the sampled retail stores. This is attributed to the fact that the tool is not popular amongst the majority of the sampled retail stores

In short, the null hypothesis is rejected and the alternative hypothesis which states that inventory management techniques and tools adopted by retail stores are effective is accepted. These findings are similar to Fullerton, McWatters and Fawson (2003)s' study of modern inventory technique adoption which supported that firms that implement a higher degree of modern tools and techniques outperform the industry.

H_{02} : The inventory management practice adopted does not influence the effectiveness of retail stores.

The Chi-square computation represented in Table 2 shows that the various variables used to measure retail store effectiveness are significant and the adopted inventory management practices have a significant influence on the retail store. Service delivery was well improved, this is demonstrated by a Chi-square value of 6.533 significant at 0.011 $p < 0.05$. Further, stock availability, outperforming competitors, increase in sales, reduction in customer loss, reduction in operational cost, increase in return on investment, reduction in stock out and overstocking are also significant with p-value < 0.05 .

Table 2: Chi-Square Test Results

S/N	Statement	Chi-Square Value	df	P Value	Decision
1	The practice improves the quality of service delivery.	6.533**	1	0.011	Significant
2	The practice increases the availability of stocks that meet customers' needs and specifications at the right time.	10.800***	1	0.001	Significant
3	The inventory practice resulted in the business outperforming its competitors.	4.533**	1	0.015	Significant
4	The inventory practice increased sales and turnover.	5.333**	1	0.018	Significant
5	The inventory practice has reduced the loss of customers.	13.333***	1	0.000	Significant
6	The inventory practice has reduced operational costs.	30.200***	2	0.000	Significant
7	The inventory practice has enhanced the return on investment.	15.800***	2	0.000	Significant
8	The inventory practice has reduced stock-out levels.	5.333**	1	0.018	Significant
9	The inventory practice has reduced overstocking.	3.133**	1	0.044	Significant
10	The inventory practice has reduced wastages through stock obsolescence.	1.467	3	0.190	Insignificant

***, ** denotes that Chi-square is significant at 99 and 95% confidence levels.

Source: Authors Compilation

Conversely, reduction in wastage through obsolescence reported a Chi-square value of 1.467 with p-value of 0.190 > 0.05 which was a result of other factors that do not apply to most sampled retail stores.

For instance, factors that arise from stores that do not deal in perishable stock are presented in Table 2. This indicates that the adoptions of these inventory management practices are significantly impactful on the

performance and effectiveness of retail stores as 90% of the statements measuring performance proved consistent and statistically significant.

Hence, the null hypothesis was rejected. The alternative hypothesis which states that the adopted inventory management practice influences the effectiveness of retail stores is therefore accepted. This finding is similar to the findings of Munyao et al (2015) in their study of the roles of inventory management practices on the performance of the production department.

V. CONCLUSIONS AND RECOMMENDATIONS

The major focus and objectives of this study were to examine the impact of inventory management practice and its effectiveness on retail stores in Vhembe District Municipality in Limpopo Province of South Africa. From the study, the following key findings emerged:

Firstly, there is a consensus among the respondents' perception about the effectiveness of the adopted inventory management practice, which in turn contributes to their performance. Also, findings from the study indicate that all of the stores adopted inventory management techniques and tools such as EOQ, JIT, barcoding and inventory management software for their operations. Thirdly, the findings further indicate that all of the stores that adopted these inventory management tools and techniques are large and medium-scale businesses that have branches either locally or internationally as they are capable of investing in inventory management tools that small-scale businesses cannot. Lastly, the majority of the respondents perceived that the adopted inventory management system greatly contributed to their effectiveness by improving the quality of service delivery and high rate of customer retention, reducing operational storage, carrying and security costs, reduces under stocking and overstocking and finally increases returns on investment through increased sales and turnover.

From the study's findings and conclusions, the study recommends that retail stores should invest more in modern inventory management systems as it has a long-term beneficial effect on the effectiveness and performance of retail stores. Also, retail store owners or top management should always organise continuous on-job training for their staff or employees to keep them abreast of the availability and usage of modern inventory management tools and techniques to enhance the job skills and performance of the retail store employees. Furthermore, retail stores should maintain a good relationship with their supplier to improve the supply chain management system to enhance the smooth operation of the business and achieve a high level of profits through minimisation of stock holding costs amongst others.

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