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EXAMINING THE EFFECT OF MATERIAL REQUIREMENT PLANNING ON FIRM PERFORMANCE: EVIDENCE FROM THE MANUFACTURING SECTOR IN GHANA.

By:

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A thesis submitted to the Department of Supply Chain and Information Systems, Institute of Distance Learning, in Partial Fulfilment of the Requirements for the Award of the degree of

MASTER OF SCIENCE IN

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

AUGUST, 2023

DECLARATION

I hereby declare that this submission is my own work towards a post graduate degree in Master of Science in Logistics and Supply Chain Management and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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WO SANE NO BADWENMA

DEDICATION

This work is dedicated to everyone who pushed and encouraged me in pursuing this program.

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ACKNOWLEDGEMENT

I reverence God Almighty for His preservation over me and even more during the period of study. Without Him, I could not have made it successfully through the program.

I would also like to acknowledge the support and guidance of my devoted supervisor, Dr. Samuel Bruce Rockson who amidst his not so free work schedule, has been able to guide me in my study. Dr. Samuel Bruce Rockson made available other means of discovering scholarly materials to complete this thesis.

The contribution of my course mates and friends who willingly shared with me their valuable time and resources during the study cannot be forgotten.

Lastly, I appreciate the special contributions of participants, who helped or were willing to help me in one way or another. You all are part of this success.

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ABSTRACT

Material Requirements Production planning is a technique for planning that helps production managers schedule and place orders for dependent-demand items such as raw materials, component parts, and sub-assemblies in relation to the level of production that they want to achieve. Managers of organisations that manufacture products are well-versed in the role that raw materials play in the day-to-day operations of an organisation. Direct materials play an important role in the production process of the vast majority of manufacturing companies, which in turn affects their performance. Due to inefficient materials management systems, the majority of finished goods are kept in the warehouse rather than being transported to the locations where they will be consumed, which contributes to the inefficiency of the organisation. Therefore, this study is set to analyse the effect of material requirement planning on the performance of manufacturing firms in Ghana. A total of 200 questionnaires were collected and subsequently analysed through a structural equational model. The study revealed that there's a strong, direct, and positive relationship between MRP and FP. In essence, improvements in MRP practises directly contribute to the enhancement of firm performance. a strong, direct, and positive relationship between the use of IT and FP Therefore, effective utilisation of IT in the manufacturing sector in Ghana can directly contribute to improved supply chain performance. Finally, it was revealed that while IT and MRP alone improve firm performance, their cooperation reduces it. This showing that IT moderates the MRP-firm performance link, but not in a positive way. As MRP practises improve, this stimulates better usage of IT, which in turn improves FP. This has the potential to augment the favourable influence of Material Requirements Planning (MRP) on firm Performance (SCP), thereby bolstering the overall efficiency and effectiveness of the supply chain.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Material Requirement Planning, or MRP, is a practise in inventory management that involves the sequencing and adoption of coherent techniques in creating and identifying special inventory and material needs of each company production component for the purpose of efficient and appropriate product delivery. MRP is an acronym for "material requirement planning" (Viswanadham and Narahari, 2015). Since the 1970s, material requirements planning has been an extremely well-liked and generally implemented strategy for controlling many levels of inventories. The widespread implementation of this useful instrument in the management of materials has resulted in a significant drop in inventory levels and an increase in output (Miclo et al., 2019).

The role that inventories play in the operations of an organisation is critical to its success. In almost all manufacturing companies, inventory makes up approximately sixty percent of the company's current assets (Bhattacharya, 2021). Because they maintain such a large quantity of stock on hand, manufacturing companies invest a significant amount of money in their operations. The high risk involved in investing such a huge percentage of funds underlines the necessity for businesses to establish inventory management systems that are effective and efficient so that they can anticipate a high return on investment and improvement in productivity (Padachi, 2006). The goal of effective inventory management is to maintain an optimum level of stock inventory relative to a company's working capital. Inventory management focuses on the efficient management of stock (Chowdhury and Amin, 2007; Makori and Jagongo, 2013; Olusakin, 2014; and Olang and Grace, 2017).

