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**EXAMINING THE EFFECTS OF INVENTORY MANAGEMENT ON STORE
PERFORMANCE: A CASE OF BUILDING MATERIALS MANUFACTURING
FIRMS IN GHANA**

BY

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DECLARATION

I hereby declare that this thesis is the result of my original work towards the MSc in Logistics and Management and that, to the best of my knowledge, it neither contains materials published by another person, nor materials which have been accepted for the award of any other degree of the University, except where due acknowledgements have been made in the text.

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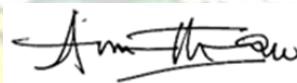
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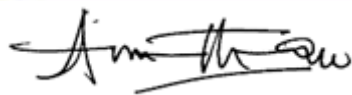
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DEDICATION

I dedicate this thesis to the God Almighty for His grace and mercies and then my lovely wife Jennifer Deynu and family for their immense supports and prayers.

ACKNOWLEDGEMENTS

I am grateful to the Almighty God who granted me life, good health and protection during this programme.

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I am also grateful to my family, friends, course mates and my department



ABSTRACT

The prime objective of any business organisation is to get the best return on every little investment made, and one sure way of achieving this goal is through proper and effective inventory management. If inventory is not properly managed, it can result in liquidity crisis which may eventually bring a firm to its knees. It is, therefore, against this backdrop that this study sought to examine the effect of inventory management practices on store performance of building manufacturing firms in Ghana. It was found from the study that the selected building materials manufacturing firms have been practicing inventory management. However, its effectiveness and how those practices affect their store performance is where a challenge is faced. It was also found that inventory management does not explain significantly changes in store performance of building materials manufacturing firms. Therefore, pragmatic measures should be put in place to curb such challenges to ensure effective and efficient inventory control among building materials manufacturing firms in Ghana. To ensure that the inventory management plans and policies are being followed, it is important to set up effective and efficient monitoring systems. This would include recruiting well qualified personnel to manage the inventory system and set up functioning information systems which will be used to manage the system. Inventory management should not be the preserve of the management and stores or logistics department only but every staff must be made to understand the importance of inventory management.

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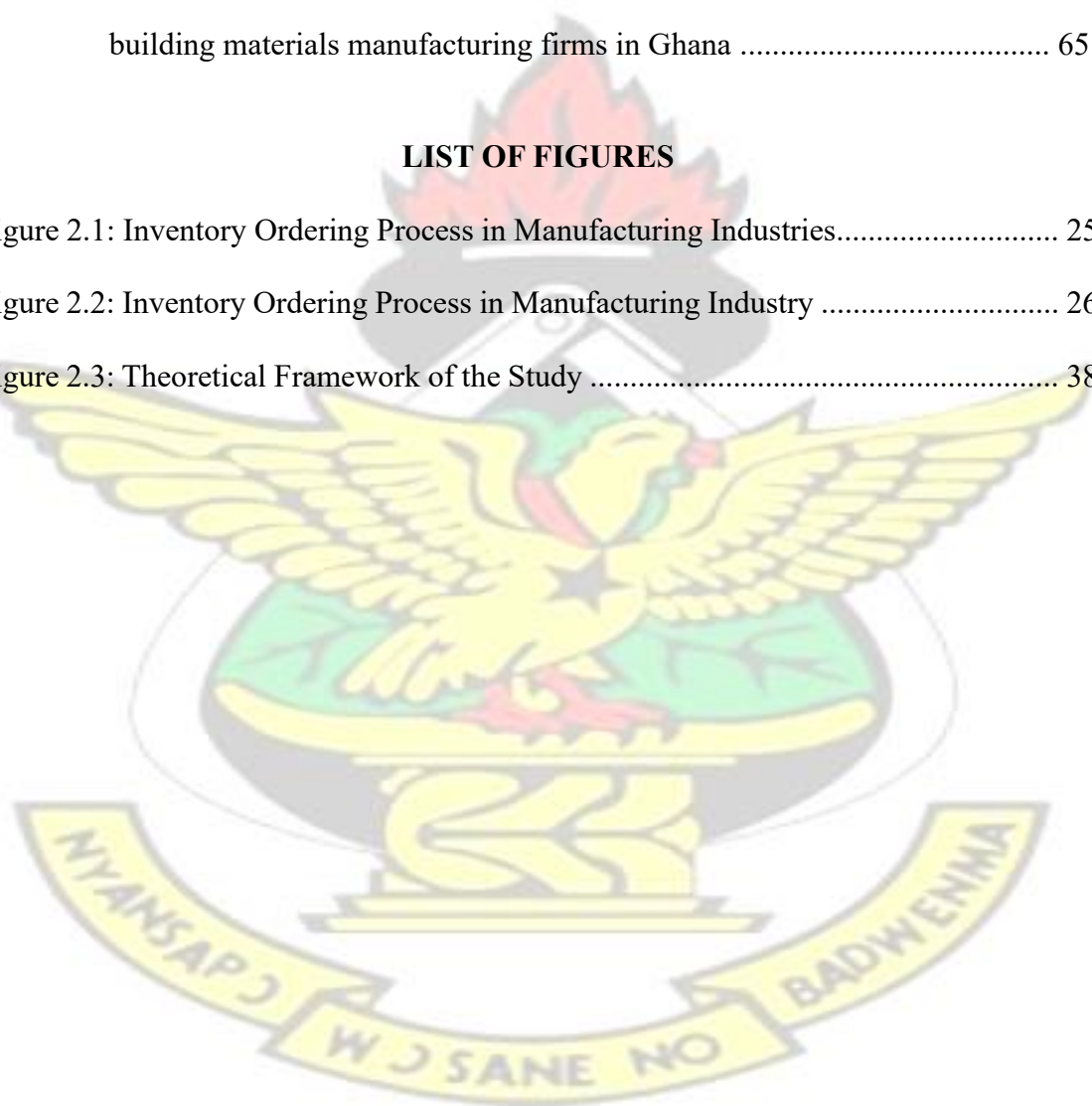
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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Inventories constitute a major component of the total assets of every business organisation. They include stock of raw materials, work in progress, and finished goods as well as other supplies held by a firm to facilitate their operations. As indicated by Bevilacqua, Ciarapica and Paciarotti (2015), inventories comprise both assets and other items held in the ordinary course of business. Like other forms of assets, inventories are held by business organisations to benefit their future operations. Inadequate inventory could disturb the smooth running of a firm, while excess inventory could also lead to needless holding cost, which can consequently cause a firm to experience a dip in both its profitability and overall performance. As indicated Kolias, Dimelis and Filios (2011), excessive stock is not desirable, especially for longer periods as high inventory levels lead to high carrying cost and a reduction in profitability.

It is, therefore, absolutely imperative for organisations to maintain an ideal size of inventory at all times so as to avoid extra holding cost and stock out. As reiterated by Abdulrashee, Yahaya, Isiaka and Aliu (2011), firms must hold an appropriate level of stock so as to meet both production and sales needs. 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 (Lwiki, Ojera, Mugenda, & Wachira, 2013).

In order to achieve an ideal level of inventory, firms need to constantly undertake sound and time-tested inventory management practices. Inventory management refers to the system used by a firm to control its investment in inventory (Thürer et al., 2014). It entails a planned method of purchasing and storing materials or items to prevent both stock out and excessive stock level. It involves the recording and monitoring of stock level, forecasting future demand and deciding on when and how to order (Adeyemi & Salami, 2010). According to Mathuva (2013), inventory management involves making decisions that are in line with basic trade off among firm's objectives, costs and other constraints. Basic activities undertaken within the sphere of inventory management include purchasing, classification, inspection, codifications, store keeping, stock taking and stock control (Kamau & Kagiri, 2015).

Inventory management is critical to the effective and efficient functioning of a firm. It helps in the determination of the optimal amount of materials and goods that a firm should hold at any given time (Kumar & Bahl, 2014). According to Ahmed (2016), effective inventory management helps to ensure adequate supply of high quality products that can satisfy the needs of customers whilst minimizing the carrying cost of a firm's inventory. A well- functioning inventory management system has a great effect on a firm's total performance (Akindipe, 2014). According to Mahidin, Othman and Saifudin (2016), an effective inventory management improves a firm's total performance through matching inventory management practices with competitive advantages. A well-managed inventory system is often a key to meeting profit margin objectives (Mwangi & Nyambura, 2015). This is because good inventory management practices help to ensure regular supply of materials as and when needed (Kamau & Kagiri, 2015).

The above discussion underscores the significant role that inventory management practices play when it comes to store performance of firms. Nonetheless, reports suggest that most firms have failed to give inventory management the desired attention. For example, a survey conducted by Mwangi, Makau and Kosimbei (2014) among selected firms in Kenya revealed that the sector has suffered so much over the past years due to poor material planning, poor inventory control, purchasing problems, quality control problems, stores control problems, among others.

Similarly, Temeng, Eshun and Essey (2010) contends that historically, organizations have ignored the potential cost savings from proper inventory management, treating inventory as a necessary evil and not as an asset that requires proper management. Consequently, many inventory systems are based on arbitrary rules. This practice has caused some organizations to have more funds invested in inventory than necessary and yet, they are still not able to meet customers' demand due to poor distribution of investment and inventory items. Temanget al. further posit that some problems associated with inventory management occur due to lack of effective and efficient inventory management arising mainly from the inability of management to identify proper inventory management practices that need to be adopted or even where identified, the application is often inadequate.

Firms adopt diverse techniques vis-à-vis the management of their inventories. According to Lwiki et al. (2013), the various practices adopted by firms in managing their inventory have significant impact on returns, profitability and volume of sales.

Hence, the need for firms to take inventory management practices very seriously.

As revealed by Augustine and Agu (2013), studies abound on the subject of inventory management practices and organizational performance. However, it appears the subject

has not received the desired attention from researchers in Ghana as the researcher has, so far, not been able to locate any study on the subject from the Ghanaian perspective. It is, therefore, in the bid to fill this knowledge gap that this study intends to examine the effect of inventory management practices on store performance in Ghana, with particular focus on building manufacturing firms in Ghana.

1.2 Problem of the Study

Inventories are vital to the successful functioning of both manufacturing and retailing organizations (Augustine & Agu, 2013). Ineffective inventory system could result in loss of customers and sales (Syed, Mohamad, Rahman, & Suhaimi, 2016). Victoire (2015) argues that, the life blood of any organization is inventory. Adequate and appropriate movement of inventory is critical to the growth and financial success of every organisation (Panigrahi, 2013). Better management of inventories helps organizations to release capital for use elsewhere productively (Akindipe, 2014). The profitability of any organisation is directly or indirectly affected by the kind of inventory management system being operated. An effective inventory management helps to generate more sales for a company which directly affects the company's performance (Keitany, Wanyoike, & Richu, 2014).

Notwithstanding, studies suggest that a number of firms face numerous challenges when it comes to inventory management, a situation that hamper their performance. Munyao, Omulo, Mwithiga and Chepkulei (2015) suggests that there have been cases of materials overstocking, which eventually get expired; under stocking; lack of stocktaking; theft of materials by workers ; and delays in the delivery of materials into organisations, among others. Maniet al. (2016) added that, nearly 60 percent to 70 percent of the total funds employed by firms are tied up in current assets, of which inventory is the most significant

component. Similarly, Etale and Lingilar (2016) contend that inventory represents close to 33 percent of a firm's total assets and as much as 90 percent of its working capital.

Considering the fact inventory constitutes a major segment of a firm's assets, it is crucial that good inventory management practice is put in place to ensure the firm's growth and profitability. In other words, it is important for firms to have sound, effective and well-coordinated inventory management systems to facilitate their longterm survival. As reiterated Victoire (2015), organisations must view inventory management as a serious stabilising and economic growth factor than a mere drainpipe. With the application of proper inventory management techniques, the right materials will be available at the right time, with the minimum storage costs and investment.

The prime objective of any business organisation is to get the best return on every little investment made, and one sure way of achieving this goal is through proper and effective inventory management (Munyao et al., 2015). According to Zariyawati, Hirnissa and Diana-Rose (2017), the management of inventory can positively affect how profit-making organisations maximize their earnings. However, if inventory is not properly managed, it can result in liquidity crisis which may eventually bring a firm to its knees. It is, therefore, against this backdrop that this study sought to examine the effect of inventory management practices on store performance of building manufacturing firms in Ghana.

