

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**KNUST**

**AN INVESTIGATION INTO INVENTORY MANAGEMENT PRACTICES AND  
CUSTOMER SATISFACTION IN THE MANUFACTURING INDUSTRY OF  
GHANA. A CASE STUDY OF GHACEM LIMITED**

**BY**

**ANTHONY ASARE**

**PG9256521**

**A thesis submitted to the department of Supply Chain and Information Systems  
Kwame Nkrumah university of science and technology graduate school of business in  
partial fulfilment of the requirements for the degree of master's in (MSc) Logistics  
and Supply Chain Management**

**Graduate School of Business, KNUST**

NOVEMBER 2023

# KNUST



## DECLARATION

### Candidate's Declaration

I hereby declare that this submission is my own work towards the Master of (MSc) Logistics and Supply Chain Management and that to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree of the university except where due acknowledgement has been made in the text.

Anthony Asare (PG9256521): .....

Student

Signature

Date

Certified by:

Mawuko Dza (Ph. D)  
(Supervisor)

Signature..... Date.....

Prof. David Asamoah  
(Head of Department)

Signature..... Date.....

## ABSTRACT

The main aim of this study was to investigate inventory management practices and customer satisfaction in the manufacturing industry in Ghana; a case study of GHACEM limited. Specifically, the study aimed to; examine the effect of inventory control on customer satisfaction at GHACEM; identify the effect of inventory cost on customer satisfaction at GHACEM and to analyse the challenges of inventory management at GHACEM. The study adopted the descriptive survey approach of collecting data, because the study was based on the use of questionnaire to elicit information based on people's opinion to generate data for the analysis of the research topic. The target population for this study comprised mainly all employees of GHACEM. One hundred and fifty (150) respondents were sampled out for the study. Hence, the sample size for the study is 150. A simple random sampling technique was employed to select the 150 employees out of all the employees. Questionnaires were used as the data collection instrument. Data was processed and analyzed using Statistical Package for Social Sciences (SPSS.v.21) software and generated into percentages, pie charts, bar charts and tables to give a good visual impression and clarity of information. To achieve an ideal level of inventory, firms need to constantly undertake sound and time-tested inventory management practices. In conclusion, it is safe to say that inventory management practices have a positive effect on customer satisfaction. It was recommended that there should be an installation of a strong control and inspecting system to detect fraud and theft of inventory. Also, stores should be enlarged and tidy to help enable maximum usage of space among others.

## TABLE OF CONTENTS

<b>Content .....</b>	
<b>Page</b>	
<b>DECLARATION .....</b>	<b>i</b>

<b>ABSTRACT</b> .....	ii
<b>TABLE OF CONTENTS</b> .....	ii
<b>LIST OF TABLES</b> .....	v
<b>LIST OF FIGURES</b> .....	vi
<b>ACKNOWLEDGEMENT</b> .....	vi
<b>DEDICATION</b> .....	vii
<b>CHAPTER ONE: INTRODUCTION</b> .....	1
1.1 Background of the Study .....	1
1.2 Problem Statement .....	5
1.3 Objectives of the Study .....	5
1.4 Research Questions .....	6
1.5 Significance of the Study .....	6
1.6 Scope of the Study .....	7
1.7 Summary of Research Methodology .....	7
1.8 Limitations of the Study .....	7
1.9 Ethical Considerations .....	7
1.10 Organization of Chapters .....	8
<b>CHAPTER TWO: LITERATURE REVIEW</b> .....	9
2.1 Introduction .....	9
2.2 Theoretical Framework .....	9
2.3 The Concept of Inventory Management.....	9
2.3.1 Inventory Management Techniques .....	12



2.3.2 Inventory Control .....	18
2.3.3 Inventory Cost.....	19
2.4 Concept of Customer Satisfaction.....	20
2.4.1 Customer Satisfaction Models .....	22
2.4.2 Factors Affecting Customer Satisfaction.....	24
2.4.3 Inventory Control and Customer Satisfaction.....	26
2.4.4 Inventory Cost and Customer Satisfaction.....	28
2.5 Review of Empirical Literature.....	28
2.6 Conceptual Framework .....	31
<b>CHAPTER THREE: METHODOLOGY.....</b>	<b>34</b>
3.1 Introduction.....	34
3.2 Research Design.....	34
3.3 Population and Sample Size.....	34
3.4 Sampling Technique.....	35
3.5. Sources of Data .....	35
3.6 Data Collection Instrument .....	35
3.7. Data Analysis .....	36
<b>CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND DISCUSSIONS .....</b>	<b>37</b>
4.1 Introduction.....	37
4.2 Demographic Data of Respondents.....	37
4.3 Effect of Inventory Control on Customer Satisfaction.....	38
4.3.1 Regression Analysis between Inventory Control on Customer Satisfaction.....	38

4.4 Effect of Inventory Cost on Customer Satisfaction .....	39
4.4.1 Regression Analysis between Inventory Cost and Customer Satisfaction.....	39
4.5 Challenges of Inventory Management at GTP .....	40
4.5.1 Challenges of Inventory Management .....	40
4.5.2 Challenges Affect Performance.....	41
4.5.3 Measures for Inventory Management Improvement.....	41
4.6 Discussion of Findings.....	42
4.7 Chapter Summary.....	44
<b>CHAPTER FIVE.....</b>	<b>46</b>
<b>SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>46</b>
5.1 Introduction.....	46
5.2 Summary .....	46
5.3 Conclusions.....	47
5.4 Recommendations.....	47
5.4.1 Suggestions for Future Research.....	48
<b>REFERENCES.....</b>	<b>49</b>
<b>QUESTIONNAIRE.....</b>	<b>55</b>
<b>LIST OF TABLES</b>	
Table 4.1: Analysis of Demographic Data of Respondents .....	34
Table 4.2: Model Summary .....	35
Table 4.3: ANOVA <sup>a</sup> .....	35

Table 4.4: Coefficients <sup>a</sup> .....	36
Table 4.5: Model Summary .....	36
Table 4.6: ANOVA <sup>a</sup> .....	37
Table 4.7: Coefficients <sup>a</sup> .....	37
Table 4.8: Challenges Affect Performance .....	38

**LIST OF FIGURES**

Figure 1: Conceptual Framework.....	29
Figure 4.2: Challenges of Inventory Management .....	38
Figure 4.3: Measures for Inventory Management Improvement .....	39

**ACKNOWLEDGEMENT**

I would like to express my sincere gratitude to my supervisor, Dr. Mawuko Dza for his professional guidance, critics, advice, encouragement, and the goodwill with which he supervised this project work. I am grateful. Besides my supervisor, my sincere thanks extend to my families and loved ones for their unfailing support, enthusiasm and immense knowledge exhibited during the study. Again, I would like to express my special thanks of gratitude to my mother and my lovely wife for their encouragement, financial support, and prayers throughout my studies. Finally, to all who made this project a success, I deeply appreciate it and God bless us all.



## DEDICATION

This research is dedicated to Almighty God for his grace and mercy and also to my supportive  
Lovely wife and my mother for their concern and efforts throughout my academic work.

# KNUST



## CHAPTER ONE INTRODUCTION

### 1.1 Background of the Study

The relationship between customer satisfaction and behavioural intentions have received strong followership in the product and services theory according to Bufquin et al. (2017). It is a fact that every organization tends to move to a position where customer satisfaction is given a favourable consideration. Tsai and Hsu (2014) mentioned that customer satisfaction was caused by the comparison between customers' pre-expectation of products or services through past purchase experiences and the current purchase experience. In other words, customer satisfaction is a construct that must be met optimally for efficient and effective achievement of stated objectives, and for smooth continuation of business (James & Mona, 2011).

Increased customer satisfaction can provide company benefits like customer loyalty, retention, expanding the life of merchandise the customer purchases and increases customers positive word of mouth communication (Tao 2014). When the customer is satisfied with the product or service of the company, it can make the customer to purchase frequently and to recommend products or services to potential customers. It is impossible for a business organization to grow up in case the company ignores or disregards the needs of customers (Tao 2014).

Afsar (2010) posits that no organization, except monopolists, can survive in the competitive business environment without having loyal customers. In other words, the main element of a successful business is developing loyal customers through customer retention practices (Ansari & Riasi, 2016). In other words, if customers fail to patronize or repeat the purchase of the products of the organization, definitely sales and profitability of the organization will drop which will adversely affect the entire performance of the firm (Sukaisih & Hamid, 2015). In a nut shell, the degree at which organizations retain their customers depends to a large extent the degree of satisfaction derived from the products of the organizations (Sukaisih & Hamid, 2015).

Inventory is a costly asset for all manufacturing, retail and service-oriented businesses, and as such, it requires careful management to keep costs down (Mentzer, Min & Bobbitt, 2014). Since it is nearly difficult for companies to run a system without inventory, they have come to understand how critical it is to retain some on hand in case of a sudden rise in demand or another unanticipated occurrence. Holding resources for future production and/or sales is what inventory is all about (Vohra, 2018). Inventory can be thought of as an underutilized yet economically valuable resource. Improved inventory management would free up cash that may be put to better use elsewhere (Ghosh & kumar, 2013). Inventories are also becoming more and more important to businesses, and they are requiring more and more expert assistance (Iyer, 2011). An inventory is a collection of resources that are held for future use. Also included in this wide category are commodities at the pre-sale stage, such as semi-finished products (Mentzer, Min & Bobbitt, 2014).

Customers have grown used to high levels of product availability, which has resulted in larger stock levels for most firms. Inventory management may help or hinder an organization's operations and profitability, as most departments are largely reliant on supply, (Ittmenn and King, 2010). Companies are also under increased pressure from consumers and shareholders to reduce costs while simultaneously improving performance, so they must discover ways to enhance the efficacy and efficiency of their operations (Vohra, 2018). Companies and their consumers are feeling the effects of these pressures more and more. A growing number of firms are turning to inventory management to decrease costs, improve their competitiveness and boost corporate profitability (Nweze, 2014).

The profits of an organization can easily be maximized with the help of an effective inventory management system in places. Huynh (2011) defined profitability as the measure of the ability of a firm to earn profit. Profitability is all about cost minimization and revenue maximization. An effective inventory management improves the firm's profitability through matching inventory management practices and a competitive advantage (Mahidin et al., 2015). The main

goal and objective of inventory management system is to keep the necessary required inventory at any time so that production runs smoothly without interruption whatsoever (Panigrahi, 2013). Koumanakos (2008) studied the effect of inventory management on firm profitability in manufacturing firms operating in three industrial sectors in Greece. Food textiles and chemicals were used in the study covering 2000 – 2002 period. The hypothesis that lean inventory management leads to an improvement in a firm's profitability was tested. The findings suggest that the higher the level of inventories preserved (departing from lean operations) by a firm, the lower the rate of return.

Increased product availability and reduced order cycle time will improve customer service by decreasing overall resources required to offer the requisite level of customer service to a given segment (Iyer, 2011). Inventory management must be increasingly complicated and dynamic to meet the demands of mass customisation, rapid response, and high-quality service (Chima, 2017). It is the responsibility of the inventory manager to ensure that the end user (customer) receives the appropriate goods at the right time while also optimizing profitability (Chima, 2017). Therefore, a system that is both trustworthy and adaptable is essential to help management make critical decisions that might have a lasting and profitable impact on their businesses (Banomyong & Supatn, 2011).

Inventory management is a crucial strategic aspect for boosting competitiveness in a global, competitive, and dynamic economy (Xu, Pan & Ballot, 2013). Since its inception as a costcutting measure, inventory management has grown into a critical component of every company's ability to remain competitive. Successful businesses throughout the world have long understood the importance of effective inventory management in generating new revenue (Zhang, Goh & Meng, 2011). Inventory management systems are essential because they assist companies save money in the face of high storage costs, loss via degradation, damages, and capital that is locked up (Nweze, 2014). On a worldwide basis, inventory management has become one of the most important factors for firm profitability.