The output of the material requirements planning system provides inventory and production managers with information that is useful to them (Kumar and Suresh, 2006). It does this by providing answers to queries such as "what," "how much," and "when" to order, as well as "when" the manufacturing should be scheduled and "when" the items should be delivered. This lends support to the process of inventory planning and control. It is through this process that the comprehensive planning of the necessary power and materials to fulfil the needs of the primary production table is established (Akintokunbo and Obom, 2021). It plays an important function in determining the order of production priorities and making purchases in accordance with the orders that are scheduled to be placed for the product's components and parts (Imetieg and Lutovac, 2015). Both the statistical forecast of product components and the preservation of inventories to assure timely delivery of resources are facilitated by this practise. It is primarily concerned with long-term material planning and makes use of safety inventories to deal with changes in production (Akintokunbo and Obom, 2021).

According to Kocolu (2011), Alfalla-Luque et al. (2015), and de Mattos et al. (2015), supply chain management improves performance through the efficient use of resources and capabilities via the development of internal and external linkages, thereby creating a supply chain that is seamlessly coordinated (Kocolu, 2011; Alfalla-Luque et al., 2015; de Mattos et al., 2015). It is of the utmost importance to measure the performance of a broad spectrum of tasks, such as logistics, inventory management and warehousing, demand forecasting, and supplier and customer relationship management (McKinnon, 2017; Alicke et al., 2017; and Li et al., 2015), and it is also of the utmost importance to manage such performance through a set of practises at the firm and the supply chain level. This is necessary in order to achieve the goal. Performance is the primary factor that brings to light the strategic aspects of competition that a company has chosen to

pursue (Daddi et al., 2016). The purpose of this study is to evaluate the effect that material requirement planning has on the efficiency of supply chain performance in Ghana's industrial industry.

1.2 Statement of the Problem

Material Requirements Production planning, or MRP for short, is a technique for planning that helps production managers schedule and place orders for dependent-demand items such as raw materials, component parts, and sub-assemblies in relation to the level of production that they want to achieve. Managers of organisations that manufacture products are well-versed in the role that raw materials play in the day-to-day operations of an organisation. Direct materials play an important role in the production process of the vast majority of manufacturing companies, which in turn affects the performance of those companies. Due to inefficient materials management systems, the majority of finished goods are kept in the warehouse rather than being transported to the locations where they will be consumed, which contributes to the inefficiency of the organisation.

According to Zhu et al. (2008), operational performance refers to the effectiveness with which a company is able to manufacture and distribute its goods or provide its services to its clientele. In the research that has been done, there appears to be a general agreement that the primary and most frequently mentioned performance indicators are quality, delivery, flexibility, and cost (Van Looy and Shafagatova, 2016; Chavez et al., 2017; Kaydos, W., 2020; and Trattner et al., 2019). The performance of the supply chain in terms of product quality, customer satisfaction, and cost reduction was demonstrated by Akintokunbo and Obom (2021). The studies utilise product quality,

customer satisfaction, and cost reduction as the measures for determining supply chain performance. This is in light of the studies that came before it.

Based on the findings of empirical investigations, it appears that relatively little study has been conducted in the field of material need planning (Akintokunbo and Obom, 2021; Ptak and Smith, 2016). Akintokunbo and Obom (202), reported on how firm material requirement planning affects performance, with the result being a lack of appropriate justification due to a lack of intervening variables. This was the result of their investigation into how firm material requirement planning affects performance. Fatorachian and Kazemi (2021) suggested that the findings regarding the direct impact of material requirement planning on performance were not credible due to liable mediation mechanisms, which were omitted in the vast majority of studies. They claimed that this was the reason for the lack of credibility of the findings. This research investigates the impact that material requirement planning has on supply chain performance as well as the role that information technology plays as a mediator in the relationship between the two.

1.3 Objectives of the Study

The main objective of the study is to analyse the effect of material requirement planning on supply chain performance of manufacturing firms in Ghana. The study specifically addressed the following objectives:

1. To examine the effect of material requirement planning on performance in the manufacturing firm in Ghana.
2. To assess the relationship of information technology and performance in the manufacturing firm in Ghana.

3. To investigate the mediating effect of information technology on material requirement planning and performance.

1.4 Research Questions

This research sought to achieve these stated objectives by answering the following questions on the research.