1.3 Objectives of the Study

The general objective of the study is to examine the effect of inventory management practices on the store performance of building materials manufacturing firms in Ghana. However, the specific objectives are as follows;

1. To assess the inventory management practices adopted by Building materials manufacturing firms in Ghana.
2. To test the relationship between inventory management practices and store performance of Building materials manufacturing firms in Ghana.
3. To establish the effect of inventory management practices (information technology, lean inventory system, strategic supplier partnership) on the store performance of building materials manufacturing firms in Ghana.
4. To investigate the challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana

1.4 Research Questions

1. What inventory management practices are adopted by building materials manufacturing firms in Ghana?
2. What is the relationship between inventory management practices and store performance of building materials manufacturing firms in Ghana?
3. What effect do inventory management practices (information technology, lean inventory system, strategic supplier partnership) have on the store performance of building materials manufacturing firms in Ghana?
4. What are the challenges of existing inventory management practices of building materials manufacturing firms in Ghana?

1.5 Significance of the Study

A research into the area of the inventory management in building materials manufacturing firms is relevant for several reasons. First, it is going to help the manufacturing sector to fashion out efficient and effective inventory policies for their various depots. Thus, the study will bring out how the building materials manufacturing firms will manage its

inventory policies so as to be responsive and at the same time efficient in its downstream activities 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 general 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 in the building materials manufacturing firms so as to be able to satisfy their production need. The economy of the country also stands to benefit from the research in this area since it is going to help the building materials manufacturing firms improve in their inventory control.

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 control in the manufacturing sector. This study is undertaken to enhance the frontiers of knowledge by adding up to literature on inventory management practices in manufacturing industries and its effect on the products that they produce

Furthermore, the study will serve as management policy guide for the stakeholders in the manufacturing sector since the study will reveal the state of the building materials manufacturing firms' inventory management practices and also the level of production. Management can hence use the results to determine how best to run operations.

1.6 Overview of Methodology

The study adopted a survey research design and a quantitative research approach in an attempt to measure the extent of inventory management practices on store performance. Since quantitative research seeks to measure a particular phenomenon, the study thus develops a conceptual framework which depicts the relationships the study seeks to measure and test. Inventory management practices are the independent variables of the

study whereas store performance is the dependent variable. The conceptual model was tested in quantitative survey using questionnaire to collect data and test the relationships. The questionnaire items were adopted from extant studies to measure the independent variables and dependent variable respectively. Purposive and convenience sampling techniques were used to select a sample of respondents for the study with the unit of analysis been firm-level. In addition, secondary data were collected in the form of review of key literature on inventory management practices, and store performance publications including journal articles, books, among others. However, primary data were the dominant source of data through the use of questionnaire administered. The data gathered would be analysed quantitatively with the aid of relevant statistical tools such as frequency tables, measures of location and dispersion among others. Simple linear regression was adopted to test the relationships among the variables. Finally, the data were interpreted and summarized in order to draw conclusions and suggest some useful recommendations.

1.7 Scope of the Study

The scope of the study is to assess the effect of inventory management practices on store performance of selected building materials manufacturing firms in Ghana. The study was carried out at selected building materials manufacturing firms in the Accra metropolis. The management of these building materials manufacturing inventory was covered by this study. Data were gathered from management and staff of the selected building materials manufacturing firms with specific focus on those officers responsible for procuring and managing their inventory.

1.8 Limitations of the Study

Firstly, there was a challenge of apathy of some respondents in taking part of the study. As a result, the study only focused on building materials manufacturing firms. Secondly, time constraints and inadequate financial and material resources are expected to be challenges that somehow limited the depth of coverage of the research work. A longer time and enough resources would help to unearth more findings especially within the entire manufacturing sector and institutions in other regions of the country to determine how inventory management affect their stores performance.

1.9 Organization of the Study

Generally, the study is organized into five chapters. Chapter one starts with general introduction about inventory and inventory management followed by statement of the problem and continues with the research objectives and questions, the scope and limitations of the study, significance of the study and the organisation of the study. Chapter two reviews related studies and literatures on inventory management and service level in service firms. Chapter three provides the methodology used in the study and the organisation profile. Chapter four presents the analysis of the findings and interpretation of the data generated. Chapter five provides the summary of the findings, recommendations and conclusions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the theoretical and empirical literature on inventory management in the manufacturing sector. According to Saxenian (1991), inventory management has traditionally been viewed as an internal procedure that took account of inventory within

one building, warehouse or location. However, advancements in technological applications have allowed organizations to look beyond this.

In any company, inventory management is an important area that the management always focuses on when it comes to improving business efficiencies and cutting costs. Supply chain inventory management is so critical for planning or forecasting for the future needs and for developing strategic plans to handle the market situations (Smeltzer, 1997).

2.2 Conceptual Review

This section reviews the fundamental concepts of the study including inventory management, in terms of reasons for keeping it, types, costs, inventory models, as well as store performance. These are captured in the next sub-sections.

2.2.1 Inventory

Inventory is any stored resources that are used to satisfy a current or future demand and are held in different forms by organizations namely raw materials, work in progress and finished goods. According to Cachon and Fisher (2000), organizations necessarily hold inventory to assist in future consumption and sale. While inventory are at times considered to be evil in organizations, most organizations hold inventory for various reasons, which include physical necessities, functional purposes, speculative purposes, etc. Inventory control shows how much inventory is held by companies at any time and how they are monitored (LaLonde and Masters, 1994). It applies to every item organizations used to produce a good and this covers inventory at every stage of the manufacturing process, from procurement and delivery to usage and re-ordering the inventory. Bartlett (1990) stated that efficient inventory control allows an organization to

have the right quantity of inventory, at the right place and at the right time. It also ensures that resources in terms of capital are not tied up, and protects production of goods and services if there are bottlenecks within the supply chain.

2.2.3 Inventory Management in the Supply Chain

“Inventory management is about optimizing the balance between the costs of supply, cost of production, costs of holding inventory and the need to provide the highest level of service to customers” (Hughes et al, 1998). Inventory management is therefore the set of policies and controls that monitor levels of inventory and determines the levels to maintain, when to replenish inventory and the size of orders (Davies and Heineke, 2005).

In a broad context, inventory or inventory could include equipment and inputs meant for further processes in the form of raw materials, components at interim stages of the process, such as semi-finished goods or work-in-progress; and outputs such as parts, components and finished goods (Davies and Heineke, 2005).

Towill (2003) posit that inventory management acts as a major component of any supply chain irrespective of whether it is a product or service supply chain. Inventory management plays an important role in matching demand and supply within the entire supply chain, ultimately providing flexibility in coping with external and internal events of the today’s uncertain, globalized business environment.

According to Storey (2006), the 17th annual state of logistics report of the Council of Supply Chain Management Professionals stated that, huge amount of cost is recorded as the cost of holding inventory in United States economy. It is evident that this truth is applicable to many other countries of the world especially in the manufacturing sector. In situations where all the partners in a supply chain manage inventory effectively and

efficiently, this will be resulted with less interruptions in production process, reduction in storage cost, product availability and many other organization specific quantitative and qualitative benefits leading to the organizational performance.

Grablowsky (2005) asserted that the world has been moved towards integrated and collaborative approach to inventory management within the supply chain rather than isolated approach to manage inventory. In previous research studies like Hari (2004), it was found out that most of the inventory managers tend to take inventory management decisions based on intuition due to lack of the professional expertise in the field, no proper analysis of inventory data, human bias by the senior managers that result with use of rule of thumb, no user involvement in inventory management systems, inventory decisions are not integrated with strategic needs of the organizations, and ultimately result with no proper inventory management practices with an organization. Proper inventory management practices are really important for fast moving manufacturing products such as gold, copper, alcoholic and non-alcoholic drinks.

2.2.4 Reasons for Keeping Inventory

All organizations keep inventories in smaller or larger scale. They exist to smooth out gaps in the rate or timing of demand and supply. Only if the supply of products occurred exactly when they are demanded, products would never be stored. With high inventory level, many companies may also encounter problems in operations; defective deliveries, poor floor layout, untrained operators, off-standards, re-work, down times, inaccurate quantities etc. Or high inventory levels can be consequences of these problems. Either way, these unexposed problems cause wastes; increase costs and prevent smooth output of operations.

Baily (1987) identified and summarized the benefits of inventory management as; economies of purchasing, economies of production, optimize customer service, transportation savings, hedge against future (Price fluctuation, quantity discounts), hedge against unforeseen contingencies (labor unrests, natural disasters, surges in demand, etc.) and to maintain independence of the supply chain.

2.2.5 Types of Inventory

To increase efficiency and responsiveness this research analyzes the main types of inventory and the way these can be classified (Chopra and Meindl, 2007).

2.2.5.1 Cycle Inventory

Represents the inventory used to fulfill the demand in the period between two deliveries of the suppliers. The size of the current inventory is the result of the production, the transportation or of the acquirement of the merchandise in large lots.

The companies make or acquire large lots to exploit the economies of scale in production, transportation or the purchasing process. With the increase of the lot, the expedition costs grow too. Chopra and Meindl, 2007).

2.2.5.2 Safety Inventory

Safety inventory is the inventory that needs to be held in the case the demand overflows the expectations or the supplier does not deliver the merchandise in time. If everything were predictable then current inventory would be enough. Because the demand is uncertain and it could overflow expectation, firms keep a safety inventory so they would be able to satisfy a high but unexpected demand. Managers are faced with a key decision as to what they must establish as the size of the safety inventory. If the safety inventory

is too large then the merchandise won't sell and they will have to sell it for a lower price after the season is closed. If the firm has a small safety inventory then the firm will have smaller sales. Therefore, deciding for a certain size of the safety inventory implies a link between the cost of owning too much in a safety inventory and the cost of decreasing the sales because of an insignificant safety inventory.

2.2.5.3 Seasonal Inventory

Seasonal inventory is used in case the demand has predictable variations. Companies create inventory in periods when demand is low and they deposit merchandise for the periods when they won't be able to produce a sufficient quantity to satisfy the demand. Managers face the key decisions as to when they have to decide whether they have to form a seasonal inventory and if they do decide to create it, they must decide on its size. If a company can easily change the rate of the production system at a very low cost then they must not need a seasonal inventory, because the production system can adapt itself for a period when the demand reaches high values without implying high costs.

Anyway, if changing the production rate is expensive (for example, when employees must be fired or hired) then a company must establish an appropriate rate of production and they must form an inventory when the demand is low. So, the main problem for the supplying chains managers who form a seasonal inventory is the cost of it in comparison with the cost of having a flexible rate of production (Chopra and Meindl, 2007).

2.2.5.4 The Service Level

The service level is a part of the demand satisfied in time by the products in the inventory. A high level of the availability of the products creates a high level of responsibility

implying at the same time a growth of the cost because lots of inventory are formed but rarely used. In opposition, at a low level of product availability, the inventory cost is lower but it is possible that a client is not served on time.

Traditional supply chain metrics focus on efficiency and productivity (Cohen and Roussel, 2005). Improvements in service levels, costs and inventory levels are the desired outcome of an operations strategy and are measured accordingly. A more strategic perspective looks at these measures as enablers of business objectives such as growth within a specific segment or market, accelerated product development, or immediate product availability. When aligned with key business objectives in the supply chain, service level becomes an added source of competitive advantage.

2.2.6 Inventory Management and Stores Performance

Inventory Management system provides adequate information to properly manage the flow of goods, proper utilization of people and equipment, coordination of internal processes and communicate with customers. Inventory Management does not only make decisions or manage operations but provides adequate information to supply chain management personnel who make more timely and accurate important decisions to manage and maximize their operations. A successful business organization depends upon many factors, one of which is an effective inventory management system. Effective inventory management consists of effective record-keeping to shipping and timely receipt of goods on time. An effective Inventory management can keep the supply chain of organization running smoothly and efficiently. Inventory management problems can affect an organization profitability and customer service. They can cost an organization

more money and can lead to excess inventory or over inventorying that is difficult to dispose (Carter and Price, 1993).

A work done by Roman (1999) on the effect of inventories and inventory management on Dell's corporate profit indicated that average profit has increased between 19.5 to 25 percent per month. This came about as a result of the fact that Dell carries very little inventory and the whole organization concentrates on increasing manufacturing and delivery process of components and products through its supply chain. Dell delivers new products to market faster than its competitors by dealing directly with the customer thereby eliminating middlemen. However, studies done by Richardson (1995) documented that lack of efficient inventory management has led organizations incurring a total inventory carrying costs between 25 to 55 percent of cost of entire production cost. He identified that most of the problems are usually due to improper inventory processes and out-of-date systems. There are a number of problems that caused serious problems with inventory management. He identified some Common Challenges faced by organizations in Inventory Management are:

Lack of qualified Supply chain employees. Some organizations do not put qualified supply chain personnel in charge of their inventory systems and they do not have experience, apathy towards work, or do not have training on logistics and supply chain management. The processes used are not wide enough and do not cover all the aspects and activities in the company.