Managing stock effectively is important for every business because without adequate level of stock, the flow of production, sale as well as profit levels will be hampered which is not the objective of any business. As a result, a company's strategic viability is increasingly contingent on its capacity to function with a low stock price (Chima, 2017). New technologies are making inventory management easier and more efficient. Organization must ensure that, they will not run out of inventory because production depends on the balances flow of material (Zhang, Goh & Meng, 2011). Inventory management methods must be put in place to guarantee that materials are accessible and in the correct quantity when they are required. Management must guarantee that proper inventory-management strategies are used to minimize difficulties such as excessive storage costs, losses due to degradation and damages (Vohra, 2018).

This study therefore seeks to investigate inventory management practices and customer satisfaction in the manufacturing industry in Ghana. Ghana has started a complex effort to boost its industrial capacity and production, building on years of strong development in the sector. The goal of this flurry of new efforts is to improve the climate for manufacturing investment and increase the value-added portion of the nation's produced exports. While there are still obstacles to overcome, particularly in the areas of taxes and insolvency regulation, these initiatives may help to boost the non-oil sector's contribution to total development and encourage sustainable diversification. According to the Ghana Statistical Service, manufacturing contributed GHS28 billion (\$6.1 billion) to GDP in 2017, up from GHS23.9 billion (\$5.2 billion) in 2016 and GHS20.5 billion (\$4.4 billion) in 2015. (GSS). In 2017, this amounted to 11.7% of the GDP. Even while manufacturing's economic contribution has marginally declined over the previous ten years, this is mostly because the GDP contribution of the oil industry has increased. After expanding by 7.9 percent in 2016 and 3.7 percent in 2015, the manufacturing sector did, in fact, grow by an amazing 9.5 percent in 2017.



## **1.2 Problem Statement**

Competitive pressure and difficulties in sustaining and growing profitability are becoming more prevalent in today's business environment. It is becoming increasingly difficult for the executives of these organizations to come up with new ways to boost their competitiveness and profitability (Defee & Fugate, 2010). Inventory management has been studied extensively in industrialized countries, however data shows that cultural, socioeconomic, and environmental factors impact the relationship between inventory management and profitability in each nation (Dai & Chen, 2012).

For example, it was accepted by Keebler and Plank (2009) that results from US and European corporations could not be applied to other nations. The infrastructure and corporate systems in developed nations like Europe, America, and parts of Asia are more equipped to handle inventory management than in developing countries like Ghana. In most firms in Ghana, the necessity to understand the expenses involved with inventory management to optimize profit remains unabated (Prempeh, 2016; Dick et al., 2008). Other literature within the Ghanaian context were carried out by Koomson (2017) and Kasim, Zubieru and Antwi (2015). All these studies focused on the impact of inventory management and performance or profitability. None of the studies cited by the researcher focused on the impact of inventory management on customer satisfaction. This has created a dearth in literature. Therefore, this study is designed to empirically assess the impact of inventory management on customer satisfaction.

## **1.3 Objectives of the Study**

The main aim of this study is to investigate inventory management practices and customer satisfaction in the manufacturing industry in Ghana; a case study of GHACEM limited.

Specifically, the study aims to:

1. Examine the effect of inventory control on customer satisfaction at GHACEM.
2. Identify the effect of inventory cost on customer satisfaction at GHACEM.

3. Analyse the challenges of inventory management at GHACEM.

#### **1.4 Research Questions**

The study was guided by the following questions.

1. What is the effect of inventory control on customer satisfaction at GHACEM?
2. What is the effect of inventory cost on customer satisfaction at GHACEM?
3. What are the challenges of inventory management at GHACEM?

#### **1.5 Significance of the Study**

According to Rajeev (2008), efficient inventory management requires always maintaining the proper level of stock. An excessive amount of inventory takes up valuable real estate, results in additional financial strain, and raises the risk of losses due to spoilage, damage, and theft. On the other side, having too little inventory can frequently cause disruptions in corporate operations and raise the probability of providing inadequate service to customers (Dimitrios, 2008). Research into the area of the impact of efficient inventory practices is relevant for several reasons. First, it is going to help organizations to fashion out efficient and effective inventory policies for themselves.

Thus, the study will bring out how organizations must manage their stock policies to be responsive and at the same time efficient thereby increasing the value chain of the supply chain (which is also known as supply chain profitability). The study will also be beneficial to the public and the entire population because it will come up with appropriate suggestions on how timely and in the right quantities that inventory would be managed to be able to satisfy their requirements. Also, the benefit of sharing information among researchers is another reason for the study. Thus, the information provided in the study will be useful to researchers who might want to undertake further research into the area of inventory management in the public and/or

private sector. This study is undertaken to enhance the frontiers of knowledge by adding up to literature on inventory management on customer satisfaction.

### **1.6 Scope of the Study**

This study focused on inventory management practices at GHACEM Limited. Data was gathered from management and staff of the organisation with specific focus on those officers responsible for acquiring and managing the company's inventory. The study was carried out in the Greater Accra Region of Ghana.

### **1.7 Summary of Research Methodology**

The study will adopt a descriptive survey approach. The population of the study will comprise employees of GHACEM. Fifty (50) employees will be sampled out for the study. A purposive sampling technique was employed to select the 50 employees out of all the employees. A questionnaire will be chosen as the data collection instrument. The present study will employ quantitative techniques for data analysis to achieve the set objectives. The Statistical Product and Service Solutions (SPSS v.22.0) will be used to analyze the data collected.

### **1.8 Limitations of the Study**

Firstly, there might be the challenge of apathy of some respondents in taking part in the study. Secondly, time constraints and inadequate financial and material resources were challenges that limited the depth of coverage of the research work. A longer time and enough resources would have helped to unearth more findings especially with other organizations in the industry to determine how stock management help them reduce cost.

### **1.9 Ethical Considerations**

The researcher takes into consideration the research values of voluntary participation, confidentiality, and protection of respondents from any possible damage that might come

because of their engagement in the study. The researcher will make it clear that participation in the study is entirely optional for the respondents to the survey. It will be acceptable to either decline to participate or to opt out entirely. The researcher will also provide the respondents with an assurance that the information they provide will be kept secret and that they will be protected from any potential damage that may result from the study since the findings will only be used for the reasons for which they were intended.

### **1.10 Organization of Chapters**

This study would be divided into five chapters. The first chapter would cover the introduction, background of the study, statement of problem, research objectives and questions, significance of the study, scope and limitation of the study and organization of the study. Chapter two deals with the theoretical, empirical, and conceptual framework whilst chapter three deals with the research methodology. The fourth chapter essentially deals with the findings and discussion of the study whilst the fifth chapter concludes the study with summary of findings, conclusion, and recommendations.



## CHAPTER TWO LITERATURE REVIEW

### 2.1 Introduction

In this chapter, the study looks at relevant theories, definitions and principles that are fundamental to inventory management and customer satisfaction.

### 2.2 Theoretical Framework

**Just-In-Time Inventory Theory:** With a just-in-time inventory system, items are not produced until they are needed by customers. Benefits to this system include reduced overhead and minimum storage requirements. There is also less waste when perishable items are involved. Manufacturers of extremely expensive products, such as airplanes, use a just-in-time inventory system, but it is also employed for items at the other end of the spectrum -- custom floral arrangements, for example, or wedding cakes. On-demand publishing houses, which print books only after an order is placed, also use such a system (Wisner, 2013)

**Inventory Theory:** The inventory theory put into practice by most retailers is that of deterministic continuous review. This essentially means keeping items in stock and ordering more when levels begin to drop. This model works best when you can predict customer orders and shipping times. For example, if it takes a week for items to ship to a store, you need enough inventory to last a week. Otherwise, you will have to turn customers away when the item is out of stock (Waters, 2013).

### 2.3 The Concept of Inventory Management

Inventory management has been defined in many ways by many authors. As expected, these authors defined inventory management based on their perception of the subject matter. Lyons and Gillingham (2013) in their book, Purchasing and Supply Chain Management defined inventory as an accounting term for the value or quantity of raw materials, components, assemblies, consumables, work-in-progress and finished stock that are kept or stored for use



as need arises. Coyle et al., (2013), defines inventory as raw materials, work-in-progress, finished goods and supplies required for creation of a company's goods and services. According to an article written by Michael Pollick and edited by Lindsey D. (Wise GEEK, 2011), inventory is the total amount of commodities or materials contained in a storehouse or warehouse at a given time.

Nwandu, (2016) defines inventory management as a form of administration control that is particularly essential in all manufacturing, wholesale, and retail organizations. The essence of inventory according to Nwandu is, "to have the right goods quality and quantity, at the right place and time". Orga (2016), defines inventory management as a process of ensuring that the right quality of the relevant stock is available at the right time and in the right place. Nweze (2014), on his own part defines inventory management as the means of ensuring that actual flow of inventory in an organization conforms with plan. From the foregoing therefore, one infers that inventory management is the act of ensuring that balanced items of stock are maintained at the right quantity, quality, place, and time in an organization, to ensure organizational business continuum.

According to Banjoko (2014), organizations carry inventories for a variety of reasons.

Inventories perform significant functions in the total production system and since "it is physically impossible and economically impracticable for each stock of item to arrive exactly where and when it is needed", there is need to keep some amount of inventory at any point in time. Banjoko (2014) outlined seven reasons for holding inventories, which include;

- To enhance uninterrupted flow of production

- To meet variations in product demand.
- To allow flexibility in production scheduling
- To decouple successive stages of operations
- To level production activities

- To provide a means of hedging against future prices and delivery uncertainties
- To provide a means of obtaining economic lot size and gaining quantity discounts.

Stock and Lambert (2011), categorized inventories into six main types, namely:

**Cycle Stock:** It is the inventory that results from the replenishment process and is required to meet demand under conditions of certainty. That is when the firm can predict demand and replenishment times (lead times) perfectly.

**In-Transit Inventory (Pipeline):** It is the inventory that is en route from one location to another. It may be considered part of cycle stock even though it is not available for sale and or shipment until after it arrive at the destination.

**Safety or Buffer Stock:** It is the stock held more than cycle stock because of uncertainty in demand or lead time. The notion is that a portion of average inventory should be devoted to cover short-range variations in demand and lead time.

**Speculative Stock:** It is inventory held for reasons other than satisfying current demand. That is inventories purchased because of speculations of price hikes.

**Seasonal Stock:** It is a form of speculative stock that involves the accumulative of inventory before a season begins to maintain a stable labour force and stable production runs or in the case of agriculture products, inventory accumulated because of a growing season that limits availability throughout the year.

**Dead (obsolete) Stock:** It is the set of items for which no demand has been registered for some specified period. They are out of date, deteriorated or no longer useful because of advancements in technology.

### 2.3.1 Inventory Management Techniques

Inventory management relates to the tracking and management of commodities which includes the monitoring of commodities moved in and out of stockroom locations and the reconciling of the inventory balances. Some of the techniques used in managing inventories are discussed below.

**ABC Analysis:** This technique assigns items to three groups according to the relative impact or values of the items that makes up the group. Those thought to have the greatest impact, or value, for example, constituted the 'A' group, while those items thought to have a lesser impact or value were contained in the 'B' and 'C' groups respectively (Coyle et al., 2013). In many ABC analysis, a common mistake is to think of the 'B' and 'C' items as being less important than the 'A' items and, subsequently, to focus most of management's attention on the 'A' items. A decision might be made to assume very high in-stock levels for the 'A' items and little or no availability for the 'B' and 'C' items.

The fallacy here relates to the fact that all items in the A, B and C categories are important to some extent and that strategy is to assure availability at an appropriate level of cost. The purpose of this classification is to ensure that purchasing staff use resources to maximum efficiency by concentrating on those items that have the greatest potential savings. Selective control will be more effective than an approach that treats all items identically (Lysons & Gillingham, 2013). This theory suggests that though all categories of inventory is important, inventory must be categorized or classified in accordance to their relative impact or value and treated differently.

**Economic Order Quantity (EOQ):** Plasecki (2011) defines Economic Order Quantity as an accounting formula that determines the point at which the combination of order costs and inventory costs are the least. Lysons and Gillingham (2013), also defines Economic Order Quantity as the optimal ordering quantity for an item of stock that minimizes cost. According

to Lysons and Gillingham (2013), to calculate the Economic Order Quantity, a mathematical model of reality must be constructed. All mathematical models make assumptions that simplify reality. The model is valid only when the assumptions are true or nearly true. When an assumption is modified or deleted, a new model must be constructed.