1. What is the effect of material requirement planning on performance in the manufacturing firm in Ghana?
2. What is the impact of information technology on performance in the manufacturing firm in Ghana?
3. What is the mediating effect of information technology on material requirement planning and performance?

1.5 Significance of the Study

This study contributes to stakeholders, such as managers, customers, and strategic partners (such as investors), in their efforts on material requirement planning and how it affects supply chain management. These stakeholders include customers, customers, and investors. The study is advantageous for every manufacturer or supplier looking to increase sales performance, and it will help managers become effective at each stage of the customer's buying process. Ultimately, sales efficiency, the speed at which each task in the sales process is carried out, will help earn the business on the right terms and in the right time period.

According to the findings of the study, effective material requirement planning (MRP) has a significant role in the supply chain performance of manufacturing companies. This is because MRP contributes to proper inventory planning, which in turn makes the

production process more consistent. In conclusion, the research contributed to the existing body of knowledge by expanding on how manufacturing companies in Ghana, which is considered a developing region, might make use of material requirement planning to influence the operational performance of manufacturing companies there. In addition, the research was useful as a reference for other individuals who could be interested in conducting research that is connected to the variables that were used in the study.

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1.6 Scope of the Study

Context, geography, and time frames are the three main categories that make up the scope of the study. In terms of location, the research was conducted on a sample of manufacturing companies located in Kumasi, which is located in the Ashanti region of Ghana. The background of the study consists of material need planning, information technology, and the performance of supply chain operations. In addition, the survey takes a cross-sectional approach with regard to the time frame under consideration.

1.7 Summary of Methodology

McChesney and Aldridge, (2019) found that if your research philosophy is positivism, then your research approach will invariably be a quantitative approach. In light of this, the research used a quantitative research approach and an explanatory design to investigate the impact that material requirement planning has on the supply chain performance of manufacturing companies in Ghana. The data for the study was collected using a cross-sectional survey strategy, which was the method that was used to address the study objectives. Because this was a study conducted at the organisational level, the organisational level itself served as the unit of analysis for the

study. The research makes use of first-hand accounts and information. In order to collect primary data, the major instrument that was used was a structured questionnaire. As a direct consequence of this, the number of participants in the study's sample was 150. (150). Version 26 of SPSS was utilised in order to carry out the data analysis. Specifically, descriptive statistics such as means and frequencies were used to characterise the quality of the data as well as to offer quantitative descriptions in simplified summaries. These statistics were utilised in this manner because of the dual purpose that they serve. In addition, regression analysis was utilised in order to investigate the degree of statistical relationship that existed between the variables within the context of the study's preconceived hypotheses in order to arrive at the results of the study.

1.8 Limitations of the Study

The limitations of the study will be best concluded at the end of chapter four of the study.

1.9 Organisation of the Study

The work is grouped and shown in five chapters. It starts with the general introduction; background of the study, statement of problem, objectives of the research and questions of the research which needs to be answered at the end of the research, the research relevance, scope and limitations of the study were presented in the first chapter. The second Chapter presents the literature review that discusses relevant literature which supports the work. The third Chapter describes the methodology of the study. The section critically addresses the research design, population, sampling technique, data collection and analysis technique. The fourth chapter discusses the findings of the

study. This throws more light on the study. The final chapter summarizes the findings of the study, conclusions and recommendations.

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents a relevant literature review on the topic *"The Effect of Material Requirement Planning on firm Performance, Evidence from the Manufacturing Sector in Ghana."* The chapter is organised in five (5) main sections as follows: Section 2.1 presents the conceptual literature review, discussing concepts such as material requirement planning, information technology, and supply chain performance, while Section 2.2 presents the theoretical review, which is the Theory of Constraints. Section 2.3 presents the empirical reviews and hypothesis formulation, while the conceptual framework is presented in Section 2.4.

2.1 Conceptual Literature Review

This section of the literature review presents the conceptual review. In particular, the main constructs used in this study are material requirement planning, information technology, and supply chain performance.