A flawed and unrealistic business plan. To be able to forecast future performance of an organization depends upon accurate and reliable data, and to be able to analyze them accurately. This affects inventory management process because inaccurate data or information may lead to over-inventorying or under inventorying of inventory.

Failure on the part of a supervisor in charge of inventory management to check inventory in his custody on regular basis and ensuring that there is availability of inventory. Identifying shortages ahead of time is an important factor in achieving Customer Satisfaction (Lambert, Inventory, and Ellram, 2004).

Logistic problems and weak points can affect timely delivery of goods and services. This means that if orders for outgoing shipments are not handled in an efficient manner, they can cause delays in the delivery of the products.

Falling victim to the “bullwhip effect”. This means an organization may react disproportionate to new information in the business environment. When demand changes in the market, an organization may panic and over-inventory inventory, thinking that the changes in demand in the market will move the inventory (Loudon and Loudon 2010).

Too much expired inventory in inventory. Expired inventory is goods or materials in inventory whose potency or efficacy to be sold at the normal price has expired or yet to be expired. This usually occurs in grocery and drug stores. As a particular food product or drug nears its expiration date, the organization may discount the item in order to dispose it quickly before it expires (Carter and Price 1993).

Inaccurate computer information of inventory items for production or sale. There are always associated costs like loss of goodwill, if customer goes to a warehouse of an organization or supermarket to order or procure an item, and later found out that system inventory do not match the physical inventory. Inaccurate inventory records can easily result in loss of resources; reduce customer expectation and service level (Zhou, 2009).

2.2.7 Inventory Costs

Historically organizations used to carry high inventory and many of them viewed this as sign of wealth (Waters, 2003). However, this attitude has changed many years ago and companies have found it necessary to manage their inventory efficiently and effectively in the dynamic business environment. The drive to reduce cost in order to stay in business has led to companies using new method of inventory which has considerably reduced inventory levels and costs. According to Monczka et al (2010) excess inventory ties up capital which an organization could use more productively elsewhere. And the drawback of holding excess inventory is the effect it has on the organization working capital and the inventory costs.

Monczka et al (2010) identified and elaborated the main factors comprising the total cost of holding inventory which include: Cost of the items (Purchase cost or material cost), Ordering Cost (Processing of order and delivery of materials), Cost of holding Inventory (Taxes, Opportunity costs, Insurance costs, Space costs and Inventory service costs), Inventory out Costs (Lost sales cost and Back-order cost).

2.2.7.1 Cost of the items

This is the total cost of acquiring an item from supplier, and production cost of item manufactured in house. Production cost is difficult to calculate as it has to cover direct material used to make the item namely Labour, overheads and opportunity costs (Monczka et al., 2010).

2.2.7.2 Ordering Cost

According to Monczka et al. (2010), ordering costs covers all costs associated with the release of an order and accepting delivery of the items. They include all the cost of

generating and sending an order or transmitting an order electronically to suppliers, transport, receipt inspection and quality checks. They further emphasized that if an organization manufactures an item in-house the preparation and equipment costs may be the ordering cost.

2.2.7.3 Cost of holding Inventory

This covers all costs for holding and storing materials and Monczka et al. (2010) summarized them in three main components namely Financial cost , Storage cost, and maintenance cost.

Financial cost

This is mainly for capital tied up, but also the opportunity cost. This may also include taxes and various other charges on the amount of inventory held (Monczka et al., 2010).

Storage Cost

This consist of all cost associated with providing storage for material, providing a warehouse (both internal and external), racking and administration systems (Monczka et al., 2010).

Other costs may include communication costs, operational costs, consumables and utilities, wages and salaries of supply chain personnel involved in warehouse operations. (Christopher, 2005).

Maintenance Costs

This involves costs associated in right conditions, inventory checks, obsolescence, deterioration, spillages, damage and loss (Monczka et al 2010).

2.2.7.4 Stockout Costs

These are costs of not having an item available which is needed for production and consumption. Another important function of inventory is to avoid shortages and inventory outs. If an item is repeatedly out of inventory, customers are likely to go elsewhere which will affect the organization reputation and reliability (Monczka et al 2010). In this view organizations are willing to incur the cost of holding inventory to avoid higher cost of shortages (Waters, 2003).

2.2.8 Inventory Management among the Building Materials Manufacturing Firms

A good number of studies have been carried out in this area (Ballard, 1996). However, as far as the manufacturing industry is concerned, the literature on this subject is inadequate. But in recent years the mounting accumulation of inventories in public and private building materials manufacturing firms made them to realize the importance of the inventory management.

For building materials manufacturing firms, inventory management includes a company's activities to acquire, dispose, and control of inventories that are necessary for the attainment of a company's objectives. The management of inventories concerns the flow to, within, and from the company and the balance between shortages and excesses in an uncertain environment (Tersin, 1988). In relation to building materials manufacturing firms, McPharson (1987) stated, "inventory management systems are designed to obtain concise and accurate information for control and planning of planned goods, issues, cuts, projections, raw materials and semi-finished goods basically for export". Inventory management has been a concern for practitioners especially in the

manufacturing industry, in that overall investment in inventory accounts for relatively large part of the company's assets.

In the manufacturing sector, inventory may account for 40 to 60% of total assets (Verwijmeren et al., 2009). Inventories tie up money, and the success or failure in inventory management impacts a company's financial status. Having too much inventory can be as problematic as having too little inventory. Too much inventory requires unnecessary costs related to issues of storage, markdowns and obsolescence, while too little results in inventory outs or disrupted production. Besides, long-run production associated with a high level of inventory conceals production problems (e.g., quality), which can damage a company's long-term performance (Vergin, 2006). Therefore, in the manufacturing sector, the primary goal of inventory management has been to maximize a company's profitability by minimizing the cost tied up with inventory and at the same time meeting the production requirements (Lambert, Inventory, and Ellram, 2004).

Traditionally, for building materials manufacturing firms, inventories cause conflicts between functional units within a company. For example, within a company, purchasing, production, and marketing people want to build a high level of inventory for raw material cost reduction, efficient production run, and suppliers service level, while warehousing and finance people want to reduce the inventory level for storage space and economic reasons (Tersine, 2003). As global competition between suppliers in the open markets has increased, power has been shifted from suppliers to customers (Verwijmere, 2008).

2.2.8.1 Storage, Distribution and Disposal Management

Since materials stored is equivalent to cash and forms a major part of the total product cost, it is essential that the material should be properly accounted for and safe guarded in an efficient and organized store. With a judicious and proper control of management of stores, one can minimize the losses due to the obsolescence, pilferage, excess storing, etc. (Mullemann, et al., 1993).

Preservation of items in the space provided in the stores is of great importance because floor space accommodation is a costly issue. Keeping of items at various places in stores, particularly the slow-moving and non-moving items is a crucial concern. But this is often given least importance in the manufacturing industry (Mullemann, et al., 1993).

To have an effective storage programme, factors such as nature of the item, codification of the item, the expected idleness, economic value of the item and the need for protection should be taken care of. To identify the item in an easy way on the shelves and racks, it is necessary to have good lighting (Mullemann, et al., 1993).

The stores section which is a part of commercial department in the selected building materials manufacturing firms has to maintain good relationship with branches of its own other departments in the organization. The stores and purchase sections' functions are complimentary and close cooperation between these two sections will result in better standardization, codification, value analysis, variety reduction, inventory control, salvage, disposal of obsolete and materials. Even in the absence of integrated materials management in building materials manufacturing firms, the stores and purchase sections have close cooperation and co-ordination (Carter and Price, 1993).

According to a study done by Zhou (2009) he maintained that stores section is responsible for the issue of materials to various departments and sections in the building materials manufacturing firms. Basing on the bill of materials, work order, material requisition notes, the stores personnel need to issue the material as prescribed in the authorized documents as mentioned above. While delivering the quantities of material, the personnel in stores section, enter an entry in the books of stores and also an entry has to be made in electronic data processing.

The store is expected to maintain documents like bin card, codex, obsolete items, rejected items, suppliers index, indents and bills of materials.

Surplus, obsolete and metallic items management assumed tremendous importance in the materials management activities. Surplus originates from three sources namely scrap, obsolete materials and damaged equipment. Holding these items is costly to the organization. These costs include carrying charges, cost of maintaining the records, loss of the use of capital held up in inventories. In view of this, special efforts need to be made to avoid keeping them (Carter and Price, 1993).

2.2.8.2 Critical Evaluation of Inventory Management Practices in the Manufacturing Sector

Inventory management is an integral part of materials management and plays a key role in the smooth and uninterrupted running of the manufacturing industry. To have higher operational efficiency and profitability of an organization, reduction of the capital locked up in inventories is very much essential. The same will help in improving the liquidity position of the enterprise. As inventories involve locking up of capital, proper care must be given in dealing with the problem of inventory management. The sum of the value of

the raw materials, fuels and lubricants, consumable's spare parts, processing material and finished products are called as inventory (Zhou, 2009).

The basic objectives of inventory management in the building materials manufacturing firms would be to keep down capital investment at a minimum level in inventories without endangering the process of extracting mineral, to minimize the idle time of men, machinery and capital caused by shortage of various kinds of materials, to reduce the costs in maintaining the inventory and to minimize the losses of obsolescence. Inventories account for a major portion of working capital of a manufacturing unit. The predominant position in the total working capital obviously warrants for their maximum efficiency. Thus, inventory management in manufacturing sector aim at balancing between too much inventory and too less inventory. A firm cannot afford either excessive or shortage of inventory. To achieve higher degree of operational results, it is inevitable to maintain effective control and management of inventories (Zhou, 2009).

The structure of inventory of the manufacturing sector undertakings can be studied by classifying their total inventory into five categories: Raw materials, goods in process, finished goods, stores and spares and miscellaneous items. The structure of inventory can be analyzed in two ways. First, the share of each component of inventory is in relation to aggregate inventory. Secondly, appropriate indicators about adequacy or inadequacy of each type of inventory may be developed and applied to capital positions obtained in manufacturing sector enterprises (Zhou, 2009).

2.2.8.3 Inventory Management in the Building Materials Manufacturing Industry

Inventory management in the building materials manufacturing industry can be depicted in Figure 2.2 below.

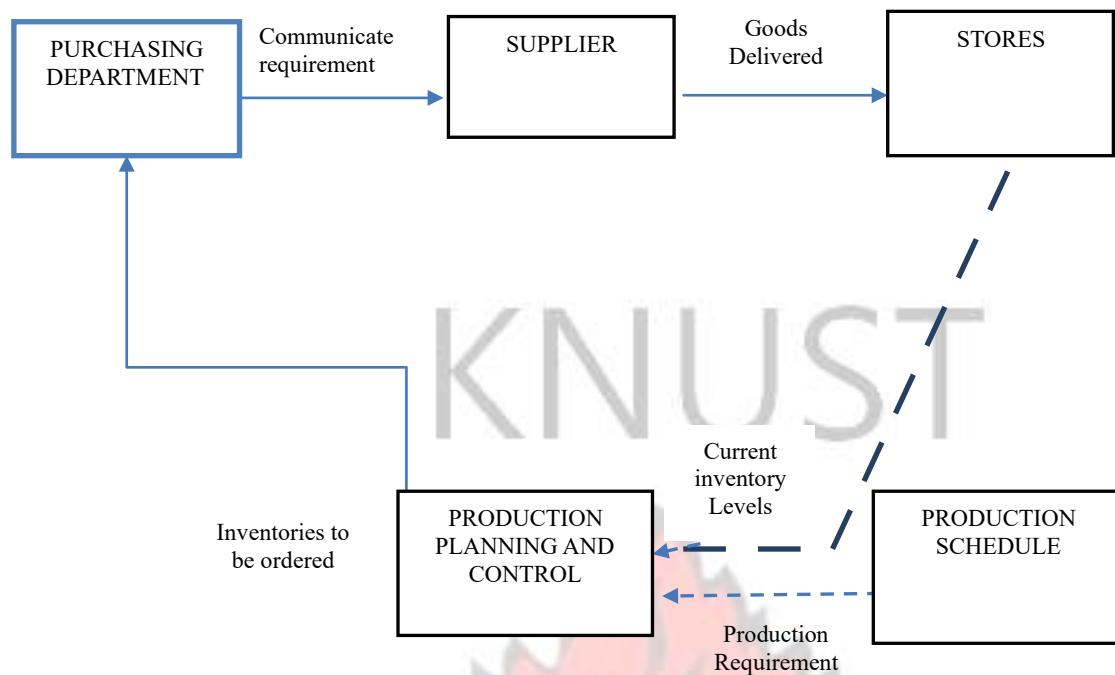


Figure 2.1: Inventory Ordering Process in Manufacturing Industries

Source: (Goonatilake, 1984)

The joint effect of these two factors needs to be studied carefully to understand the climate in which inventory control has to operate. Figure 2.2 shows a simple model of the general stock ordering process in developed countries. As shown, the production planning and control department takes into account future production schedules and current stock availability, and communicates stock to be ordered to the purchasing department. Once the type and quantity of stock to be ordered are known, it is normally a simple task for the purchasing department to secure the supplies. Often, orders are placed over the telephone (or telex, if the supplier is overseas) and if bank guarantees, such as “letters of credit”, are needed, it is a simple task to obtain them. The situation in many developing countries is totally different as shown in Figure 2.3.