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 variability and uncertainty exist (Lysons & Gillingham. 2013). This theory suggests that the appropriate or optimum level of stock or inventory that an organization should keep, or store must help to reduce the cost of doing business. The EOQ model is based on certain assumptions which include:

- Known and constant demand,
- Instantaneous replenishment,
- Backorder is not allowed
- No constraints on order size
- Cost of order is constant
- Unit price is constant, (Banjoko, 2014).

**Material Requirement Planning (MRP I):** Ballou (2019), defined material requirement planning as a mechanical method of supply scheduling where the timing of purchase or of production output is synchronized to meet period by period operations requirement. Ballou (2019) explained further that material requirement planning methods try to avoid carrying more inventory than is needed at a time. Thus, the emphasis is on carrying only the quantities of stock needed at any point in time, and this is achieved through precise timing of material flows to meet requirements. Lysons and Gillingham (2013), defined material requirement planning as a product-oriented computerized technique aimed at minimizing inventory and maintaining delivery schedules. It relates the dependent requirements for the materials and components



comprising a product to time periods known as 'buckets' over a planned horizon (typically one year) based on forecasts provided by marketing and sales and other input information.

Coyle et al (2013) explained material requirement planning as a set of logically related procedures, decision rules, and records designed to translate a master production schedule into time-phased net inventory requirements for each component item needed to implement this schedule. Lysons and Gillingham (2013) outlined the aims of material requirement planning as follows:

- To synchronize ordering and delivery of materials and components with production requirements.
- To achieve planned and controlled inventories and ensure that required items are available at the time of usage or not much earlier.
- To promote planning between the purchaser and the supplier to the advantage of each.
- To enable rapid action to be taken to overcome material or component shortage due to emergencies, late delivery and so on.

Coyle et al (2013) also explained the goals of material requirements planning as follows:

- Ensure the availability of materials, components, and products for planned production and for customer delivery.
- Maintain the lowest possible inventory level.
- Plan manufacturing activities delivery schedule and purchasing activities.

In doing so, the material requirement planning system considers current and planned quantities of parts and inventory products, as well as the time used for planning.

**Manufacturing Resource Planning (MRP II):** Manufacturing resource planning (MRP II), has been defined by the American Production and inventory Control Association as a system built around materials requirement planning and including the additional planning functions of production planning, master production scheduling and capacity requirement planning. Lysons



and Gillingham (2013), explained that manufacturing resource planning (MRP II) has wider implications than material requirements planning (MRP I). Stock and Lambert (2011) also explained that, material requirements planning (MRP I) developed into manufacturing resource planning (MRP II) with the addition of financial, marketing and purchasing components.

According to Coyle et al (2013), manufacturing resource planning (MRP II) allows a firm to integrate financial planning and operations/logistics. They further explained that manufacturing resource planning (MRP II) serves as an excellent planning tool, and it helps describe the likely results of implementing strategies in areas such as logistics, manufacturing, marketing, and finance. Both material requirements planning (MRP I) and manufacturing resource planning (MRP II) are relevant because they place emphasis on carrying quantities of stock that is needed at any point in time and avoid unnecessary stock. This therefore helps reduce holding or carrying cost.

**Enterprise Resource Planning (ERP):** Stock and Lambert (2011), explained that Enterprise Resource Planning (ERP) is a system that includes the core accounting functions of accounts payable, accounts receivable, and general ledger, coupled with logistics functions, to manage the organization. Lysons and Gillingham (2013), defines Enterprise Resource Planning (ERP) as a business management system that, supported by multi-module application software integrates all the departments of functions of an enterprise. Lysons and Gillingham, further explained that Enterprise Resource Planning (ERP) is the latest and possibly the most significant development of material requirement planning (MRP I) and manufacturing resource planning (MRP II). While MRP I and MRP II allowed manufacturers to track supplies, work in progress and the output of finished goods helps to meet sales orders. ERP is applicable to all organizations and allows managers from all functions or departments to have a consolidated view of what is or is not taking place throughout the enterprise.

**Distribution Resource Planning (DRP):** Lysons and Gillingham (2013), defined Distribution Resource Planning as an inventory control scheduling technique that applies material requirements planning principles to distribution inventories. It may also be regarded as a method of handling stock replenishment in a multi-echelon environment. Vollman et al., (2018), observed that Distribution Resource Planning (DRP) serves a central role in coordinating the flow of goods inside the factory with the system modules that place goods in the hands of the customers, and provides the basis for integrating the manufacturing resource planning (MRP II) system from the firm to the field. According to Coyle et al (2013), Distribution Resource Planning is a widely used and potentially powerful technique for outbound logistics systems to help determine the appropriate level of inventory. They further explained that DRP helps companies to improve customer service (decrease stock out situations), reduce the overall level of finished goods, and improve distribution center operations.

The underlying rationale for Distribution Resource Planning (DRP) is to more accurately forecast demand and to explode that information back for use in developing production schedules. In that way, a company can minimize inbound inventory by using material requirements planning (MRP) in conjunction with production schedules. Outbound inventory is minimized using Distribution Resource Planning (MRP) (Coyle et al, 2013). This theory suggests that inventory quantities are determined by comparing inventory status with the total number of items needed to meet the production schedule.

**Just-In-Time System (JIT):** Coyle et al (2013) defined Just-In-Time (JIT) system as an inventory control system that attempts to reduce inventory levels by coordinating demand and supply by the point where the desired item arrives just in time for use. Ideally, products should arrive exactly when a firm needs it, with no tolerance for late or early deliveries. Lysons and

Gillingham (2013), also defined Just-In-Time system as an inventory control philosophy whose goal is to maintain first enough material in just the right place at just the right time to make just the right amount of product. It is a lean production system used mainly in repetitive manufacturing. The Just-In-Time system suggests that inventories should be available when an organization needs them, not any earlier, nor any later.

Stock and Lambert (2011) defined Just-In-Time system as a program which seeks to eliminate non-value-added activities from any operation with objectives of producing high-quality products, high productivity levels, lower levels of inventory, and developing long-term relationships with channel members. Stock and Lambert 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. This theory is relevant because it focuses on the identification and elimination of manufacturing system. This therefore helps to eliminate unnecessary inventory and reduce cost throughout the entire supply chain system.

All these inventory management techniques discussed above reveals that carrying unnecessary stock of goods and materials adds to the operational cost of the organization and therefore reduces its profitability. Therefore, the solution to reducing overall cost of holding inventory lies with adopting the use of efficient procedures to manage and control physical inventory of goods. Thus, the organization must invest thoroughly in ensuring that the right stock is available when and where it is needed. This helps to reduce the loss of sales opportunities and thereby improve upon the profitability of the organization (Sawaya Jr. & Giaque, 2016).



### 2.3.2 Inventory Control

Inventory control is a process that entails supervising the warehouse, the supply of products, and its accessibility so that there is an adequate supply of the goods to customers and raw materials to the manufacturing company. The main goals of the process are to control the stock and to accurately provide information on inventory. Moreover, inventory control is defined as observing the materials needed for production and working to provide them according to the planned timelines to ensure the regularity of operations and the use of capabilities, which leads to reducing costs and the regular flow of ready-made products to customers on specified dates (Marand et al., 2019).

The importance of inventory control stems from the importance of determining the economic quantity of demand and determining the point of re-ordering and reducing inventory to the lowest possible extent. The project may be able to accurately determine the quantity of the stock if it is under static conditions that are characterized by stability and certainty, but the current and future conditions are characterized by the mobility and dynamism of irregular conditions, which affects the difference in the quality of the stock of raw materials, semi-finished materials, or finished goods, as well as rates of use, supply dates, or periods (Rajeswari, 2019). The importance of inventory for economic, industrial, and commercial units emerges as significantly alike, as it is an indispensable element under any circumstance.

Consumers request goods and services at the appropriate time and place, and therefore units need to store those materials in a manner that meets those needs first-hand, without any interruption in production. The stock represents the connecting link and valve that connects the most important activities within the economic unit, starting from the stage of purchasing goods in commercial units, or raw materials for economic units, through the cycle of production and



storage and the costs associated with them over those stages, and finally ending with how they are formulated and sold through the sales cycle in response to customer requests (Rabta, 2020). The commodity inventory is currently one of the most important current in terms of its enormous value when compared to other assets, especially in industrial units, and any error in determining its value leads to errors in determining the total current assets and the total equity. This error applies to determining the basic elements in the income statement, and thus affects the total and net profit, and this error in evaluating the commodity stock in a certain period will affect the subsequent periods as well. This is because the stock at the end of the current period is the stock at the beginning of the subsequent period, thus affecting the validity of the subsequent period by the amount of error that occurred in determining the value of last-period inventory in the previous period (Herath and Lu, 2018).

### **2.3.3 Inventory Cost**

Efficient inventory cost management is vital for the successful functioning of manufacturing and retailing organizations. Inventories consist of raw materials, work in progress, spare parts or consumables, goods in transit and finished goods. It is not necessary that an organization will have all these inventory classes, but whatever may be the inventory items, they need efficient management as, generally, substantial share of the company's funds is invested in inventory. The inventory cost management of any organization represents an important decision-making function at all stages of the product manufacturing, distribution and sales chain.

Apart from being a major portion of total current assets of many organizations, according to Moore, Lee and Taylor (2013) inventory often represent as much as 40% of the capital of industrial organizations. Sawaya and Giauque (2016) also stated that inventory represents 33%

of a company's assets and as much as 90% of working capital. As inventory constitutes a major segment of a company's assets, it is crucial that good inventory management practice is put in place to ensure the organization's growth and profitability to sustain the business as a going concern. This means that the right materials are in stock in the right quantity and are available at the required time. Proper and regular checks on stores inventory are conducted to avoid pilferage, wastage, and loss of customers due to stock-outs. Making the right order for inventories (buying of stocks that are needed by customers) always would promote high turnover thereby improving the profit level of the organization.

#### **2.4 Concept of Customer Satisfaction**

It is important to understand what customer satisfaction' means. In business circles, the term refers to the kind of products and services a company provides to meet and exceed its customers' expectations. Organizations within the same market sector must assess the quality of their services if they are to attract and retain customers. It appears many researchers have conceptualized customer satisfaction as the feeling of pleasure or disappointment that an individual gain from comparing a perceived performance or outcome against their expectations (Brandy & Robertson, 2021). The two usual conceptualizations of satisfaction are transactionspecific satisfaction and cumulative satisfaction (Yi & La, 2014). The former indicates how the customer evaluates his or her experience and the way that he or she reacts to a service encounter (Boshoff & Gray, 2014).

Customers who experience a product or service for the first time express this reaction. Cumulative satisfaction, on the other hand, refers to how the customer evaluates his or her consuming experience overall (Kotler et al., 2019). Based on this overall evaluation, customers set a personal standard that they use subsequently to gauge service quality. However, there is

general agreement that the measurement of customer satisfaction is a post-consumption assessment about the products or services gained (Brandy & Robertson, 2021). Satisfaction is a feeling that surfaces from an evaluation process, i.e. when the consumer of a good or service compares what is received against what is expected from the utilization of that good or service (Kotler et al., 2019). The following criteria are laid down by Liu et al. (2018) for measuring the satisfaction level of customers regarding purchase and subsequent consumption of goods or services:

**Satisfaction:** The perception developed by the customers that the goods or services are acceptable or tolerable.

**Content:** The features of goods or services and the underlying benefits gives customer a positive consumption experience.

**Relived:** The alleviation of the negative state of customers' mind by the goods or services provided.

**Novelty:** The goods or services bring freshness and excitement in customers.

**Surprise:** The amazement and unexpected pleasure brought to people by goods or services consumed.

There is general agreement that, satisfaction is a person's feelings of pleasure or disappointment resulting from comparing a product's performance in relation to its expectations (Kotler, 2017). Customer satisfaction is a business term explaining about a measurement of the kind of products and services provided by a company to meet its customer's expectation. To some, this may be seen as the company's Key Performance Indicator (KPI). In a competitive marketplace where businesses compete for customers, customer satisfaction is seen as a key differentiator and increasingly has become a key element of business strategy (Sivadas, & Baker-Prewitt, 2020). It is well established that satisfied

customers are key to long-term business success. It is also defined as a global issue that affects all organizations, regardless of its size, whether profit or non-profit, local, or multi-national.