2.1.1 Material requirement planning (MRP)

There are numerous approaches to defining and conceptualising the process of material needs planning. Akintokunbo and Obom (2021) define material requirements planning as a collection of sequential, fundamental, and coherent techniques for deciphering the primary production arrangement to the desired needs of each component of the inventory and categorising appropriate approaches for them through scheming special boundaries. Material requirements planning is described as a collection of sequential, fundamental, and coherent techniques for deciphering the primary production

arrangement to the desired needs of each component of the inventory. It is also defined as a collection of sequential, essential, and logical techniques for converting the primary creation plan to the constituent parts of the final product. These techniques include the issuance of purchase or manufacturing orders in order to implement primary scheduling within the specified cost and time constraints (Milne et al., 2012). Also, at its core, MRP is a time-phased order release system that, under ideal conditions, plans the order releases for needed dependent demand inventory items in such a way that they arrive precisely when they are needed (AbdAlrhman, 2018).

Additionally, according to Carazas et al. (2019), MRP is a technique for inventory management that makes use of the resources provided by computer software to manage inventories. It does this by dividing the demand for inventory into precise time intervals in order to keep inventory levels at optimal levels and guarantee continuous output (Akande, 2019; Dolgui et al., 2013; Souza, 2014). Its purpose is to answer questions regarding what is necessary, when it is required, and how much is required. MRP is helpful in predicting capacity requirements and allocating production periods to guarantee satisfied customers (Adiele and Ihunwo, 2021). It has also been demonstrated that this approach is helpful in inventory management, which is necessary in order to fulfil production requirements such as rapidity, dependability, and adaptability (Souza, 2014; Muchaendepi et al., 2019; and Jacobs et al., 2018). So, MRP has been linked to the performance of operations by reducing the risk of inventory obsolescence, stock outs, and excess stock levels while improving material flow, customer satisfaction, and product quality (Adiele and Ihunwo, 2021; Akintokunbo and Obom, 2021; Munyaka and Yadavalli, 2022).

2.1.2 Information Technology

The term "information technologies" (IT) refers to any set of tools that are intended to facilitate communication between two or more parties (Benckendorff et al., 2019). Because it can be used to analyse data, store data, and move data from one location to another, information technology has become an increasingly crucial part of our day-to-day lives (Hammi et al., 2018). IT is regarded as a critical source for gaining a competitive advantage, innovation, and sustainable industrial systems, and it plays a critical role in our production process, material management relationships with providers, and client relationships. In addition, IT is regarded as a critical source for gaining a competitive advantage, innovation, and sustainable industrial systems (Qiu et al., 2020). According to Büyükozkan and Gocer (2018), an IT-enabled supply chain is gaining popularity in the supply chain literature as a need for the successful operation of a business. This is the argument that the authors make.

In particular, the term "IT infrastructure" refers to the collection of components that include the computing platform, communication networks, shared data devices, essential software, and essential data processing applications, among other things (Tseng et al., 2011; Swafford et al., 2008). According to Swafford et al. (2008), the adaptability of information technology is dependent on the degree to which its components are modular, how well they interact with one another, and how well they fit together. The ability to connect any IT component to other components within the company or with channel partners and the ability to modularize any IT component into smaller pieces so that it is easier to maintain and replace are the two primary characteristics that define a flexible IT infrastructure. (Swafford et al., 2008) Connectivity means that any IT part can be linked to other parts within the company or with the help of channel partners.

It is of the utmost importance to have a supply chain that is enabled by information technology, particularly in companies that provide logistics services. This is because these companies often do things that require them to do more than one thing (Burkinshaw, 2018). for example, from the warehouse to a third-party logistics firm to the final delivery to customers. So, you could say that information technology makes it easier for people in different organisations to talk to each other and share information huge benefits come to businesses that put an emphasis on their information technology infrastructure. It is possible that implementing information technology will make a big difference in how well the supply chain works as a whole, but only if the organisation is able to understand what the technology can do and make sure that all processes run smoothly (Lohmer et al., 2020).Some researchers also think that IT-enabled supply chains can help break down the traditional barriers between activities within a company or between the company and its channel suppliers. This leads to the development of dynamic capability and operational capability for the organisation in question (Irfan et al., 2019; Warner and Wager, 2019; Keijser et al., 2021; and Tian et al., 2021). These findings were published in Irfan et al., 2019.

The development system and information technology, which have already spread to many parts of life, not only help people process data, but they are also quickly changing to help managers make decisions that will help a company make a better plan. This is one of the many ways in which the development system and information technology have improved people's lives (Tyagi et al., 2020). Many companies have used advanced systems and information technology to give themselves an edge in the past. IT can store a large amount of data and help with the process of submitting data (Dash et al., 2019). But not all businesses have made the most of what modern information systems and technology have to offer.