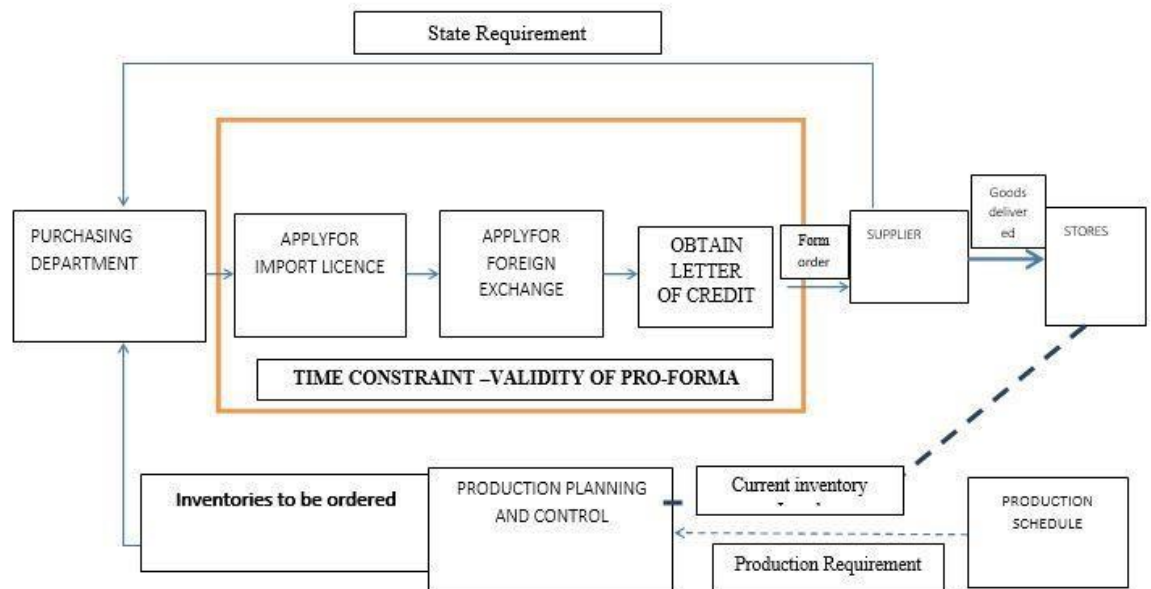


Figure 2.2: Inventory Ordering Process in Manufacturing Industry

Source: (Goonatilake, 1984)

The situation depicted in Figure 2.3 has a profound effect on inventory control measures adopted in developing countries. Industrialists there have bitter experience of the tedious process of obtaining the documents necessary for securing the supply of much needed raw materials and parts. As will be demonstrated later, this is one of the main reasons why basic inventory control concepts such as the Economic Batch Quantity are not widely used in these circumstances.

2.3 Theoretical Review

A theory is a hypothesis or a set of ideas intended to explain something, especially one based on general principles unrelated to the explanation's subject. Two main theories that support this study are the resource-based view (RBV) and strategic choice theory which are described in this section.

2.3.1 Resource-Based View Theory (RBV)

A resource refers to a company's entire set of tools for increasing output or profit, including plant, labor, raw materials, and assets (Clark, 2007). As a result, this theory is utilized to solve the question of why enterprises in the same industry perform differently over time. Why, on the other hand, do certain companies continually outperform others? According to Porter (1982), the value chain concept was developed to explain why certain organizations have a competitive advantage over others. This is because internal capabilities and resources provide a competitive advantage when a company emphasizes the resources worth, uniqueness, imperfect imitable character, and non-substitutable nature, according to RBV (Miles and Covin, 2010). These resources can be defined as tangible or intangible resources and can include assets, capabilities, organizational procedures, or information (Dickinson et al. 2010). Theoretically, resources that are completely managed or owned by the focal organization should be nurtured in order to improve their contribution to the firm's competitive edge in its industry (Hoffman and Sandilands, 2005). This theory connects the research variable where we want to know if there is any effect on firm performance after adopting green production (Li and Geiser, 2009).

If the number of institutions in a competitive arena owning a resource is smaller than the number of institutions required to generate ideal competition, the resource is uncommon (Pfeffer, 2003). In this regard, factories that have implemented eco design that is distinctive in nature may be in a better position than others (Hooley and Greenley, 2005). Core competencies indicate what a corporation can accomplish better than others. Competencies describe what a company can do well (Prahalad and Hamel, 1990). Lawson and Lorenz (Lawson and Lorenz, 1999). In the resource-based view, allocating resources to non-core tasks results in opportunity costs. This is especially essential in the

tertiary institutions when it comes to materials handling practices. A company that can effectively use its resources to its advantage can obtain a competitive advantage.

2.3.2 Strategic Choice Theory

The theory looks at the interaction of the actions of an organization and events (De Rond and Thietart, 2007). An integrative approach of the Strategic Choice Theory is important in risk management. For example, by emphasizing on cross-functional integration in organizations (Jemison, 1981). The Strategic choice theory represents the relationship between risk management, choices and organizational performance and the environmental/, organizational interaction. It stresses the importance of managerial risk management options and practices (Child, 1972). It views organizations as partly influenced by their environment and affected by the choices they make to control environmental the disturbances (Miles et al., 1978).

Strategic choice theory has an integrative approach and views businesses entity adaptability, which learn over time. Their strategic options therefore lead to actions that management direct (Child, 1997). Strategic type of organizations, Analyzers, Defenders or Prospector therefore determine the way managers and organizations operate in unpredictable events and situations. According to the strategic choice theory prospectors, proactivity and innovation is the guiding principle (Nollet et al., 2005). They produce internally sometime, they alter their product range. The defenders pursue procurement of the items through established suppliers so as to ensure efficiency in the production while developing a stable mix of products (Shook et al., 2009).

2.4 Empirical Review

Previous studies and researches in the area explained results they found from different perspective/practices. Some of the research findings related to warehousing activities are summarized as follows.

Sneha and More (2016) finds out in her study of efficiency and effectiveness of Store Management that, as a result of global competition and supply chain concepts, including a focus on integral inventory control, warehousing has become a critical activity in the supply chain to outperform competitors on customer service, lead-times, and costs. Timely and accurate information about products, resources and processes are essential to operationalize a planning and control structure that effectively and efficiently achieves the high performance of store operations required in today's marketplace. The author also showed that store complexity affects the planning and control structure through the comprehensiveness of the work to be done.

In highly complex stores, feeding organizational actors with the right type of information and knowledge at the right time is difficult. Nonetheless, a complex warehousing operation requires a control structure that has a great deal of information, data, and knowledge about products, processes, customers, and resources readily available. Thus, Optimization strategies are utilized to position product availability and delivery as a competitive advantage while also optimizing the cost trade-offs associated with transportation, facilities, equipment, workforce, and other critical cost variables. The distribution center also provides time-saving utility by storing product until it is demanded.

Shah and Khanzode, (2017), identifies the tradeoffs between picking efficiency and order responsiveness could be studied with different stochastic issues (worker overtime, earliness, tardiness, penalty, order due date, costs, etc.). In addition, many studies have

been found solely for picking efficiency, but the integrated model including responsiveness may provide better results.

Karim et al. (2018) show their result of on failure factors of store productivity as; to sustain economic development, the warehousing industry must be focused on positive action that should be supported by everyone at all levels of government, private and non-profit organizations as well as the people. Therefore, suggestions and recommendations on store productivity performance will directly influence development to a higher level and boost competitiveness in the logistics service sector. However, these warehousing and storage strategies will be beneficial when everyone participates consistently, endeavors to innovate and improve productivity, and increases the efficiency of warehousing operations.

Habazin et al., (2016), provide their recommendation in the study of the Order Picking process in stores” that every process, from receiving until shipping as well as order picking is also the one that accounts for the majority of store operating costs and requires the most performing time. Once the picker starts gathering products from orders, they walk, move, lift, put, pack and do other related works, which take time and, in that way, become costs. To perform a suggestion of a solution, the order picking process has been analyzed, regarding detailed process flow and time dedicated for its performance. In accordance with its status, it has a possibility of being reduced by different strategies. Companies willing to optimize their processes tend to measure them but also tend to have an objective view on the core process structure. To be open to change and to be continuous in evaluation is a crucial matter for any process optimization.

In addition, the authors also suggest that, after a detailed analysis, observed on broad data that include seasonality, KPIs, types of goods, performance and the structure of any kind

of store process, it can be well modified. By optimizing order picking as proposed, it is considered that the processes would run more efficiently. The optimization includes predefining WMS data and reorganization of dedicated storage locations directly influencing the time-consuming order picking, which is presented with the proposed changes in the observed company's store layout. The evaluation of effectiveness of a certain process, such as order picking, should be constantly supervised in the form of analysis and chronographically measured to be controlled and reduced.

Atieh et al. (2016) examines the main purpose of automating the store system is to control the movement and storage of the products, together with the benefit of enhanced security and quicker handling. The newly created software upgraded the capabilities of the store management system. Currently, the stored data can be organized according to serial number, activated easily assuring the FIFO concept, and handed to the dealers accurately with the least number of possible errors.

Van den Berg (2012) reflects in his study of highly competitive store management that excellent store performance helps companies to create competitive advantage by reducing logistics costs, by increasing internal and external customer service levels, and by aligning business activities. Research shows that best-in-class companies realize competitive customer service levels while achieving logistics costs advantages of 20 to 30 percent over their laggard peers. Moreover, these companies are financially more successful.

In Malaysia, Agus and Noor (2006) examined the relationship between inventory management practices and financial performance. 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).

In addition, Roumiantsev and Netessine (2005) investigated the association between inventory management policies and the financial performance of a firm. The purpose of their study was to assess the impact of inventory management practices on financial performance 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 financial performance as measured by return on assets. Also, Eckert (2007) examined inventory management and role it plays in improving customer satisfaction. He found a positive relationship between customer satisfaction and supplier partnerships, education and training of employees, and technology.

In another study, Nyabwanga and Ojera (2012) investigated the relationship between inventory management practices and business performance of small scale enterprises (SSEs) in Kisii Municipality in Kenya. The relationship was probed based on primary data gathered by use of a structured questionnaire from 70 SSEs. The empirical results revealed a positive significant relationship between business performance and effective inventory management practices at 0.05 significance level. Further, they showed that inventory budgeting had the largest effect on business performance with a beta coefficient of 0.329, followed by shelf-space management with a beta coefficient of 0.30. Inventory

level management had the least but significant effect with a beta coefficient of 0.297. The study suggests that owners/managers of SSEs embrace effective inventory management practices as a tactic to further their business performance.

In Kenya, Lwika et al. (2013) looked at the impact of inventory management practices on financial performance of sugar manufacturing firms, by analysing the extent to which lean inventory system, strategic supplier partnership and information technology are being applied in these firms. The research survey was conducted in all the eight operating sugar manufacturing firms from the period 2002-2007. The primary data was collected using structured and semi-structured questionnaires administered to key informants in the organisations. Secondary data was obtained from annual financial performance statements available in the year Book sugar statistics. Descriptive statistics was used to test the impact of inventory management practices and Correlation analysis was used to determine the nature and magnitude of the relationship among inventory management variables. The results indicate that there exists a positive correlation between inventory management and Return on Sales ($r=0.740$) and also with Return on Equity ($r=0.653$) which were found to be statistically significant at 5% level.

In Ghana, Kasim, Zubieru and Antwi (2015) assessed the inventory management practices of small and medium enterprises in the northern region of Ghana. The purpose of their study was to assess inventory management practices and its effect on the financial performance of SMEs in the Northern Region of Ghana. The study adopted a descriptive cross-sectional survey research design which allowed the collection of primary quantitative data through structured questionnaires. The target population was 1000 owner/ managers of SMEs. Stratified random sampling technique was used to obtain a sample of 300 SMEs comprising 164 trading, 26 manufacturing, 10 hairstyling, 62 dressmaking, and 38 carpentry enterprises.