Companies that have a more satisfied customer base also experience higher economic returns (Yeung et al., 2019). Apparently, many researchers conceptualize customer satisfaction as an individual's feeling of pleasure (or disappointment) resulting from comparing the perceived performance or outcome in relation to the expectation (Lovelock, Patterson and Walker, 2001). There are two general conceptualizations of satisfaction here, namely, the transaction-specific satisfaction and the cumulative satisfaction (Yi & La, 2014). Transaction-specific satisfaction is the customer's very own evaluation of his or her experience and reaction towards a particular service encounter (Boshoff & Gray, 2014). This reaction is expressed by the customer who experiences a product or service for the first time.

Meanwhile, cumulative satisfaction refers to the customer's overall evaluation of the consumption experience to date (Johnson, Anderson & Fornell, 2015); an own accumulation of contacts with services provided them from day-to-day. However, in general, it is agreed that customer satisfaction measurement is a post-consumption assessment by the user, about the products or services gained.

#### **2.4.1 Customer Satisfaction Models**

Customer satisfaction model helps explain survey results that indicate different levels of satisfaction for a service that one individual may experience. Some models differentiate between technical service quality and perceived service [quality]. The models that will be looked at include Disconfirmation Model Propounded by Oliver and Satisfiers, dissatisfies and delighters or excitors model propounded by Noriaki Kano.



**Disconfirmation Model:** According to Oliver (1980), the disconfirmation model explains that when the customers compare their perceptions of actual products or services performance with the expectations, then the feelings of satisfaction have arisen. Any discrepancies between the expectations and the performance create the disconfirmation. He identified three (3) types of disconfirmations. And they are:

**Positive disconfirmation:** This occurs when product or service performance exceeds performance. In this case, the customers are highly satisfied.

**Negative disconfirmation:** This on the other hand occurs when products or service performance is less than expectations. In this case, the customers are highly dissatisfied.

**Zero disconfirmation:** it occurs when product or service performance is equal to expectations. In this case, customers are neither well satisfied nor less satisfied. They feel 'ok' by the turn of events.

**Satisfiers, dissatisfies and delighters or excitors model:** According to Kano (1984) model is a theory of product development and customer satisfaction that classifies customer preferences. The model offers some insight into the product attributes which are perceived to be important to customers. It focuses on differentiating product features, as opposed to focusing initially on customer needs.

**Satisfiers:** These are characteristics which customers say they want in the product, and their presence led to satisfaction.

**Dissatisfaction:** It is the expected characteristics in a product whose presence leads to customer dissatisfaction. They have the property that they would not be frequently mentioned by customers when asked about what they are looking for in a product, because they are assumed to be present.

**Delighters or Excitors:** Here, innovation or new product is undisputedly the catalyst in delivering these attributes to customers. According to Kano, delighters are the most powerful

and have the potential to lead to the highest gross profit margins. Excitement attributes are for the most part unforeseen by the client but may yield paramount satisfaction. The beauty behind an excitement attribute is to spur a potential consumers' imagination, these attributes are used to help the customer discover needs that they have never thought about before. Having concurrent excitement attributes within a product can provide a significant competitive advantage over a rival. In a diverse product assortment, the excitement attributes trigger impulsive wants and needs in the mind of the customer. The more the customer thinks about these amazing new ideas, the more they want it.

#### **2.4.2 Factors Affecting Customer Satisfaction**

Today's world of intensive competition requires firms to maintain the capability of high quality service as a sustainable competitive priority (Lee, 2017). Identification of factors responsible for customer satisfaction is a key concern of marketing scholars and marketers in now a days and it will remain in the future. There is considerable evidence that quality factors affecting customer satisfaction in numerous ways (Rahman, 2014a). Many studies have found a direct positive link between service quality perceptions and customer behavioral intentions (Zeithaml et al., 2016). Several factors responsible for customer satisfaction in telecommunication industry includes

**Service innovativeness:** Innovativeness is the tendency to develop new products as well as the capacity to introduce new products satisfy customers and improve firm value. There is a positive significant relationship observed between service innovativeness and customer satisfaction (Dotzel, Shankar & Berry, 2017).

**Service reliability:** Reliability is about the accuracy and timeliness in the service provided. Service reliability refers to accessibility – Service is available when desired (when the customer wants to use it); Continuity – Customer has an uninterrupted service over desired duration and

Performance – Meets the customers' expectations (CQR, 2014). To maintain the customer, the organization needs to ensure that the right products and services, supported by the right promotion and making it available at the right time for the customers (Munusamy, Chelliah & Mun, 2020). Degree of service reliability has significant influence on degree of customer satisfaction.

**Service competitiveness:** Service competitiveness refers to the degree of fitness of a service organization in dealing with competing with other competitive business firms; high degree of competitiveness leads to higher innovativeness in goods and services leading to strategic advantages in marketplace and higher customer satisfaction. Companies can foster customer value learning and incorporate it as a cornerstone of their competitive strategies (Parasuraman, 1985).

**Service consistency:** Consistency determines the desirable service qualities for clients. Service consistency is always an expectation of all customers; they want peace of mind and no unpleasant surprises. In service, consistency implies achieving sameness, uniformity and fairness in the delivery or execution of all the service attributes, regardless of time, place, occasion, and service provider (Domingo, 2014). Therefore, service consistency refers to degree of conformity of service value whereas customer perceived that they received service in a consistent manner without any variation.

**Pricing:** Price is used as an indicator of product quality, which results in better expectations from the product and determines higher satisfaction. The research shows that price perceptions directly influence satisfaction judgments as well as indirectly through perceptions of price fairness (Herrmann et al., 2017). Price reasonability and consumer satisfaction are significantly associated with each other. This reveals that the consumers can be held on to for a longer duration by offering them the fair prices so; the customer satisfaction is caused by the fairness of the price (Ali et al., 2020).



**Customer demand fulfilment:** Service providers render services in expectation to fulfilment of customer demand. For fulfilment of customer demand requires an intensive investigation to find out what the customer expected and incorporate it into service requirement. Higher degree of usefulness of service leads to a higher degree of customer satisfaction.

**Operator's contribution to society:** Corporate responsiveness towards society creates perception of societal partnership in the customer's mind and they realized themselves that they are valued by the corporation. The study reveals that corporate social responsibility has a positive impact on the valuing brand image of the corporation and makes customers satisfied. Corporate social responsibility taught to be an important strategic tool for organizations in order to gain a competitive advantage and to display a positive image to society for profitable and long-lasting customer relationship management in service and manufacturing industry around the world (Rahman, 2014b).

**Brand value:** Marketing academics and practitioners have repeatedly reported that consumers look for brands that provide them with unique and remarkable experiences. As a result, the concept of brand experience has become popular among marketers (Rundle-Thiele & Bennett, 2021). The industry depends on people's experience on quality and a good experience may lead to better purchase intention which could build a better image on the market. Since the market is highly competitive, it is recommended that only high-quality products be offered to customers (Khalili, Rahchamani & Abtahi, 2017).

### **2.4.3 Inventory Control and Customer Satisfaction**

Ionescu et al. (2018) tried to identify aspects related to the stock assessment of sold goods and to determine the effect of the stock valuation methods applied in Romania on the financial situation and customer satisfaction of the companies. As a method of pricing and comparing those indicators with each other, the primary objective of the research is an analysis of the



effect that stock valuation methods can have on the financial position and customer satisfaction, from which the main research hypothesis was launched predicting that stock valuation options have a different impact on the financial position and customer satisfaction of the economic unit. This was confirmed based on a theoretical study and applied analysis, as these verified that stock accounting options have different effects on both the financial position and customer satisfaction of the facility.

The research study conducted by Alrjoub and Ahmad (2017) aimed to clarify the effect of various inventory types (raw material stock, in-progress inventory, finished stock, total stock) on the company's customer satisfaction, in addition to the fact that the relationship is affected by some additional factors, such as the cost of capital, which has not been previously examined. This study focuses on these impacts. The moderate cost of capital with regards to the relationship between types of inventories and the customer satisfaction of companies, as data collected for 48 companies for the period confirms (2010-2016), indicated that inventory management, taking into account their types, affects the company's customer satisfaction in the long term. The relationship between inventory management and the company's customer satisfaction is modified, but the interaction between the cost of capital and the type of inventory has a variety of different implications, and the researcher recommended that companies consider the cost of capital when deciding on inventory types and to adapt inventory control to match any possible changes in their business environment.

Also, a study by Jonek-Kowalska (2014) aimed to examine the financial aspects of changes in the level of finished stock in the mining establishment.

#### **2.4.4 Inventory Cost and Customer Satisfaction**

Mohamad, Suraidi, Rahman and Suhaimi (2016) in a case study of a textile chain store in Malaysia, examined the relation between inventory cost and customer satisfaction and found that their inventory days was significantly related to customer satisfaction. The study identified that the textile chain store company had unorganized inventory cost, large amount of inventory days and lacked accurate stores balances due to unskilled workers. Also, Victoire (2015) investigated the impact of inventory cost on customer satisfaction in Rwanda using a manufacturing company as case study. The findings indicate that inventory cost had significant impact on the company's customer satisfaction.

Prempeh (2015) studied the impact of efficient inventory cost on the customer satisfaction of manufacturing firms in Ghana, using raw material inventory management and profit as variables. Cross sectional data from the annual reports of four manufacturing firms listed on the Ghana Stock Exchange were analysed using Ordinary Least Squares (OLS) and multiple regression techniques.

#### **2.5 Review of Empirical Literature**

Zhang et al, (2015) have argued that causal relationship exists between inventory management flexibility and profitability. They suggested that good inventory management flexibility allows firms to leverage their managerial experience and intra and inter inventory management competences, and finally generate high levels of inventory service flexibility. That is because flexible competency, which is an internal management focus, provides the processes and infrastructure that enable a firm to achieve the desired levels of capability. The outcome of an efficient inventory service is “developing service capabilities as these investments will provide firms with access to different market segments, hence, yield economic returns. So, the higher the level of inventory flexibility, the higher the performance of firms. Therefore, the

simultaneous development of inventory management flexibility and service flexibility will reinforce a firm's ability to improve profitability. This implies that inventory management flexibility is expected to positively influence profitability via its positive impact on service flexibility (inventory service flexibility as a mediating variable).

In Malaysia, Agus and Noor (2016) examined the relationship between inventory management practices and profitability. The study measured manager's perceptions of inventory and supply chain management practices and the level of performance in the industry. The practices include lean inventory systems, Technology, and strategic supplier partnerships. They employed a structured questionnaire, which was designed to assess the companies in terms of the described dimensions. The sample companies were randomly chosen from manufacturing companies (non- food-based manufacturing companies with medium to high technology) in Klang valley, Malaysia. The findings suggest that inventory management practices have significant correlations with profitability and return on sales (ROS).

Roumiantsev and Netessine (2015) investigated the association between inventory management policies and the profitability of a firm. The purpose of the study was to assess the impact of inventory management practices on profitability across the period 1992-2002. They used conventional firm specific variables (inventory levels, margins, and lead times) as explanatory variables. They found no evidence that smaller relative levels are associated with profitability as measured by return on assets.

In Greece, Koumanakos (2018) studied the effect of inventory management on the profitability of 135 manufacturing firms operating in three industrial sectors in Greece, food, textiles, and chemicals were used in the study covering 2000 – 2002 period. The hypothesis that lean inventory management leads to an improvement in a firm's profitability was tested. The findings suggest that the higher the level of inventories preserved (departing from lean



operations) by a firm, the lower the rate of return. In conclusion, most of the studies reviewed concentrated on conventional firm level variables such as inventory levels, demand, and lead time. Little attempt was made to capture the perceptions of managers about the impact of inventory management practices on firm profitability.

Sekerolgu and Altan (2014) investigated the effect of inventory management on the profitability of Turkish firms which operated in weaving industry, eatables industry, wholesale, and retail industry, in between 2003-2012 years. Research data consists of profitability ratios and inventory turnovers ratio calculated by using balance sheets and income statements of firms which operated in Borsa Istanbul (BIST). In this research, the relationship between inventories and profitability was investigated by using SPSS-20 software with regression and correlation analysis. The results achieved from three industry departments which exist in the study interpreted as comparatively. Accordingly, it is determined that there is a positive relationship between inventory management and profitability in eatable industry. However, it was founded that there is no relationship between inventory management and profitability in the weaving industry and wholesale and retail industry.

In Ghana, Prempeh (2016) investigated the impact of efficient inventory management on the profitability of manufacturing firms in Ghana. The study design was cross sectional. The study employed the use of secondary data. Cross sectional data from 2004 to 2014 was gathered for the analysis from the annual reports of four manufacturing companies listed on the Ghana Stock Exchange. Judgmental sampling was used to select the four manufacturing companies listed on the Ghana Stock Exchange (GSE). Companies whose data were up to date were considered. Measures of profitability were examined and related to proxies for efficient inventory management by manufacturers. The Ordinary Least Squares (OLS) stated in the form of a multiple regression model was used in the data analysis. The study revealed that there is a



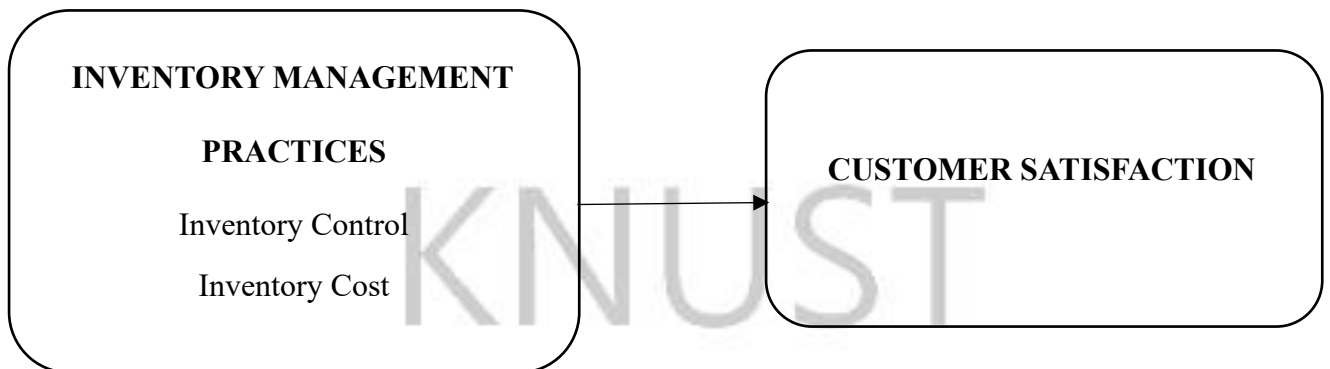
significantly strong correlation between the main variable, raw materials inventory management and profitability of manufacturing firms in Ghana and it is positive. Therefore, efficient management of raw material inventory is a major factor to be considered by Ghanaian manufacturers in enhancing or boosting their profitability

KNUST

## **2.6 Conceptual Framework**

A conceptual framework is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation. Mugenda and Mugenda (2013) defined a conceptual framework as a hypothesized model identifying the model under study and the relationship between the dependent and independent variables. Kothari (2014) defined an independent variable also known as the explanatory variable as the presumed cause of the changes of the dependent variable, while a dependent variable refers to the variable which the researcher wishes to explain. The goal of the conceptual framework is to categorize and describe concepts relevant to the study and map relationships among them. Such a framework helps the researcher to define the concept, map the research terrain or conceptual scope, systematize relations among concepts and identify gaps in literature (Creswell, 2013). The conceptual framework of the study was based on key concepts of the study and literature review. The conceptual framework was then used to analyse the results of the research. It was based on the impact of inventory management practices on customer satisfaction. This is shown in the figure below.

**Figure 2.1: Conceptual Framework**



**Source: Field Survey, 2021**

The study investigated the increase in the level of finished stock, which is often the result of the lack of permanent cost advantages in recruitment companies, in addition to the correlation between changes in the level of finished stocks. And economic fluctuations in the global markets for energy resources in the mining markets was also examined, in which case the researcher studied the level of finished stocks in the largest Polish mining company. Data from the period from 2003 to 2012 were studied, and given the considerations and research discussed in this study, it can be concluded that for the studied mining establishment, there are periods of surplus levels from finished stock, an excess stock event that indicates sales problems in the years 2005, 2009, and 2012. However, the level of stock rose regularly throughout the examined period, and finished goods provided by the establishment were relatively homogeneous, and its quality standards do not face large fluctuations over time.

*H<sub>1</sub>: There is a positive relationship between inventory control and customer satisfaction.*

The study found a significantly strong and positive relationship between raw material inventory cost and customer satisfaction. In a related study, Sitienei and Memba (2015) using similar analysis techniques examined the effect of inventory cost on the customer satisfaction of cement manufacturing companies in Kenya. Their study findings revealed that inventory

turnover, inventory conversion period, and inventory storage costs were negatively related to customer satisfaction. Lwiki, Ojera, Mugenda and Wachira (2013) examined the impact of inventory cost on the customer satisfaction of sugar manufacturing firms in Kenya. Both primary and secondary data collected were analysed using descriptive statistics and correlation analysis, and they found inventory cost had positive correlation with customer satisfaction.

*H<sub>2</sub>: There is a positive relationship between inventory cost and customer satisfaction.*



## **CHAPTER THREE METHODOLOGY**

### **3.1 Introduction**

This chapter provides an outline of the research design, profile of GHACEM, population and sample size, sampling techniques, sources of data, data collection instrument and data analysis.

### **3.2 Research Design**

Research design is a plan that promotes systematic management of data collection. Design and methodology dictate what is needed to answer your research questions. There are various types of research design; Cross-Sectional Design, Descriptive Design, Experimental Design and Case Study Design (Fraenkel and Wallen, 2013). The study adopted a descriptive study approach. According to Pilot and Hurgler (2015), descriptive survey aims predominantly at observing, describing, and documenting aspects of a situation as it naturally occurs rather than explaining them. The design provides a more accurate picture of events at a point in time. Fraenkel and Wallen (2013) continued that one big advantage of the descriptive survey design is that it has the potential to provide us with a lot of information obtained from quite a large sample of individuals. For this study, a quantitative method was adopted.

### **3.3 Population and Sample Size**

Frankel and Wallen (2000), states that the population is a group to which results of the study are intended to apply. The target population for this study comprised mainly all employees of GHACEM. Sekeran (2010) defines a sample as a portion of the population that has attributes as the entire population. One hundred and fifty (150) respondents were sampled out for the study. Hence, the sample size for the study is 150.



### 3.4 Sampling Technique

Sampling technique is the process by which relatively small number of individuals or measures of individuals, objects or events is chosen and analyzed to find out something about the entire population from which it was chosen. A simple random sampling technique was employed to select the 150 employees out of all the employees. This technique was used because it will ensure that everyone in the population has an equal chance of being selected. The goal of the sampling method was to obtain a sample that is a representative of the population. The technique that was used by the researcher to select the sample size require prior knowledge of the target population which allowed a determination of the size of the sample needed to achieve a reasonable estimate with accepted precision and accuracy of the population.

### 3.5. Sources of Data

There are two major sources of data used by researchers: Primary and Secondary data. This study will use primary data.

**Primary Sources of Data:** Primary data will be gathered from employees of Ghacem through questionnaires. The respondents will be given three working days to fill the questionnaire handed out to them. This will be done to allow the employees ample time in filling the questionnaire and not to feel pressured. The researcher's choice of using of using primary data is influenced by the size of the population, and the subject under review. The researchers will use a structured questionnaire. This will ensure that respondents share relevant information concerning the subject under review. Advantages associated with this method includes access to direct, original, and unbiased data or response from the selected respondents.

### 3.6 Data Collection Instrument

A questionnaire was chosen as the data collection instrument. The questionnaire had closeended questions which respondents were asked to tick the appropriate answer. The

questionnaires were divided into various sections to capture the critical areas spelt out in the objectives of the study. The questions were thoroughly explained to the respondents after copies of the questionnaire are handed to them. The purpose was to help the respondents understand the relevance of the research and provide their independent views on the questionnaire items given them. To have a valid and a reliable data, the researcher will ensure that the questionnaires are well prepared which will allow for error minimization.

### **3.7. Data Analysis**

The present study employed quantitative techniques for data analysis to achieve the set objectives. The Statistical Package for Social Sciences (SPSS v.21.0) was used to analyse the data collected. Tables and other statistical inferences were made from the data gathered. Representations like charts, pie charts etc. will be used to ensure easy and quick interpretation of data. Responses were also expressed in percentages. Data from the completed questionnaire were checked for consistency. The items in the questionnaire were grouped based on the responses given by the respondents and coded for easy usage.

## CHAPTER FOUR DATA PRESENTATION, ANALYSIS AND DISCUSSIONS

### 4.1 Introduction

This chapter looks at the presentation and analysis of data collected from the field. It gives information on the responses obtained from the various questions posed to the respondents via the questionnaires.

### 4.2 Demographic Data of Respondents

Table 4.1 below presents the demographic data of the study respondents. The gender composition of the respondents is shown in Table 1. The table provides the gender information which shows that 76% of the respondents were males while 24% of them were females. The survey shows that most of the respondents were males.

**Table 4.1: Analysis of Demographic Data of Respondents**

Question	Response	Frequency	Percentage
Gender	Male	114	76%
	Female	36	24%
Age	31-40	51	34%
	41-50	99	66%
Number of Years at Ghacem	0-3 years	23	15%
	3-7 years	43	29%
	7-10 years	46	31%
	10+	38	25%

**Source: Field Survey, 2022**

In addition, Table 4.1 shows the age distribution of the respondents. Out of the total respondents, 66% representing the majority were between the ages 41-50 years while 34% were between the ages of 31-40. Thus, most of the respondents were between the ages of 41-50 years. Furthermore, the respondents were asked how long they had been working at Ghacem. The survey showed that, majority of the respondents representing 31% said 8-10 years while 29% said 3-7 years. 25% said above 10 years while 15% said 0-3 years. Thus, most of the respondents said they have been with Ghacem for 7-10 years.

### 4.3 Effect of Inventory Control on Customer Satisfaction

#### 4.3.1 Regression Analysis between Inventory Control on Customer Satisfaction

The regression analysis provides information on the relationship that exist between inventory control and customer satisfaction. Analysis on inventory control is presented in the tables below. Table 4.2 presents the model summary of the variables involved in this study. The R value of 0.534 shows the regression coefficient between inventory control and customer satisfaction. The regression coefficient shows a high relation between inventory control and customer satisfaction. The  $R^2$  value of 0.654 showed the coefficient of determination between inventory control as well as customer satisfaction. The coefficient of determination showed that 65.4% variation in customer satisfaction is caused by effective inventory controls.

**Table 4.2: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.543 <sup>a</sup>	.654	.528	6.25501

a. Predictors: (Constant), inventory control, customer satisfaction

Table 4.3 represents the analysis of variance. From the table, the sig. figure of 0.000 indicate that inventory control is significant to customer satisfaction.

**Table 4.3: ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5414.266	6	2463.953	32.475	.000 <sup>b</sup>
Residual	4416.472	44	68.454		
Total	9830.738	50			

a. Dependent Variable: customer satisfaction

b. Predictors: (Constant), Inventory control

Table 4.4 represents the effect (B), relationship (Beta) and significance (Sig.) between inventory control and customer satisfaction. The B value of 0.694 showed that inventory control has a positive effect on customer satisfaction. This means that an effective inventory



control will influence customer satisfaction. The beta value of 0.665 showed that there is a positive and strong correlation between inventory control and customer satisfaction. The significant value of 0.000 showed that inventory control is significant to customer satisfaction.