The data was analysed using both descriptive and inferential statistics. The study revealed that SME financial performance was positively related to efficiency of inventory management (EIM) at 1 percent significance level. The study concluded that stock management practices have influence on the financial performance of SMEs hence there was the need for SME managers to embrace efficient stock management practices as a strategy to improve their financial performance and survive in the uncertain business environment (Kasim et al., 2015).

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 (Prempeh, 2016).

In Kenya, Munyao, Omulo, Mwithiga and Chepkulei (2015) examined the role of inventory management practices in the performance of the production department. The study sought to find the inventory management techniques used by manufacturing firms

in Mombasa County, and established the level of effectiveness of inventory management practices of manufacturing firms in Mombasa County. It also determined the level of performance of production departments of manufacturing firms in Mombasa County and finally, determined whether computerized inventory management influences the performance of the production department. The study adopted the descriptive research design. The target population was textile, rolling mills and food and beverage manufacturing firms in Mombasa County.

A survey was conducted which adopted stratified random sampling technique. Out of 150 manufacturing firms, a sample size of 45 manufacturing firms was used. A questionnaire was used as data collection instrument. One questionnaire was issued to one respondent at random from each of the forty five manufacturing firms included in the sample. Reliability of research instruments was tested using Split Half Reliability Test. The study found out that manufacturing firms used various inventory management techniques such as the action level methods, just-in-time, periodic review technique, material requirement planning 1 and economic order quantity. The study found that despite the fact that MRP 1 was most effective in contributing to performance of the production department, most organisations in the manufacturing industry used action level methods (Munyao et al., 2015).

In Kenya, Lwika et al. (2013) found a positive relationship between information technology and Return on Sales and also with Return on Equity which were found to be statistically significant at 5% level.

In Greece, Koumanakos (2008) studied the effect of inventory management on firm performance using 1358 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

financial performance 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. On the contrary, Lwika et al. (2013) found a positive relationship between lean inventory system and Return on Sales and also with Return on Equity which were found to be statistically significant at 5% level.

In Kenya, Lwika et al. (2013) found a positive relationship between information technology and Return on Sales and also with Return on Equity which were found to be statistically significant at 5% level.

2.5 Conceptual Framework

A conceptual framework is made up of variables or constructs that reflects the study's topic, objectives and direction that the researcher seeks the study to follow. Kombo and Tromp (2004) defined concept as a general idea or an abstract which is inferred from different specific situations. Hence, a theoretical framework involves a set of measurable constructs extracted from specific fields of enquiry to structure a particular presentation. Mugenda and Mugenda however defined theoretical framework formally to be a hypothesized model which reflect the relationship between a study's dependent and independent variables. Independent variables refer to an explanatory variable which is presumed to cause changes in the dependent variable whereas a dependent variable refers to what the researcher seeks to explain (Kothari, 2004).

The framework imply helps to define the variables, map the terrain of the research and conceptual scope as well as identify the relationships that exist in the concepts and find gaps in the literature related to the study (Creswell, 2003).

This study involved two main concepts – inventory management practices and store performance. However, the framework of this study was designed to reflect the variables in the research topic and the literature review done in the study. Therefore, based on the aforementioned contexts from which the researcher gathered the concepts from, the framework would help to guide the rest of the research and in analyzing the results of research.

The study identified Lean Inventory Systems (LIS), Inventory Models (IM) and Information Technology (IT) as the three main independent variables and store performance (PERF) as the dependent variable. The framework that related these constructs and reflected the objectives of the study can be seen in Figure 2.4.

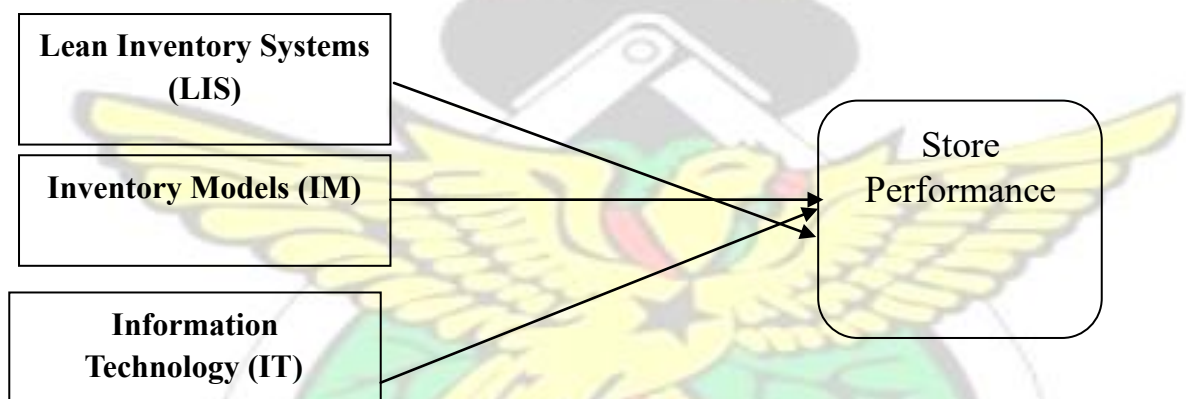


Figure 2.3: Theoretical Framework of the Study

Source: Researcher's Own Construct, 2022

2.6 Summary of Literature Review

Various studies reviewed in the foregoing literature have revealed that efficient and effective inventory management in a supply chain can play a vital role in cutting inventory holding costs across the different stages of the supply chain, thus emphasizing the need of a general model for managing inventories within a supply chain. Studies document that the main reasons for holding stocks of inventories include economies of purchasing, economies of production, optimizing customer service, transportation

savings, hedge against future, unforeseen contingences, etc. Holding inventories has its cost which include non-value-added costs, opportunity cost, complacency, inventory deteriorate become obsolete, lost, stolen, etc.

Models of inventory control from the literature indicated that inventory management does not necessarily mean holding lower inventory but ordering inventory at a level where total cost of holding inventory is minimized (Economic Order Quantity).

The interaction between purchasing department and supplier (mainly overseas) is a very complex one. Most governments in developing countries have regulations governing import controls and foreign exchange transactions. Under such controls, the purchasing department initially has to obtain a pro forma invoice from the supplier (the validity of the pro forma is usually limited to 90 days). Armed with the pro forma invoice, the purchasing department first applies to the relevant government authority for an import licence. After obtaining the licence, the next obstacle is to secure the release of foreign exchange for the transaction. (Goonatilake, 1984).

As a final measure, industrialists in developing countries often have to secure a letter of credit from a reputable banker, without which the overseas supplier will not accept the order. Considering the extensive bureaucratic obstacles and poor communication networks prevalent in many developing countries, the whole process is time consuming. It is hoped that the import licence, foreign exchange approval and the letter of credit will be obtained within three months, the usual period of validity attached to pro forma invoices. If one fails to obtain these within three months, the whole time consuming process must be started again since in all likelihood the new pro forma invoice issued by the supplier will have a different value (to take inflation and other factors into account).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methodology adopted for this study. It looks at the research design, population of the study, sample size and sampling techniques, sources of data, data collection tools and procedure, instrument development and measures, data analysis, validity and reliability of measures, ethical consideration among others. The rest of the sub-sections in comprehensively discusses these in sub-sections.

3.2 Research Design

The nature of this study required the use of survey research design and cross-sectional data. The data for this study were obtained from a field study which was directed and guided by the researcher and the supervisor. The study specifically focused on the building materials manufacturing industry. For this study's purpose, some selected building materials manufacturing firms were used as the focal firms in the industry's supply chain and all investigations, analyses and discussions were conducted in line with the knowledge and experience of key personnel of these companies.

The geographical scope of the study was Accra metropolis in Ghana. The study viewed this selected region as representative of the building materials manufacturing industry in Ghana as majority of the players find themselves in this region and most transformation of this industry emanated from this region. In order to achieve the objective of the study, the researcher a single data collection instrument to reach out to at least 20 respondents per selected building materials manufacturing firm in the selected geographical area. This enabled the researcher to put together adequate respondents to conduct the field study.

3.3 Population of the Study

From the previous sub-section, this study focused on the building materials manufacturing industry in Ghana. The study population involved procurement, stores and warehousing staff of building materials manufacturing firms within the study's geographical setting. Also, the population of the study constituted the staff within the firm's setting who have gained experience and growth. Therefore, operating staff within the firms in Accra were considered for the study.

3.4 Sample Size and Sampling Techniques

For the purpose of this study, there was difficulty in obtaining information on the actual population size of building materials manufacturing firms in the selected region, hence it was necessary to select a suitable sample size for the study which was determined in light of the complexity of issues under investigation and for the purpose of generalization of findings. Therefore, a large sample sized sufficed for the aforementioned issues. Again, there was lack of a sampling frame for the study so it was necessary that non-probability sampling technique be adopted for this study.

Using a purposive sampling technique, selected firms included building materials manufacturing firms in the Accra metropolis. The staff and management responsible for inventory management were covered by this study. These sampling techniques were used to have a good representation of the population. A quota of 20 respondents was selected from each company after several concerns related to sampling representation and adequacy were selected. The overall project was purported to involve 60 respondents in the Greater Accra region. The summary of the sampling for the study as well as the response rate from the data collection have been summarized and presented in Table 3.1.

Table 3.1: Summary of Sample and Data Collected

Company	Quota	Questionnaire Received	Response Rate
E-Facade Ghana	20	19	95.00%
Royal Aluminium Systems	20	20	100.00%
Permafix Industries Gh. Ltd	20	20	100.00%
Total	60	59	98.3%

Source: Field Work, 2023

3.5 Sources of Data

There were two types of data sources that the researcher obtained to provide the necessary input for further analysis of the study. These two types of data sources were primary data and secondary data. Primary data are collected specifically for the analysis desired. Primary data collection usually involves the originated data that has been collected by the researcher for a purpose to delve into a specific research problem. Primary data also known as first-hand data (which is data specifically collected for a particular study) was used for this research. This was carried out in this study by administering of questionnaires by a research team.

Secondary data is a resource on information that has been collected from other alternative source by the researcher or any other authors. For this study, secondary data were collected from various publications to better understand and explain the research problems. These publications include journal articles, periodicals and books, online data sources and research reports.

3.6 Development of Research Instrument and Measures

The researcher did a comprehensive review of existing literature to develop the items for the questionnaire. The measures for the questionnaire were thus adapted from existing instruments which related to the study and were able to measure the respective constructs.

However, the researcher together with the research supervisor and other researchers of the school reviewed the items and scales before the final questionnaire was refined and designed. All the same, concerns from a brief pilot study with proposed participants informed key changes to help fine-tune the final questionnaire.

For this study, it constituted a test of a model so it necessitated an independent variable, which was inventory management practices. However, because it was perceived as a complex construct, it had to be broken down into three sub-dimensions including Lean Inventory System, Inventory Models and Information Technology. The scales and items used to measure these three constructs were adapted from past studies which are summarised in Table 3.1 below;

Table 3.2: Measures, Number of Items and Sources

Variable	Type	Number of Items	Sources
Inventory Management Practices	Independent Variable		Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014)
Lean Inventory Systems (LIS)		5	
Inventory Models (IM)		8	
Information Technology (IT)		6	
Store Performance	Dependent Variable	10	Lopez et al. (2005) and Reinartz et al. (2004)

Using a 7-point Likert Scale, which ranges from “1=Strongly Agree” to “7=Strongly Agree”, all the constructs, thus both the independent variables and the dependent variable were measured.

3.7 Data Collection Procedure and Field Survey

Because the study was quantitative in nature and as such required the use of questionnaire as the main data collection instrument, the researcher administered the questionnaires to the study participants and designated a later date for collection after completion. In order to reduce unreturned questionnaires, the researcher relied on telephone calls to remind the participants on the progress of the responses to the questionnaire.

The field work was conducted during the months of March to June, 2023. The researcher contacted key personnel who hold top positions in the selected building materials manufacturing firms including CEOs, owner-manager or manager to be the main research participant representing the company. These individuals were selected as they were deemed reliable and their responses valid as they handle most of the operations of the business and would understand and appreciate the issues been posed to them concerning inventory management in the building materials manufacturing industry in Ghana.