**Table 4.4: Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	13.166	5.543		5.844	.004
Inventory control	.694	.044	.665	5.355	.265

a. Dependent Variable: customer satisfaction Sig. <0.05

#### 4.4 Effect of Inventory Cost on Customer Satisfaction

##### 4.4.1 Regression Analysis between Inventory Cost and Customer Satisfaction

The regression analysis provides information on the relationship that exist between inventory cost and customer satisfaction. Analysis on inventory cost is presented in the tables below. Table 4.5 presents the model summary of the variables involved in this study. The R value of 0.541 shows the regression coefficient of inventory cost and customer satisfaction. The regression coefficient shows a high relation between inventory cost and customer satisfaction. The R<sup>2</sup> value of 0.339 showed the coefficient of determination between inventory cost as well as customer satisfaction. The coefficient of determination showed that 53.9% variation in customer satisfaction is caused by inventory cost.

**Table 4.5: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.541 <sup>a</sup>	.339	.413	5.50219

a. Predictors: (Constant), inventory cost, customer satisfaction

Table 4.6 represents the analysis of variance. From the table, the sig. figure of 0.000 indicate that inventory cost is significant to customer satisfaction.

**Table 4.6: ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2192.035	3	1644.014	31.736	.000 <sup>b</sup>
Residual	4435.576	63	49.134		
Total	6627.611	66			

a. Dependent Variable: Customer satisfaction

b. Predictors: (Constant), Inventory cost

Table 4.7 represents the effect (B), relationship (Beta) and significance (Sig.) of inventory cost and customer satisfaction. The B value of 0.394 showed that inventory cost has a positive effect on customer satisfaction. This means that effective inventory cost will influence customer satisfaction. The significant value of 0.000 showed that inventory cost is significant to the customer satisfaction at Ghacem.

**Table 4.7: Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	12.291	4.252		2.771	.006
Inventory cost	.394	.093	.663	3.524	.137

a. Dependent Variable: Customer satisfaction

Sig. <0.05

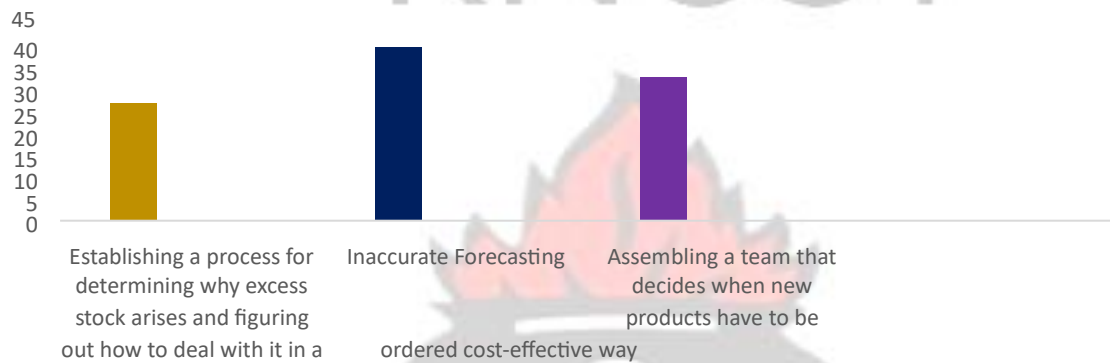
## 4.5 Challenges of Inventory Management at GTP

### 4.5.1 Challenges of Inventory Management

In Figure 4.1, 40% of the respondents representing 60 persons asserted that, the major challenge to inventory management in their organization is inaccurate forecasting. On the other hand,

33% said the major challenge was assembling a team that decides when new products must be ordered while 27% said the major challenge was establishing a process for determining why excess inventory arises and figuring out how to deal with it in a cost-effective way. Thus, most of the respondents said there is inaccurate forecasting on the management of inventories in their organisation.

**Figure 4.1: Challenges of Inventory Management**



**Source: Field Survey, 2022**

#### 4.5.2 Challenges Affect Performance

In Table 4.8, majority of the respondents representing 64% asserted that, the challenges of the inventory management techniques do affect the performance of their organisation while 36% representing the minority said it doesn't affect the performance of their organisation. Thus, most of the respondents asserted that the challenges of inventory management affect the performance of their organization.

**Table 4.8: Challenges Affect Performance**

Response	Frequency	Percentage
Yes	96	64%
No	54	36%
<b>Total</b>	<b>150</b>	<b>100%</b>

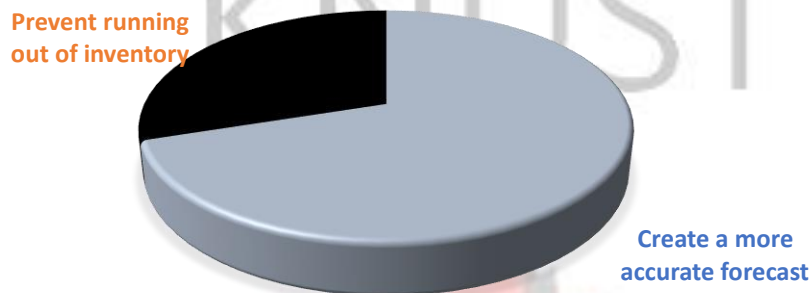
**Source: Field Survey, 2022**

#### 4.5.3 Measures for Inventory Management Improvement

Out of the 150 respondents, 105 persons representing 70% of the respondents said the best way to curb the challenges of inventory management in their organisation is by creating a more accurate forecast while 30% representing 45 persons said its by preventing the organisation

from running out of stock/inventory. Thus, most of the respondents said their organisation must create more accurate forecast to prevent the challenges associated with the inventory management.

**Figure 4.2: Measures for Inventory Management Improvement**



**Source: Field Survey, 2022**

#### **4.6 Discussion of Findings**

The first objective sought to examine the effect of inventory control on customer satisfaction at GHACEM. The study identified a positive relationship between inventory control and customer satisfaction. Similarly, Zhang et al, (2015) have argued that causal relationship exists between inventory control and customer satisfaction. They suggested that good inventory control allows firms to leverage their managerial experience and intra and inter inventory management competences, and finally generate high levels of inventory service flexibility. That is because flexible competency, which is an internal management focus, provides the processes and infrastructure that enable a firm to achieve the desired levels of capability. The outcome of an efficient inventory service is “developing service capabilities as these investments will provide firms with access to different market segments, hence, yield economic returns. So, the higher the level of inventory flexibility, the higher it leads to customer satisfaction. Therefore, the simultaneous development of inventory control and service flexibility will reinforce a firm’s ability to improve performance. This implies that inventory



control is expected to positively influence and customer satisfaction via its positive impact on service flexibility (inventory service flexibility as a mediating variable).

Also, Ionescu et al. (2018) tried to identify aspects related to the stock assessment of sold goods and to determine the effect of the stock valuation methods applied in Romania on the financial situation and customer satisfaction of the companies. As a method of pricing and comparing those indicators with each other, the primary objective of the research is an analysis of the effect that stock valuation methods can have on the financial position and customer satisfaction, from which the main research hypothesis was launched predicting that stock valuation options have a different impact on the financial position and customer satisfaction of the economic unit. This was confirmed based on a theoretical study and applied analysis, as these verified that stock accounting options have different effects on both the financial position and customer satisfaction of the facility.

The second objective sought to identify the effect of inventory cost on customer satisfaction at GHACEM. The study identified a positive relationship between inventory cost and customer satisfaction. Similarly, Mohamad, Suraidi, Rahman and Suhaimi (2016) in a case study of a textile chain store in Malaysia, examined the relation between inventory cost and customer satisfaction and found that their inventory days was significantly related to customer satisfaction. The study identified that the textile chain store company had unorganized inventory cost, large amount of inventory days and lacked accurate stores balances due to unskilled workers. Also, Victoire (2015) investigated the impact of inventory cost on customer satisfaction in Rwanda using a manufacturing company as case study. The findings indicate that inventory cost had significant impact on the company's customer satisfaction. Also, Prempeh (2015) studied the impact of efficient inventory cost on the customer satisfaction of manufacturing firms in Ghana, using raw material inventory management and profit as variables. Cross sectional data from the annual reports of four manufacturing firms listed on

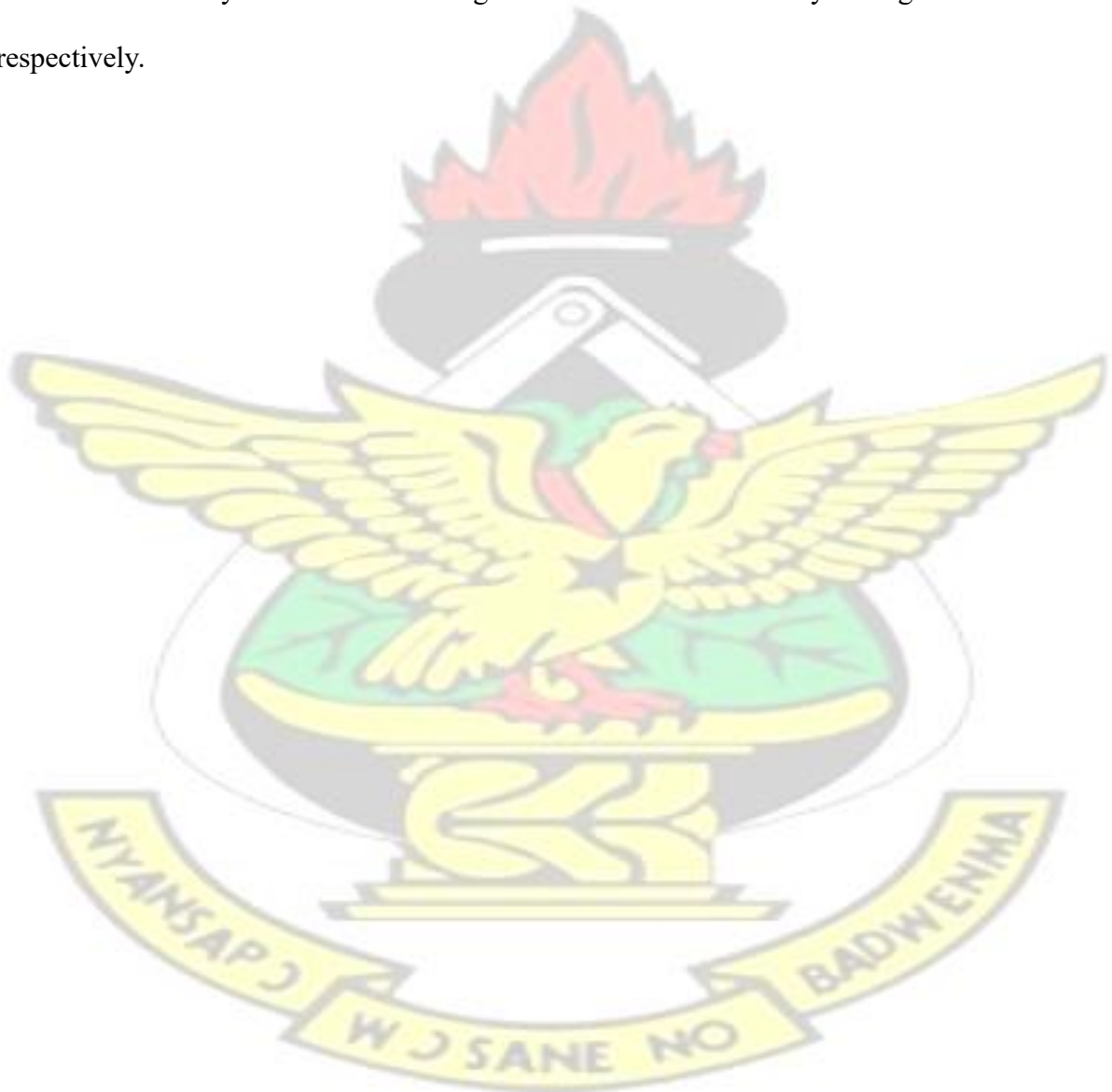
the Ghana Stock Exchange were analysed using Ordinary Least Squares (OLS) and multiple regression techniques. The study found a significantly strong and positive relationship between inventory cost and customer satisfaction

The third objective sought to analyse the challenges of inventory management at GHACEM. The study identified inaccurate forecasting, assembling a team that decides when new products have to be ordered, establishing a process for determining why excess inventory arises and figuring out how to deal with it in a cost-effective way as the main challenges associated with inventory management respectively. On the contrary, lack of commitment by the top management of the organization is the major contributor to poor inventory management systems according to Anene (2014). In most cases the management fails to provide the required support to their subjects for effective implementation of inventory management practices for example the top management might fail to involve its supply chain partners in inventory management decisions. This brings about poor coordination, increased communication costs which negatively impact on the supply chain performance of the organization. Also, Ghosh and Kumar (2003), conducted research in Nigeria on optimization of inventory control and management in the case manufacturing industry. The study found different challenges of inventory management such as delay in supply of goods or material, the interruption in production and stock out of goods or materials during production and problem of when to order and how much to order as it affects manufacturing industries in Nigeria.

#### **4.7 Chapter Summary**

This chapter analysed and discussed the data gathered for the study. Out of the 150 questionnaires sent out, all 150 questionnaires were duly returned. This represents a 100% response rate. The first objective sought to examine the effect of inventory control on customer satisfaction at GHACEM. The study identified a positive relationship between inventory

control and customer satisfaction. The second objective sought to identify the effect of inventory cost on customer satisfaction at GHACEM. The study identified a positive relationship between inventory cost and customer satisfaction. The third objective sought to analyse the challenges of inventory management at GHACEM. The study identified inaccurate forecasting, assembling a team that decides when new products have to be ordered, establishing a process for determining why excess inventory arises and figuring out how to deal with it in a cost-effective way as the main challenges associated with inventory management respectively.



## CHAPTER FIVE

### SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

After carefully analysing the data in the previous chapter, the summary of the study, its conclusion and recommendations are made in this chapter.

#### 5.2 Summary

The main aim of this study was to investigate inventory management practices and customer satisfaction in the manufacturing industry in Ghana; a case study of GHACEM limited.

Specifically, the study aimed to:

1. Examine the effect of inventory control on customer satisfaction at GHACEM.
2. Identify the effect of inventory cost on customer satisfaction at GHACEM.
3. Analyse the challenges of inventory management at GHACEM.

The study adopted the descriptive survey approach of collecting data, because the study was based on the use of questionnaire to elicit information based on people's opinion to generate data for the analysis of the research topic. The target population for this study comprised mainly all employees of GHACEM. One hundred and fifty (150) respondents were sampled out for the study. Hence, the sample size for the study is 150. A simple random sampling technique was employed to select the 150 employees out of all the employees. Questionnaires were used as the data collection instrument. Data was processed and analysed using Statistical Package for Social Sciences (SPSS.v.21) software and generated into percentages, pie charts, bar charts and tables to give a good visual impression and clarity of information.

The first objective sought to examine the effect of inventory control on customer satisfaction at GHACEM. The study identified a positive relationship between inventory control and customer satisfaction. The second objective sought to identify the effect of inventory cost on



customer satisfaction at GHACEM. The study identified a positive relationship between inventory cost and customer satisfaction. The third objective sought to analyse the challenges of inventory management at GHACEM. The study identified inaccurate forecasting, assembling a team that decides when new products must be ordered, establishing a process for determining why excess inventory arises and figuring out how to deal with it in a cost-effective way as the main challenges associated with inventory management respectively.

### **5.3 Conclusions**

Inventories constitute a major component of the total assets of every business organisation. It is, therefore, imperative for organisations to always maintain an ideal size of inventory so as to avoid extra holding cost and stock out. This is because insufficient stock puts a firm at a risk of incurring stock out, while extreme level of stock might also lead to waste. Shortage of finished goods, for instance, could create a feeling of disappointment among customers, a situation which could possibly lead to loss of customers and sales. Too much inventory, on the other hand, consumes physical space, creates financial burden, and increases possibility of damage, spoilage, and loss. To achieve an ideal level of inventory, firms need to constantly undertake sound and time-tested inventory management practices. In conclusion, it is safe to say that inventory management practices have a positive effect on customer satisfaction.

### **5.4 Recommendations**

It is recommended that:

- There should be an installation of a strong control and inspecting system to detect fraud and theft of inventory.
- The stores should be enlarged and tidy to help enable maximum usage of space among others.
- GHACEM should install a computerized package to deal with the recording of

- inventory to avoid unintentional errors.
- GHACEM must know supplier delivery data and time. They should also be aware of the days and time during which the suppliers are expected to make deliveries and when facilities will be available to accept such deliveries. This will control the system of suppliers delivering materials at will, reduce the burden of store officers and avoid unnecessary delays, inventory out and costs.
  - All receipt and issues should be numbered serially and recorded with duplicates and distribution to appropriate section of the organization.
  - For easy identification of materials in the stores and to reduce fatigue, appropriate coding system should be employed. This can be done by using letters, figures, or a combination of both. The system could be based upon the nature of the stores items, the purpose for which items are bought or any other basis regarded as suitable for the business.
  - Management should always review and evaluate, on timely basis, the internal control systems with a view to discovering loopholes and immediately rectify them.

#### **5.4.1 Suggestions for Future Research**

From the above conclusion it should be recommended that the researchers can apply more tests on this study. It is imperative that studies be conducted in other industries to be able to determine whether effective management of inventory response is the same in all industries, and if not, what the differences could be.

## REFERENCES

- Afsar, B. (2010). Determinants of customer loyalty and proposing a customer loyalty model for the banking sector of Pakistan. *Journal of Management Marketing*, 8(1),73–90.
- Agus, A & Noor, Z.M (2016). Supply chain management and performance. An Empirical Study. A working paper university of Malaysia.
- Ali, I. (2020). COVID-19: are we ready for the second wave? *Disaster medicine and public health preparedness*, 14(5), e16-e18.
- Alrjoub, A. M. S. & Ahmad, M. A. (2017). Inventory management, cost of capital and firm performance: evidence from manufacturing firms in Jordan. *Investment management and financial innovations*, 14, 4-14.
- Ansari, A., Riasi, A. (2016). Modeling and evaluating customer loyalty using neural networks: Evidence from start-up insurance companies. *Journal of Future Business*, 15–30.
- Ballou, R.H. (2019). *Business Logistics Management: Planning, Organizing, and Controlling the Supply Chain*, 4th Edition, Prentice-Hall International, London.
- Banomyong, R & Nucharee Supatn, (2011). "Developing a supply chain performance tool for SMEs in Thailand", *Supply Chain Management: An International Journal*, Vol. 16 Issue: 1, pp.20-31, <https://doi.org/10.1108/13598541111103476>
- Banjoko S. A. (2014). *Production and Operations Management*. Sabon Publishers, Lagos.
- Boshoff, C., & Gray, B. (2014). The relationships between service quality, customer satisfaction and buying intentions in the private hospital industry. *S Afr J Bus Manag*, 35(4), 27-35.
- Brandy, M. K., & Robertson, C. J. (2021). “Searching for a Consensus on the Antecedent Role of Service Quality and Satisfaction: An Exploratory Cross – National Study”. *Journal of Business Research*, 51 (1), pp. 53 – 61.
- Bufquin, D., DiPietro, R. and Partlow, C., (2017). The Influence of The Dinex Service Quality Dimensions on Casual-Dining Restaurant Customers’ Satisfaction and Behavioral Intentions, *Journal of Foodservice Business Research*, 20:5, pp.542-556.
- Chima, A. (2017). Supply chain management issues in the oil and gas industry, *Journal of Business and Economics Research*, Vol.5, No.6, pp 27-36.
- Coyle, J. J., Bardi, E. J., & Langley, C. J (2013). *The Management of Business Logistics: A Supply Chain Perspective*, 7th Edition, Transcontinental Louiseville, Quebec.
- Creswell J. W. (2013). *Research Design: Qualitative, quantitative and mixed methods approaches*. 2nd Edition, Sage Publications Inc., Thousand Oaks, CA.



- Dai, B. & Chen, H. (2012). Profit allocation mechanisms for carrier collaboration in pickup and delivery service: *Computers & Industrial Engineering*, 3(3), 45-52
- Defee, E. & Fugate, J. (2010). Changing perspective of capabilities in the dynamic supply chain era, *The International Journal of Logistics Management*, Vol.21, No.2, pp 180-206.
- Dick, M., Green, M.A. & Aydogan, G. (2008). Six Sigma Systems, Inc., System and Method for Collecting Revenue. U.S. *Patent Application*. 12/059,883.
- Dimitrios, P. (2008). The effect of inventory management on firm performance. *International Journal of Productivity and Performance Management*. 57 (5)
- Dotzel, T., & Shankar, V. (2019). The relative effects of business-to-business (vs. business-to-consumer) service innovations on firm value and firm risk: An empirical analysis. *Journal of marketing*, 83(5), 133-152.
- Domingo, L. R. (2014). A new C–C bond formation model based on the quantum chemical topology of electron density. *RSC Advances*, 4(61), 32415-32428.
- Herath, H. S. & Lu, X. (2018). Inference of economic truth from financial statements for detecting earnings management: inventory costing methods from an information economics perspective. *Managerial and Decision Economics*, 39, 389-402.
- Herrmann, A., Huber, F., Braunstein, C. (2017) Market-driven product and service design: Bridging the gap between customer needs, quality management, and customer satisfaction, *International Journal of Production Economics*, 66, 77-96.
- Ittmann, H., & King, D. (2010). The State of Logistics TM – an overview of logistics in South Africa. CSIR, Pretoria, South Africa.
- Ionescu, L., Toma, M. & Founanou, M. (2018). Applied Analysis of the Impact of Inventory Valuation Methods on the Financial Situation and Financial Performance. *Valahian Journal of Economic Studies*, 9, 67-76.
- Iyer, K. (2011). Demand chain collaboration and operational performance: Role of IT analytic capability and environmental uncertainty, *Journal of Business and Industrial Marketing*, Vol.26, No.2, pp 81-91.
- Jonek-Kowalska, I. (2014). Financial aspects of changes in the level of finished goods inventory in a mining enterprise. *Mineral Resources Management*, 30, 143-162.
- James, A. F, and Mona, J. F., (2011). *Service Management: Operations and Information Technology*. McGraw- Hill.
- Johnson, M. D., & Fornell, C. (2015). A Framework for comparing customer satisfaction across individuals and product categories. *Journal of Economic Psychology*, 12(2), 267-286.



[http://dx.doi.org/10.1016/0167-4870\(91\)90016-M](http://dx.doi.org/10.1016/0167-4870(91)90016-M).

- Kano, T., & Mulavwa, M. (1984). Feeding ecology of the pygmy chimpanzees (*Pan paniscus*) of Wamba. In *The pygmy chimpanzee* (pp. 233-274). Springer, Boston, MA.
- Kasim, H., Zubieru, M., & Antwi, S. K. (2015). An assessment of the inventory management practices of small and medium enterprises (SMEs) in the northern region of Ghana. *European Journal of Business and Management*, 7(20), 28-39.
- Keebler, J.S. & Plank, R.E. (2009). Logistics performance measurement in the supply chain: a benchmark: benchmarking: *An International Journal* 16 (6), 785-798
- Khalil Nezhad, S., Soleymanzadeh, O., & Koraghli, M. (2019). The effect of hotel brand experience on tourists' perceived value and hotel brand strength. *Journal of Tourism and Development*, 8(1), 102-119.
- Koomson, S. (2017). Assessing organisational performance in the Ghanaian public sector: A study of Information Services Department in Cape Coast. Unpublished master's thesis, Department of Management, School of Business, College of Humanities and Legal Studies, University of Cape Coast.
- Kotler, P. (2017). Philip Kotler: some of my adventures in marketing. *Journal of Historical Research in Marketing*.
- Kothari C (2014). *Research Methodology: Methods and Techniques*, 2nd edition. New age International Publishers, New Delhi, India.
- Kotler, P., Keller, K. L., Koshy, A., and Jha, M. (2019). *Marketing management: A South Asian perspective* (13th ed.). New Delhi, DL: Pearson Prentice Hall.
- Koumanakos, D.P. (2018). The effect of inventory management on firm performance. *International Journal of productivity and performance Management*, Vol 57 (pp 355369) Emerald Group Publication.
- Lee, Y. L., & Hing, N. (2017). Measuring quality in restaurant Operations, an application of the Service Quality instrument. *International Journal of Hospitality Management*, 14(3/4), 293 –310.
- Lehtinen, U., & Lehtinen, J. R. (2019). Two approaches to service quality dimensions. *Service Industries Journal*, 11(3), 287-303.
- Li, Y., Tao, L., & Wang, Y. (2018). Relationship stability, trust and relational risk in marketing channels: Evidence from China. *Industrial Marketing Management*, 37(4), 432-446.
- Lwiki, T., Ojera, B. P. Mugenda, N. G. & Wachira, V. K. (2013). The Impact of Inventory Management Practices on Financial Performance of Sugar Manufacturing Firms in Kenya. *International Journal of Business, Humanities and Technology*, 3(5), 75-85