3.8 Developing Dataset and Data Management

The data was collected comprehensively by the researcher and it was coded and entered into Microsoft Excel. Afterwards, data screening was done and run of basic reliability tests with the aid of Statistical Product and Service Solution (SPSS) software. From this, cases that had issues such as missing values and incompleteness were thereby removed. The reason for this was primarily to improve the quality of the data used for the study's analysis and discussions.

3.9 Unit of Analysis

The nature of the study necessitated that the concepts for investigation be considered on the firm-level. Therefore, the unit of analysis for the study was building materials manufacturing firms in Ghana. As the main interest of this study was the building materials manufacturing firms, all evaluations, generalizations and conclusions were drawn from the perspective of this actor within the industry's supply chain in Ghana.

3.10 Data Analysis

Since the research design was quantitative in nature, it as such called for quantitative approach to data analysis. This was done using both descriptive and inferential statistical tools. Some of the descriptive statistical tools used include frequency tables, percentages means as well as standard deviations. Similarly, inferential statistical tools that were used includes correlational analysis and ordinary least square regression analysis. Also, there was test of validity and reliability of measures/items used to measures the constructs using Principal Component Analysis and Cronbach Alpha respectively with the aid of SPSS software, version 20.

3.11 Research Quality: Validity and Reliability

With reference to section 3.6 of this chapter, the questionnaire used for this study went through rigorous procedures before it was finally developed. Also, the researcher was equipped with appropriate data collection knowledge and skills through workshop and meetings with the supervisor and other researchers in order to collect the right data whiles eliminating any form of bias. The final data gathered were examined and screened before used for analysis. Furthermore, other statistical methods were employed to test if there was any existence of bias as well as the validity and reliability of the instrument.

3.12 Ethical Consideration

For such a study as this, there was the need to place much emphasis on ethical issues related to survey studies at the firm-level. As such, the study was not enforced on unwilling firms but those which willingly accepted to participate were considered. This was ascertained by giving letter of introduction by the school to the researcher to be given to willing firm owners/managers/CEOs in the building materials manufacturing industry in Ghana. The letter was shown or given to the participants explaining to them the purpose of the study to them. By interacting with them through several conversations, their consent and approval to partake in the study was sought and they were assured of absolute confidentiality on their responses and their business. Also, as part of ethical consideration, the data were managed and used solely for the purpose of the study as they were made known to the respondents before data collection.

3.13 Profile of Study Area

The recognition of the Ghanaian private sector as an engine of growth commenced with the introduction of the Structural Adjustment Programme (SAP) sponsored by the World Bank and International Monetary Fund (IMF). The program began in 1986 and was aimed at moving away from the government/state-controlled economy into one that is shaped by the forces of the market. This involved structural and institutional reforms with the aim to privatize state-owned enterprises and promote private enterprises.

Thus, the private sector was to take center stage in making the country's industrial sector competitive internationally through local resource-based industries that have the capacity for exports and efficient import substitution (Ackah et al., 2014). The basic objective of the SAP (1986/7 – 1989) was to lay a firm foundation for the development of a buoyant,

self-reliant and increasingly integrated economy (World Bank, 1987). To achieve this, private sector response was recognized as key to the success of the program.

Therefore, incentive policies were put in place to stimulate growth and investments. These included the maintenance of a stable and attractive environment for the private sector as well as seeking joint ventures for selected public enterprises with foreign and local private investors. It also involved the creation of opportunities that allow for dialogue between the government, business and labour. Institutional measures were also put in place to back such policies (GOG, 1987). The role of the state was therefore limited to the formulation of policies that are conducive for mobilizing private enterprises and initiatives (Sawyer, 1988). In this regard, the direct involvement of the state in the productive and distributive sectors of the economy were reduced or removed. This led to the rationalization and privatization of a substantial number of State-Owned Enterprises (SOE). Indeed, “over 70 percent of some 324 SOEs were divested” (Appiah-Kubi, 2001).

Furthermore, the Private Sector Advisory Committee (PSAC) was formed in 1991 to advise government on how the business enabling environment could be improved for the private sector to thrive. Hence, it examined regulations impeding private sector investments and development. In other words, it was meant to increase private sector investments. In fact, its main recommendations for reform were implemented by the government and was therefore seen to be successful (Ackah et al., 2010). Also, in order to have a stronger voice and to be heard, the Private Enterprises Foundation (PEF) was set up in 1994 as an advocacy group for the private sector in Ghana. The foundation was established as an initiative of a number of business groups such as the Association of Ghana Industries, the Federation of Associations of Ghanaian Exporters and the

Ghana Employers' Association with support from the United States Agency for International Development (USAID). Its membership stood at about 11 as of 2016.

The private sector has been identified as a key player in delivering economic, social and environmental development in both developed and developing countries. It has been recognized as a means to accelerate the growth of economies globally and as a catalyst for helping developing countries achieve rapid industrialization as well as poverty alleviation and other developmental goals, they so much desire.

In view of this, PSD became an integral part of Ghana's economic development strategy beginning with the structural adjustment programme and has since been seen as the bedrock necessary for the development of the country. To this end, a number of initiatives meant to promote the private sector has been in place since the 1980s. In this light, this paper sought to discuss such policies and to highlight the contributions and challenges of the private sector in Ghana.

In general, the private sector in Ghana is characterized by micro, small and medium enterprises that are highly informal. In this vein, policy makers must make the removal of barriers to growth of micro and small enterprises a topmost priority. Also, the formal private sector in Ghana is relatively small. There is therefore the need to increase the size of the formal private sector by making the documentation and registration processes less cumbersome.

For this study, three building materials manufacturing companies in the Accra metropolis were selected namely E-Facade Ghana, Royal Aluminium Systems and Permafix Industries Gh. Ltd.

CHAPTER FOUR

PRESENTATION OF FINDINGS, ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings and analysis of data gathered from the field study. Thus, it presents responses on the study of understanding the inventory management practices of building materials manufacturing firms in Ghana and their effect on store performance. Data were gathered from the field by administering questionnaires to employees of building materials manufacturing firms in the Accra metropolis. Out of the 60 questionnaires that were administered, 59 were received. This represents 98.33% response rate. Analysis was made on only valid responses from the field study. The presentations and discussions of findings were done in line with the structure of the questionnaire and followed the objectives of the study.

4.2 Demographic Information of Respondents

With reference to Table 4.1, the study revealed that 86.4% (n=51) of the participants of the study who are employees of the selected building materials manufacturing firms were males with the remaining 13.6% (n=8) were females. Majority (54.2%) of the respondents aged between 31 – 40 years. This was followed by the next 32.2% and 10.2% who were within the ages of 20 – 30 and 50 years and above respectively. On the educational ladder, majority (35.6%) were HND graduates whereas an equal number (25.4%) had First Degree or Masters qualification with a few (6.8%) being JHS/SHS graduates. With the work experience of the respondents at the building materials manufacturing firms, it was realized that most of them (35.6%) have been with their respective companies for more than 10 years and 28.8% and 27.1% had been working at

their companies from both 4 – 6 years and 7 – 9 years respectively. This is as shown in Table 4.1 below;

Table 4.1: Demographic breakdown of respondents

Variable	Categories	Freq.	%
Gender of Respondents	Male	51	86.4
	Female	8	13.6
Age of Respondent	Less than 20 years	0	.0
	20 - 30 years	19	32.2
	31 - 40 years	32	54.2
	41 - 50 years	2	3.4
	50 years and above	6	10.2
Number of Years Respondent has worked	Less than 1 year	0	.0
	1 - 3 years	5	8.5
	4 - 6 years	17	28.8
	7 - 9 years	16	27.1
	10 years and above	21	35.6
Educational Level of Respondent	JHS/SHS	4	6.8
	HND/Equivalents	21	35.6
	First Degree	15	25.4
	Second Degree	15	25.4
	Other Certificate	4	6.8
Staff Category of Respondent	Management	13	22.0
	Senior Staff	34	57.6
	Junior Staff	12	20.3

Source: Field Work, 2023

It could be seen from Table 4.1 that the demographic information of the respondents has a direct linkage with employee knowledge and perception of inventory management activities at respective building materials manufacturing firms. Given the adequately long years of service of the employees and their educational level, it is believed that the responses provided in relation to the subject of the study is a true representation of the

issues being looked into. The relationship between the demographic information and the objectives of the study are duly discussed below in the following subsections.

4.3 Inventory Management Practices of Selected Building materials manufacturing firms in Ghana

The first objective of the study was to investigate inventory management practices of selected building materials manufacturing firms in Ghana. To ensure this, questions were posed to the staff and management of selected firms in the Accra Metropolis. This section presents and discusses the findings that were revealed from questions posed to these sets of respondents.

Table 4.2 to Table 4.4 shows the various inventory management practices in existence.

Table 4.2: Lean Inventory Systems of Building Materials Manufacturing Firms

Lean Inventory Systems Items	Min	Max	Mean	SD
Operation of Just-In-time (JIT) purchasing system			5.54	
– where no safety stocks are kept	1	7	2.08	1.523
Agreements with supplier for short cycle deliveries (items which doesn't take long to deliver)	1	7	5.37	1.338
Accurate prediction of supplier delivery dates	1	7	5.12	1.598
Operation of materials Requirements planning system (MRP) – where bills of materials are 100% accurate	1	7	1.264	
Little or no expediting	1	7	4.05	1.888

Source: Field Work, 2023

It could be seen from Table 4.3 that building materials manufacturing firms ensure Lean Inventory System (LIS) as an inventory management practice as the mean responses of most of the 5 items used to measure LIS were more than 4.0 which is the midpoint signifying “Indifferent”. It could be seen that the highest response indicating agreement was received from the 4th item: *“Operation of materials Requirements planning system (MRP) – where bills of materials are 100% accurate”* with mean, 5.54 and SD=1.264. This was followed by the second item which was *“Agreements with supplier for short cycle deliveries (items which doesn’t take long to deliver)”* with Mean=5.37, SD=1.338.

However, least response indicating disagreement was received from the first item which was *“Operation of Just-In-time (JIT) purchasing system – where no safety stocks are kept”* with mean and standard deviation values of 2.08 and 1.523 respectively.

This implies that for ensuring lean inventory system as inventory management practice, the building materials manufacturing firms building materials manufacturing firms ensure operation of materials Requirements planning system (MRP) – where bills of materials are 100% accurate, agreements with supplier for short cycle deliveries (items which doesn’t take long to deliver) and it supports previous studies by Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014).

Inventory Model Items			Mean	SD
Your company uses ABC Inventory model	1	7	5.31	1.545
Your company uses Economic Order Quantity (EOQ)	1	7	5.32	1.726
Your company uses Just-in Time (JIT) inventory	1	7	3.10	1.909
Your company uses Economic Batch Quantity (EBQ)	1	7	4.54	2.045
Your company uses Vendor managed inventory	1	7	4.37	2.050
Your company uses Scientific inventory model	1	7	4.97	1.884

Table 4.3: Inventory Models of Building Materials Manufacturing Firms

	Min	Max		
Your company uses Demand forecast inventory	1	7	1.601	5.47
Your company uses Automatic Replenishment	1	7	3.69	2.028

Source: Field Work, 2023

It could be seen from Table 4.3 that Building materials manufacturing firms employ Inventory Models as an inventory management practice as the mean responses of most of the 8 items used to measure inventory models were more than 4.0 which is the midpoint signifying “Indifferent”. It could be seen that the highest response indicating agreement was received from the seventh item: “*Your company uses Demand forecast inventory*” with mean, 5.47 and SD=1.607. This was followed by the second item which was “*Your company uses Economic Order Quantity (EOQ)*” with Mean=5.32, SD=1.726. This was then followed by “*Your company uses ABC Inventory model*”, with Mean=5.31 and SD=1.545.

Other items that measured inventory models and had mean responses between 4.0 and 5.0 also signifying agreements include “*Your Company uses Economic Batch Quantity (EBQ)*”, “*Your Company uses Vendor managed inventory*” and “*Your Company uses scientific inventory model*”.

However, least responses indicating disagreement were received from two items namely – “*Your company uses Just-in Time (JIT) inventory*” and “*Your company uses Automatic Replenishment*” with mean and standard deviation values of 3.10 (1.909) and 3.69 (2.028) respectively.

This implies that Building materials manufacturing firms vehemently employs inventory models as an Inventory management practice as responses indicated such and it supports previous studies by Oballah et al. (2015), Anichebe and Agu (2013) and

Ogbo et al. (2014).