- Lysons, K. & Gillingham, M. (2013). *“Purchasing and Supply Chain Management”*, 6th Edition, Prentice Hall.
- Mahidin, F., Saad, R., Mohd, N. M. & Yusoff, R. (2015). The Influence of Inventory Management Practices towards Inventory Management Performance in Malaysian Public Hospitals. *International Academic Research Journal of Business and Technology*, 1(2), 142-148
- Marand, A. J., Li, H. & Thorstenson, A. (2019). Joint inventory control and pricing in a service-inventory system. *International Journal of Production Economics*, 209, 78- 91.
- Mentzer, J.T., Min, S., & Bobbitt, L.M., (2014). Toward a unified theory of logistics: *International Journal of Physical Distribution & Logistics Management* 34(8), 606627
- Mohamad, S. J. A. N., Suraidi, N. N., Rahman, N. A. & Suhaimi, R. D. S. (2016). A study on relationship between inventory management and company performance: A case study of textile chain store, *Journal of Advanced Management Science*,4(4) 299 – 304.
- Moore L.J., Lee S. M. & Taylor, III B.W. (2013). *Management Science*, 4th Ed, Allyn and Bacon, Needham Heights MA.
- Mugenda O, & Mugenda A (2013). *Research methods quantitative and qualitative Approaches*. Nairobi Acts press.
- Munusamy, J., Chelliah, S., & Mun, H. W. (2020). Service quality delivery and its impact on customer satisfaction in the banking sector in Malaysia. *International journal of innovation, management and technology*, 1(40), 398-404. Retrieved from <http://ijimt.org/papers/71-M461.pdf>.
- Nwandu (2016). *Principles of Management*, Enugu: Allmark Publishing Ltd.
- Nweze A.U. (2014). *Quantitative Approach to Management Accounting*, Enugu: Amazing Grace Printing and Publishing Co.
- Oliver, R.L. (1980). A cognitive model of the antecedents and consequences of satisfaction decision. *Journal of Marketing Research*, 17(4), 460-469.
- Orga C.C. (2016). *Productions Management A Quantitative Approach*, Enugu: Veemarks Publishes.
- Panigrahi, A. K. (2013). Relationship between Inventory Management and Profitability: An Empirical Analysis of Indian Cement Companies. *Asia Pacific Journal of Marketing & Management Review*, 2 (7), 107 – 120
- Parasuraman, A., Zeithaml, V. A. & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, 49, 41-50.

- Piasecki, H. B. (2011). *Business logistics management international Edition*, Prentice Hall International Inc. USA.
- Prempeh, K. B. (2015). The impact of efficient inventory management on profitability: Evidence from selected manufacturing firms in Ghana, *Munich Personal RePEc Archive MPRA Paper No, 67889* pp.1-6, <https://mpa.ub.uni-muenchen.de/67889>.
- Prempeh, K. B. (2016). The impact of inventory management on profitability: Evidence from selected manufacturing firms in Ghana. *International Journal of Finance and Accounting*, 5(1), 22-26.
- Rabta, B. (2020). An Economic Order Quantity inventory model for a product with a circular economy indicator. *Computers & Industrial Engineering*, 140, 106215.
- Rahman, M. H. (2014a). Factors affecting customer satisfaction in mobile telecommunication industry in Bangladesh. *Business, Management and Economics Engineering*, 12(1), 74-93.
- Rahman, M. H., Redwanuzzaman, M., MasudUIHasan, M., and Rahman, M. A. (2014b). Factors Affecting Customer Satisfaction on Grameenphone Users in Bangladesh. *Global Journal of Management and Business Research*, 14 (3): 5766.
- Rajeev, N. (2008). An Evaluation of Inventory Management and Performance in Indian Machine Tool SMEs: An Exploratory Study. *4th IEEE International Conference on Management of Innovation and Technology, 2008. ICMIT 2008, 21-24 Sept. 2008, Bangkok, Thailand, pp. 1412-1417.*
- Rajeswari, M. (2019). System for Inventory Control and Management of Bakery Product Using SVM. *Journal of the Gujarat Research Society*, 21, 996-1005.
- Roumiantsev S. & S. Netessine. (2015). What Can Be Learned from Classical Inventory Models: a Cross- Industry Empirical Investigation. Working paper, University of Pennsylvania.
- Sawaya, Jr. W. J. and Giauque W. C. (2016). *Production and Operations Management*, Harcourt Brace Jovanovich, Inc., Orlando, FL, pp. 121 – 303.
- Sekeroglu, G. & Altan, M. (2014). The relationship between inventory management and profitability: A comparative research on Turkish firms operated in weaving industry, eatables industry, wholesale and retail industry, *International Journal of Social. Behavioural, Economic, Business and Industrial Engineering*, 8(6) 1698 – 1703.
- Sivadas, E. & Baker – Prewitt, J. (2020). “An Examination of the Relationship between Service Quality, Customer Satisfaction, and Store Loyalty”. *International Journal of Retail Distribution Management*, 28 (2) 73 – 82. Doi: 10.1108/09590550010315223.



- Sitienei, G. & Memba, F. (2015). The effect of inventory management on profitability of cement manufacturing companies in Kenya: A case study of listed cement manufacturing companies in Kenya, *International Journal of Management and Commerce Innovations*, 3(2) 111 – 119, October 2015 – March 2016.
- Stock J.R. & Lambert, D.M. (2011). *Strategic Logistic Management*. New York: McGraw-Hill
- Sukaisih, E., & Hamid, D. (2015). Effect of Functional Service Quality on Customer Satisfaction and Image and the Impact on Loyalty Intention (Study at Three- Star Hotel in Malang City and Batu City), 4(2), 43–51.
- Tao, F. (2014). Customer Relationship management based on Increasing Customer Satisfaction. *International Journal of Business and Social Science*, Volume. 5, Issue. 5, pp. 256-263.
- Tsai, K. H., & Hsu, T. T. (2014). Cross-Functional Collaboration, Competitive Intensity, Knowledge Integration Mechanisms, and New Product Performance: A Mediated Moderation Model. *Industrial Marketing Management*, 43, 293-303. <https://doi.org/10.1016/j.indmarman.2013.08.012>.
- Victoire, M. (2015). Inventory management techniques and its contribution on better management of manufacturing companies in Rwanda Case study: Sulfo Rwanda Limited, *European Journal of Academic Essays*, 2(6) 49 – 58.
- Vohra (2018). *Quantitative Techniques in Management* New Delhi, Tata Mc Graw- Hill Publishing Co. Ltd
- Vollman, T. E., Berry, W. L., & Whybark, D. C. (2018). *Manufacturing Planning and Control Systems*, Richard D. Irwin, Homewood.
- Waters, D (2013). *Inventory control and Management*, 4<sup>th</sup> Edition, John Wiley and Sons Limited, The Atrium, Southern Gate, Chichester.
- Wise Geek (2011). “What is park maintenance”, Retrieved from <http://www.wisegeek.com/what-is-park-maintenance.htm> on September 10, 2011.
- Wisner, J. D. (2013). A Structural Equation Model of Supply Chain Management Strategies and Firm Performance. *Journal of Business Logistics*, 24(1), 1-26. <http://dx.doi.org/10.1002/j.2158-1592.2003.tb00030.x>.
- Xu, X., Pan, S. & Ballot, E. (2013). A sharing mechanism for super additive and non-super additive logistics cooperation, *International Conference on Industrial Engineering and Systems Management (IESM)*, October 28 - October 30 RABAT – MOROCCO
- Yeung, S. S., Reijnierse, E. M., Pham, V. K., Trappenburg, M. C., Lim, W. K., Meskers, C. G., & Maier, A. B. (2019). Sarcopenia and its association with falls and fractures in older adults: a systematic review and meta-analysis. *Journal of cachexia, sarcopenia and muscle*, 10(3), 485-500.



- Yi, Y. J., & La, S. N. (2014). “What Influences the Relationship Between Customer Satisfaction and Repurchase Intention: Investigating the Effect of Adjusted Expectations and Customer Loyalty”. *Psychology and Marketing*, 21(5), pp. 351 – 373.
- Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (2016). The behavioral consequences of service quality. *The Journal of Marketing*, 60(2), 31-46.
- Zhang AN, Goh M & Meng F (2011). Conceptual modeling for supply chain inventory visibility. *International Journal of Production Economics* 133(2): 578–585
- Zhang, Q. Vonderembse, M.A. & Lom, J.S. (2015). Logistic Flexibility and Its Impact on Customer Satisfaction” *The International Journal of Logistics Management*, 16(1): 8996.

## QUESTIONNAIRE

### KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

#### AN INVESTIGATION INTO INVENTORY MANAGEMENT PRACTICES AND CUSTOMER SATISFACTION IN THE MANUFACTURING INDUSTRY IN GHANA. A CASE STUDY OF GHACEM LIMITED

This research seeks to investigate inventory management practices and customer satisfaction in the manufacturing industry in Ghana; a case study of GHACEM limited. It should take less than 10 minutes for you to complete this survey. Your participation is voluntary. You may refuse to participate in this study, skip questions, or end your participation at any time. Thank you for your cooperation.

#### Section A: Demographic Information of Respondents

- i. Gender
  - Male       Female
- ii. Age
  - 20-30       31-40       41-50       50+
- iii. How long have you been working at Ghacem?
  - 0-3 years       3-7 years       7-10 years       10+

# KNUST

**Section B: Effect of Inventory Control on Customer Satisfaction**      **Please indicate (by ticking) to what extent you agree or disagree with the following statements**

No	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	My organisation has the most stringent inventory control measures					
2	The measures are relevant to the type of inventory held in my organisation					
3	There is a competent inventory control manager in my organisation					
4	Inventory is managed strategically in my organisation					
5	Inventory control enables optimal production in my organisation					
6	Inventory control enhances quality in my organisation					
7	Inventory control enables my organisation to meet assembly targets					
8	Inventory control ensures the timely delivery of products					
9	Inventory control prevents shortages					
10	Inventory control reduces wastages					

# KNUST

**Section C: Effect of Inventory Cost on Customer Satisfaction Please indicate (by ticking) to what extent you agree or disagree with the following statements**

No	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11	Inventory running cost is relatively low at Ghacem					
12	There are strategies set at Ghacem to ensure low inventory running cost					
13	Ghacem has minimized the level costs incurred					
14	The strategies set are effective and efficient in cutting cost					
15	Inventory cost determines the optimal level that minimizes carrying and ordering costs at Ghacem					
16	Inventory cost attempts to reconcile the problem of storage costs and ordering costs at Ghacem					
17	Suppliers at Ghacem deliver quality product on time					
18	Ghacem produce its goods exactly on time to meet customer demand as expected					
19	Ghacem has a scheduling procedure for production process of several levels of procedure.					

20	Ghacem combines inventory on the basis of their value					
----	---	--	--	--	--	--

# KNUST

## Section D: Challenges Associated with Inventory Management

21. What are some of the challenges associated with inventory management systems? ( )  
 Breaking down the inventory into safety stock, replenishment stock, and normal stock in order to maintain adequate levels for each of them.
- ( ) Assembling a team that decides when new products have to be ordered
  - ( ) Establishing a process for determining why excess stock arises and figuring out how to deal with it in a cost-effective way
  - ( ) Inaccurate Forecasting
  - ( ) Poor Inter-Departmental Communication
  - ( ) Other (please specify).....
22. Do these challenges affect organisational performance in any way?
- ( ) Yes                      ( ) No                      ( ) Sometimes
23. What are some of the ways that these challenges can be addressed?
- ( ) Create a more accurate forecast
  - ( ) Prevent Overstocking
  - ( ) Prevent Going out of stock
  - ( ) Train staff
  - ( ) Other (please specify).....



# KNUST