Table 4.4: Information Technology of Building Materials Manufacturing Firms

Information Technology Items	Min	Max	Mean	SD
The company has computerized all inventory management systems	1	7	5.85	1.472
The company's computers are linked with those of suppliers in a real time environment	1	7	2.58	1.684
The company uses Electronic Data Interchange Technology (EDI)	1	7	3.63	2.075
The IT equipment within the company are effective.	1	7	5.98	1.252
The management encourages the use of IT in inventory management within the company. The level of IT usage in inventory management is high within the company	1	7	5.98	1.137
	1	7	6.08	1.149

Source: Field Work, 2023

It could be seen from Table 4.4 which indicates that Building materials manufacturing firms ensure Information Technology (IT) as an inventory management practice as the mean responses of all the 6 items used to measure IT were mostly more than 4.0 which is the midpoint signifying "Indifferent". It could be seen that the highest response indicating agreement was received from the last item: "*The level of IT usage in inventory management is high within the company*" with mean = 6.08 and SD= 1.149. This was followed by the fourth and fifth items which were "*The IT equipment within the company are effective*" and "*The management encourages the use of IT in inventory management within the company.*" with mean and SD values of 5.98 (1.252) and 5.98 (1.137). This was then followed by the first item "*The company has computerized all inventory management systems*", with Mean = 5.85 and SD=1.472.

However, there were disagreements to items 2 and 3 which were “*The Company’s computers are linked with those of suppliers in a real time environment*” and “*The Company uses Electronic Data Interchange Technology (EDI)*” with mean and standard deviations of 2.58 (SD=1.684) and 3.63 (SD=2.075) respectively. This implies that Building materials manufacturing firms make use of Information technology as an Inventory management practice as responses indicated such and it rejects previous studies by Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014).

4.4 Relationship between Inventory Management Practices and Store Performance

The second objective of the study was to test the relationship between inventory management practices and store performance of Building materials manufacturing firms in Ghana. To achieve this, various measures were used to determine the inventory management practices on performance and these measures were adopted from the study of Lopez et al. (2005) and Reinartz et al. (2004) and these include reduction in production costs, enhancement in continuous production, prevention of shortages and stock out, minimizing scrap and rejects, reducing delivery lead time, minimizing machine down time, reduced resource wastages, boost employee work morale among others. A 7 point scale was employed, measuring “1=strongly disagree” through to “4=neither agree nor disagree” to “7=strongly agree”. In all, 10 adapted items were employed to measure store performance. Table 4.5 below shows the descriptive statistics of responses as given by staff of the selected building materials manufacturing firms.

Table 4.5: Inventory Management Practices and Store Performance

				Min	Max		
Mean						SD	
Inventory management enhances organisational competitive position in the industry				5	7	6.31	.676

			6.51	
Development of products and services with high profit margin is as a result good inventory management	5	7	6.10	.687
Reduce production costs	3	7	6.19	.955
Enhance continuous production	5		7.626	
Prevents shortages and stock out	5	7	6.37	.717
Minimize scrap and rejects	2	7	5.64	1.540
Reduced delivery lead time	3	7	6.19	.798
Minimized machine down time	1	7	5.85	1.271
Reduced resource wastages	4	7	6.22	.721
Boost employee work morale	4	7	5.88	.873

Source: Field Work, 2023

From Table 4.5, ten (10) items were used to signify store performance (OPerf) using a 7-point Likert Scale with 1=Strongly Disagree, 4 through to “4=Indifferent” to “7=Strongly Agree. Among the 10 items, the highest mean was obtained from the fourth item: “*Enhance continuous production*” with mean value of 6.51 and standard deviation of .626 which showed absolute agreement. All other items measured more than 5.0 implying the contribution of inventory management and store performance and these include “*Inventory management enhances organisational competitive position in the industry*”, “*Development of products and services with high profit margin is as a result good inventory management*”, “*Reduce production costs*”, “*Prevents shortages and stock out*”, “*Minimize scrap and rejects*”, “*Reduced delivery lead time*”, “*Minimized machine down time*”, “*Reduced resource wastages*” and “*Boost employee work morale*”.

This implies that building materials manufacturing firms in the Accra Metropolis recognize the effectiveness of inventory management in store performance.

4.4.1 Overall Perception of Inventory Management Practices

In sum, although there was variability in terms of the respondents' scores on the inventory management practices identified, the mean score for each construct which is more than 4.0 as shown in table 4.6 generally indicates that an average staff of the manufacturing industry somehow perceives that the identified variables are all inventory management practices. From the one sample t-test performed revealed that the mean values for all the constructs were found to be statistically significant at $p=.01$ or $.05$, and thus providing some level of confidence that the respondents, to some extent, agree that the Lean Inventory Systems (LIS), Inventory Models and Information Systems (IS) are inventory management practices as shown in Table 4.6.

Table 4.6: Overall perception on inventory management practices_ One-Sample

Test	Test Value = 4						
	Mean	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
LIS	4.4339	3.592	58	.001	.43390	.1921	.6757
INVMOD	4.5975	5.171	58	.000	.59746	.3662	.8288
INF	5.0169	7.678	58	.000	1.01695	.7518	1.2821

Source: Field Study, 2023

4.4.2 Measurement Model Analysis

Prior to estimating the theoretical framework developed for the study, it became necessary to assess the suitability of the items used in measuring the constructs. In doing this, two procedures were followed. These included (1) reliability test and (2) performing exploratory factor analysis (EFA). In all, four constructs were assessed.

4.4.3 Reliability of the Measures

In checking for reliability of the measures, Cronbach alpha was used to verify the internal consistency among the measures (Pallant, 2007). This was performed in SPSS version IBM 20. The results shown in table 4.7 indicate alpha values ranging from .517 to .766. This implies that the items used in measuring Lean Inventory Systems and Inventory Models failed. However, all items for the information systems and store performance both passed the initial test of reliability as they were far above the recommended threshold of .70 (Nunnally, 1978). The summary of results could be seen from Table 4.7.

Table 4.7: Reliability Test Results

Construct	Number of items	Alpha value
Lean Inventory Systems	5	.563
Inventory Models	8	.517
Information Systems	6	.766
Store performance	10	.766

Source: Field Study, 2023

4.4.4 Exploratory Factor Analysis (EFA)

Although the results from the reliability test shown in table 4.7 indicate that all the scales for their respective constructs had strong internal consistency, it became necessary to perform exploratory factor analysis (EFA) to help explore the interrelationships among and the dimensionality of constructs (Pallant, 2007). Hence, to demonstrate convergent validity, it was necessary to run EFA on each sub-construct. EFA was found more appropriate as some of the items were developed by the researcher and also the sample size of the study was not large enough to allow for confirmatory factor analysis (CFA). This analysis was performed in SPSS.

Using Principal Axis Factoring and Direct Oblimin with Kaiser Normalization for rotation, with Varimax rotation, four factors were fixed to extract. In all the analyses, the

system was set to extract components with Eigenvalues above 1.0 and also suppress coefficients with smaller loadings (thus, less than 0.50).

The Kaiser-Meyer-Olkin value was **.678**, exceeding the recommended value of .6 and Bartlett's Test of Sphericity reached statistical significance (, supporting the factorability of the correlation matrix (Pallant, 2007).

In stage one, to assess convergent validity, a block-wise technique was employed where each sub-construct was analysed separately to determine if the items that measures it as it should be. In most cases, the analysis failed to produce a single component (thus, two components) with all items loading on it. Hence, convergent validity was not attained.

In the second stage, these retained items were all analysed together. This was done to ensure discriminant validity. The extractions produced only four components with eigenvalues exceeding 1 which respectively explained 41.32% and 33.03% of the variance. Inspection of the inter-correlation among the components revealed the presence of many coefficients above .50.

Given a minimum loading of .50, the following items were retained. For Information Systems, items retained were INF 1, 4, 5 and 6. However, for Overall Performance items, the items retained were OPERF 3, 4, 6 and 9. After dropping the unwanted constructs and items, a satisfactory model was attained with each block of items loading onto its theoretically specified constructs. The remaining items after the EFA can be seen in Table 4.8.

Table 4.8: Factor Loadings and Validity and Reliability Results from EFA

Measures/Indicators ITEM No	Description	Component	
		1	2

Information Systems	INF1	The company has computerized all inventory management systems	.803	
	INF4	The IT equipment within the company are effective.	.897	
	INF5	The management encourages the use of IT in inventory management within the company.	.959	
	INF6	The level of IT usage in inventory management is high within the company	.941	
	OPERF3	Reduce production costs		.898
	OPERF4	Enhance continuous production		.815
Store performance		Minimize scrap and rejects		.565
	OPERF6			
	OPERF9	Reduced resource wastages		.879
Eigenvalues			3.306	2.642
% of Variance			41.319	33.029
Cronbach α				
KMO = .678				
Bartlett's test of Sphericity: χ^2(DF) 349.206 (28); $p=0.000$				

Notes:

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 4 iterations.

Source: Field Study, 2023

4.5 Test of Model

In establishing the effect of inventory management on store performance, correlation and regression analysis were employed.

The main independent variable was Information System (I); while the dependent variable was Store performance (P).

The regression estimates was given as:

$$P = b_0 + b_1 I$$

Where, b_0 = constant of proportionality b_1 =

coefficient of INF independent variable

□□error term

P = Store performance

Table 4.9: Correlations of Variables and Descriptive Statistics

Constructs	1	2
Information Systems (INF)	1	
Store performance	-.048	1
Mean	5.97	6.14
Standard Deviation	1.124	0.752

Note:

** Correlation is significant at the 0.01 level (1-tailed). *

Correlation is significant at the 0.05 level (1-tailed).

Source: Field Study, 2023

The correlation results shown in Table 4.9 above generally revealed that staff of building materials manufacturing firms partly attribute their store performance to information systems as inventory management practice. It could be seen that; information systems have a weak negative association with store performance as the coefficient of association (r) was -.048 and not significant at 0.01 or 0.05.

4.5.1 Model Assessment

The researcher used ordinary least square regression analysis to test the study's model. The main outcome variable was store performance and the predictor variable was information systems as inventory management practice. One Model was run which was store performance and has been predicted by information systems as inventory management practice.

The results to these effect relationships could be seen from Table 4.10

Table 4.10: Regression Estimates of Effect of Information Systems on Store performance

Variables:	Standard Estimates
	Store performance
	Model 1
Hypothesized <i>Direct Effect</i> Information Systems (INF)	-.032 (-.363)
FIT INDICES χ^2	
(df)	0.076(1)
χ^2/df	0.076
F-Statistics	0.132
R ²	0.002

Notes: t-values are in the parenthesis

[±] represents significant F value significant at 1%

* & ** represent significant path at 5% (1-tailed test: 1.645) and 1% (1-tailed test: 2.33) respectively

Hypothesized paths evaluated at 5% significance level (1-tailed test)

Source: Field Work, 2023

From the regression result, it could be seen that information systems as an inventory management practice do not much predict store performance as the R-square value of 0.002 was very low. It implies that only about 0.2% of changes in manufacturing store performance is predicted by logistics and inventory management. Also, it is not significant at 0.01 or 0.05.

The implication of this finding is that information systems as an inventory management practice does not contribute to store performance. The coefficient ($\beta = -.032$; $t = -.363$) makes it clearer that there is rather a negative effect. Therefore, it is important to identify other practices which rather make inventory management a significant predictor of store performance in the building materials manufacturing industry.

4.6 Challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana

The last objective of the study was to determine challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana. In order to achieve this, questions on challenges that mitigate against building materials manufacturing firms in Ghana were posed to respondents to determine their level of agreement. A 7-point scale was employed, measuring “1=strongly disagree” through to “4=neither agree nor disagree” to “7=strongly agree was used to determine the challenges. The responses to this are as displayed in Table 4.11 below.

Table 4.11: Challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana

Challenges	Min	Max	Mean	SD
Delays in delivery of materials leading to insufficient inventories	1	7	4.66	2.170
Use of manual inventory management system/Lack of technology	1	7	3.19	2.255
Lack of training	1	7	3.20	2.091
Holding too much/too little inventory	1	7	4.05	2.004
Bureaucratic process in procurement	1	7	4.71	1.762
Loss of raw materials through inventory shrinkages	1	7	3.66	1.908
Conflict of interest	1	7	3.15	1.864
Weak management system	1	7	3.05	2.063
Overstocking/under stocking	1	7	4.00	2.034

Source: Field Work, 2023

It could be seen that the respondents disagree with most of the items used to determine the challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana. It could be seen from Table 4.11 that most of the responses were less than 4.0 signifying disagreement to those items that the researcher used to determine the challenges of existing inventory management practices of selected building

materials manufacturing firms in Ghana. The challenges that received the highest response was the fifth item: “*Bureaucratic process in procurement*” with mean = 4.71 and SD=1.762. The other challenges that staff respondents agreed that they affect inventory management practices of selected building materials manufacturing firms in Ghana is the first item “*Delays in delivery of materials leading to insufficient inventories*” with mean and standard deviation values of 4.66 (2.170).

On other hand, the staff respondents disagreed to the rest of the challenges posed to them including “*Use of manual inventory management system/Lack of technology*”, *Lack of training*”, “*Loss of raw materials through inventory shrinkages*”, “*Conflict of interest*”, and “*Weak management system*” with mean and standard deviation values of 3.19(2.255), 3.20(2.091), 3.66(1.908), 3.15 (1.864) and 3.05 (2.063) respectively.

This implies that at building materials manufacturing firms in Ghana are not faced by major challenges that mitigate against their existing inventory management practices except for delays in delivery of materials and bureaucratic process in procurement and it supports previous studies by Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014).

4.7 Discussion of Findings and Implications

This study sought to assess inventory management in building materials manufacturing industries in Ghana. There was review of extant literature to come out with some inventory management practices which influence store performance. The identified practices were Lean Inventory Systems (LIS), Inventory Models and Information Systems. These were modelled into a framework and hypothesized paths were tested empirically through the use of a sample of building materials manufacturing firms’ staffs

in the Greater Accra region. Using a 7-point Likert Scale to measure the scales per construct, descriptive statistics were run for the individual constructs and reliability tests were also run before the model was run.

Three hypotheses were formulated indicating all the practices has a positive effect on store performance. However, through validity and reliability tests, the first two could not be tested as the main predictor constructs did not pass and as such removed. Therefore, only the third hypothesis was determined.

The hypothesis postulates that information systems positively influence store performance. The study found support for this assertion. This presupposes that information systems as an inventory management practice has a positive effect on store performance. However, the findings proved otherwise. Information systems rather had a negative effect and it was not statistically significant at 0.01 or 0.05 and R-square value of 0.002 proves that the relationship tested is very weak.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives a summary of the findings of the study, the conclusions and the recommendations for stakeholders to ensure effective and efficient solutions to the challenges of inventory management of selected building materials manufacturing firms in Ghana. These have been discussed in the next sub-sections.

5.2 Summary of Findings

In order to ensure achievement of the study objectives, the summary of the study findings is presented in relation to the objectives of the study. The discussion of the results in the previous chapter shows the following main findings.

5.2.1 Inventory Management Practices at Selected building materials manufacturing firms

The first objective of the study was to investigate inventory management practices of selected building materials manufacturing firms in Ghana. To ensure this, questions were posed to the staff and management of selected companies in the Accra Metropolis. These included E-Facade Ghana, Royal Aluminium Systems and Permafix Industries Ghana Ltd. It was revealed that the selected building materials manufacturing firms make use of some inventory management practices including lean inventory systems, inventory models and information systems. These findings confirm previous studies by Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014).

5.2.2 Effect of inventory management practices on store performance

As part of the second objective of the study, it was necessary to test the effect of inventory management on store performance at the selected building materials manufacturing firms. In order to achieve this, it was necessary to conduct some correlation and regression analysis to substantiate the effect. From the regression result, it could be seen that information systems as an inventory management practice do not much predict store performance as the R-square value of 0.002 was very low. It implies that only about 0.2% of changes in manufacturing store performance is predicted by logistics and inventory management. Also, it is not significant at 0.01 or 0.05.

The implication of this finding is that information systems as an inventory management practice does not contribute to store performance. The coefficient ($\beta = -.032$; $t = -.363$) makes it clearer that there is rather a negative effect. Therefore, it is important to identify other practices which rather make inventory management a significant predictor of store performance.

5.2.3 Challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana

The last objective of the study was to determine challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana. In order to achieve this, questions on challenges that mitigate against inventory management practices at the selected building materials manufacturing firms were posed to respondents to determine their level of agreement.

It could be seen that the respondents disagree with most of the items used to determine the challenges of existing inventory management practices of selected building materials manufacturing firms in Ghana.

This implies that building materials manufacturing firms in Ghana are not faced by major challenges that mitigate against their existing inventory management practices except for delays in delivery of materials and bureaucratic process in procurement and it supports previous studies by Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014).

5.3 Conclusions

Effective inventory management is upheld to be a potential driver for enhancing profit margins. Minimizing total logistics and inventory of cost through identifying an optimum

level of inventory that an organization holds is the way forward. A wellfunctioning inventories management will bring both economic benefit in terms of profitability and bring good image to the company. It will enable the company to undertake projects on time and bring out quality finished products of the company.

When a company implements effective inventories management systems, the firm's efficiency is enhanced. This has an impact on the level of performance in terms of turnover, growth, management and ultimately profitability as purported by previous studies by Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014).

Inventory management ensures that the firm does planning ahead of time to avoid shortages and make sure that right quality of materials is at the right place at the right time. Logistics and inventory management is very important since it enables firms to avoid locking their money in inventories and help build good and permanent relationship with suppliers.

To ensure that the inventory management plans and policies are being followed, it is important to set up effective and efficient monitoring systems. This would include recruiting well qualified personnel to manage the inventory system and set up functioning information systems which will be used to manage the system. Inventory management should not be the preserve of the management and stores or logistics department only but every staff must be made to understand the importance of inventory management.

This study sought to examine the inventory management practices on store performance of building materials manufacturing firms in Ghana. It can be concluded from the study that the selected building materials manufacturing firms have been practicing inventory management. However, its effectiveness and how those practices affect their store

performance is where a challenge is faced. Inventory management do not explain significantly changes in store performance of building materials manufacturing firms. Therefore, pragmatic measures should be put in place to curb such challenges to ensure effective and efficient inventory control among building materials manufacturing firms in Ghana.

5.3 Implications of the Study

5.3.1 Theoretical Implications

The results of the study show that not all the dimensions of supplier selection process are important for improving firm performance. This is in line with previous studies such as Oballah et al. (2015), Anichebe and Agu (2013) and Ogbo et al. (2014) which found a significant positive impact of inventory management on performance of firms. In light with challenges of inventory management revealed in the study, the researcher recommends the following guidelines, necessary to enhance efficiency in the current practices adopted by the manufacturing sector and other stakeholders in their inventory management.

5.3.2 Managerial Implications

There is a need for management to emphasize the importance of inventory management. Inventory management should not be the preserve of only the staffs of the warehouse, stores or logistics department. Each person in the organization must appreciate the importance of inventory control and adhere to related processes, including documenting inventory movements and storing items where they belong not just where there is open space. Dedicating one individual to full-time inventory management provides continual attention to that function, while rotating various oversight responsibilities among other

individuals broadens their understanding of inventory control processes. Such practices also promote accountability and ownership. If this is done, other major problems such as handling materials, shortage of materials etc. of selected building materials manufacturing firms as revealed by the study will be minimized if not removed.

There should be the use of an integrated information system within building materials manufacturing firms to connect and distribute projects related information particularly between staffs in the organization, or that links the company with its suppliers. To this ends, the adoption of enabling technologies such as a Logistics Information System (LIS), often in the form of Electronic Data Interchange (EDI) or Value Added Network (VAN) or the internet are desirable so that different parties in the supply chain can gain access to the needed information for decision making, thereby meeting the market requirements responsively.

Improvement in demand forecasting should be the basis for the company to plan their internal operations and to cooperate among departments to meet market demand. These should define which products will be required, what amount of these products would be called for, and when they will be needed. All forecasting must deal with four major variables that combine to determine what the market condition will be like. Those variables are demand, supply, product characteristics and competitive environment.

There should be improvement in the firms' relationships with suppliers. The most important purchasing activity is to select and keep close relationships with several reliable and high-quality suppliers in order to reduce product cost, maintain good product quality and customer services. Building materials manufacturing firms should improve their relationship with their suppliers by paying them on time, ensuring early placement of orders, free flow of information, and also being honest with them. This is because, it

was discovered from the study that some of the suppliers were reluctant to supply materials when orders are made in situations where the company is indebted to them.

From the findings, the company does not use any recognized inventory management model. The organizational corporate inventory policy must incorporate in its inventory policies efficient and effective inventory models. In an organization like a manufacturing firm where demand is not known with certainty because of improper forecasting, a combination of two or more efficient and effective models are needed to be able to approximate the future with degree of accuracy. The determination of what to order, how much to order and when to order depend on a flexible model. The existence of effective communication infrastructure prepares a fertile ground for Vendor Managed Inventory (VMI) which will instil in the organization operational efficiency. Regressing and simulation models could determine optimum lot-size.

5.4 Recommendations for Further Studies

The findings of this study revealed a negative effect of inventory management on store performance. Therefore, future research in this field should delve much into why this result was found and also in addition, a study should be carried out in respect of effective relationship building with suppliers and its impact on inventory management, as well as the use of integrated information systems in the logistics and inventory management of various inventories in the building materials manufacturing sector.

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APPENDIX
KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
INVENTORY MANAGEMENT SURVEY QUESTIONNAIRE

This questionnaire is part of a project work required by the Kwame Nkrumah University of Science and Technology as a partial requirement for the award of a Master of Science in Logistics and Supply Chain Management degree. The questionnaire is designed to solicit your independent views on “*Examining the Effects of Inventory Management on Store Performance: A Case of Building Manufacturing Firms in Ghana*”. All information provided shall be treated as confidential and used strictly for Academic purpose. Please answer the following questions freely without indicating your name.

PART 1: Background Data

1. Your Gender?
Male ☐ Female ☐
2. What is your age?
Less than 20 ☐ 20-30 years ☐ 31-40 years ☐ 41-50 years ☐ 51 and above ☐
3. Which pharmaceutical firm do you work with?
Pharmacy ☐ Drug Store ☐
Chemical Shop ☐
Other, please specify
4. How long have you worked for the company?
Less than 1 year ☐ 1-3 years ☐ 4-6 years ☐ 7-9 years ☐
10 years and above ☐
5. What is your level of education?
JHS/SHS ☐ HND/Equivalents ☐ 1st Degree ☐ Master's degree ☐
Other Cert. ☐ Other, please specify.....
6. What category of staff are you? Management ☐ Senior staff ☐ Junior staff ☐

PART 2: INVENTORY MANAGEMENT PRACTICES

<u>Strongly</u> <u>Disagree</u>	<u>Disagree</u>	<u>Somewhat</u> <u>Disagree</u>	<u>Indifferent</u>	<u>Somewhat</u> <u>Agree</u>	<u>Agree</u>	<u>Strongly</u> <u>Agree</u>
1	2	3	4	5	6	7
<i>Please the extent to which you agree with the following as practised at your company.....</i>						
Lean Inventory System				1	2	3
1. Operation of Just-In-time (JIT) purchasing system – where				4	5	6
[] [] [] no safety stocks are kept				7		
2. Agreements with supplier for short cycle deliveries (items				which doesn't		
take long to deliver)						
3. Accurate prediction of supplier delivery dates						
[] []						

4. Operation of materials Requirements planning system ☐☐☐☐☐☐☐☐ (MRP) – where bills of materials are 100% accurate
5. Little or no expediting ☐ ☐ ☐ ☐ ☐ ☐ ☐

Inventory Models	1	2	3	4	5	6	7
1. Your company uses Scientific inventory model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Your company uses Just-in Time(JIT) inventory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Your company uses ABC Inventory model	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Your company uses Economic Order Quantity(EOQ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Your company uses Economic Batch Quantity (EBQ)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Your company uses Vendor managed inventory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Your company uses Demand forecast inventory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Your company uses Automatic Replenishment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information Technology	1	2	3	4	5	6	7
1. The company has computerized all inventory management systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The company's computers are linked with those of suppliers in a real time environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The company uses Electronic Data Interchange Technology (EDI)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The IT equipment within the company are effective.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The management encourages the use of IT in inventory management within the company.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The level of IT usage in inventory management is high within the company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART 3: STORE PERFORMANCE

Strongly Disagree	Disagree	Somewhat Disagree	Indifferent	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

Please the extent to which you agree with the following the effect of inventory management on store performance.....

1	2	3	4	5	6	7
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- Inventory management enhances organisational ☐☐☐☐☐☐☐ competitive position in the industry
- Development of products and services with high profit ☐☐☐☐☐☐☐ margin is as a result good inventory management
- Reduce production costs ☐ ☐ ☐ ☐ ☐ ☐ ☐
- Enhance continuous production ☐☐☐☐☐☐☐ 5. Prevents shortages and stock out ☐☐☐☐☐☐☐
- Minimize scrap and rejects ☐☐☐☐☐☐☐ 7. Reduced delivery lead time ☐☐☐☐☐☐☐