2.1.3 Firm Performance

As a direct response to the unsteady state of the commercial marketplaces and the imperative to maintain effective command over their operations, companies are working hard to boost their overall performance (Li et al., 2021). The ability to understand and put into practise supply chain management is now a necessary precondition for maintaining one's position as a competitive participant in the global race and improving one's performance (Karimi and Rafiee, 2014; Sundram et al., 2016; Al-Shboul, 2017). The vast majority of companies have come to the realisation that increasing operational efficiencies within an organisation is insufficient and that a significant increase in their chances of survival can be achieved by making their supply chain management more competitive in comparison to that of their competitors (Hamisi, 2021; Al-Shboul, 2017; and Roh et al., 2014). In today's competitive market environment, the growth and long-term survival of any business organisation is heavily dependent on its capacity to provide value to customers in the form of high-quality goods and services that can be purchased for a price that is relatively lower than what the customers were previously paying (Akintokunbo and Obom, 2021). Customers define and patronise what they perceive to be valuable, and this patronage transforms into benefits of many kinds, which can be considered the firm's performance. Customers define and patronise what they perceive to be valuable.

The degree to which businesses are successful in accomplishing their goals can be measured by their firm performance. Consider the notion that performance is a phrase or construct employed in the world of business that is applied to the analysis of the health of a company (Garg, N., 2017; Dugguh and Dennis, 2014; Eldor and Vigoda-Gadot, 2017; Bailey et al., 2017). Competition now takes place not between individual companies but among their supply chains. According to Gawankar et al. (2017), firm

performance is concerned with the actual output or results of an organisation as measured against its intended outputs (or goals and objectives) aimed at surviving and remaining in business in spite of the competition. In other words, firm performance is concerned with how well an organisation is able to remain in business in spite of the competition. Researchers from a variety of backgrounds have come up with a variety of distinct criteria that they believe should be considered the fundamentals of effective firm performance. (Gimenez et al., 2012) says that the overall performance of the firm can be broken down into three categories: financial performance, product performance, and operational performance.

The term "firm performance" refers to the degree to which an organisation is successful in achieving both its financial and its market-oriented objectives simultaneously (Qrunfleh and Tarafdar, 2013). The primary short-term goals of supplier relationship management are to boost productivity and cut down on the amount of time needed to turn over inventory. The long-term goals of supplier relationship management are to boost market share and profit for all participants in the firm through the delivery of high-quality products and increased levels of customer satisfaction in a manner that is both cost-effective and efficient (Njagi and Shalle, 2016; Thakkar et al., 2012). Hugos (2018) defines "firm performance" as the culmination of "purchasing effectiveness" and "purchasing efficiency." The term "performance," in reference to the firm, refers to the degree to which a predetermined objective is achieved through the execution of a certain plan of action. Performance in the firm is measured by the extent to which the supplier relationship management function is able to realise its planned goals while using the fewest possible resources available to the business and to the satisfaction of its clients (Agango and Achuora, 2018).

2.2 Theoretical Literature Review

This section of the literature review presents the theoretical review of the study. There is one main theory, which has been presented and discussed in this study. Namely: theory of Constraints. This theory gives us a way to look at requirement planning and firm performance from all angles and learn more about them. The theory is elucidated below.

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2.2.1 Theory of Constraints (TOC)

Dr. Eliyahu Goldratt and Jeff Cox came up with the Theory of Constraints (TOC). This is a management and manufacturing idea. It is based on the idea that every complex system has a simple part that makes it work. To put it another way, every system has at least one limitation, which is anything that limits the ability to generate more of the system's specified purpose (Klein et al., 2015). TOC looks at the whole organisation and tries to figure out what is holding it back from reaching its full potential (Cox III et al., 2010). The TOC sees a corporation not as a single entity but rather as a network of separate but connected links (Rosenthall and Horn, 2013). The sum of the efforts put forth by the system's individual components, known as links, determines the system's overall performance. Also, any disturbances or fluctuations that happen at any point of this connected system, i.e., the manufacturing and distribution of products, will eventually show up further down the line in the connected links, which will affect the delivery to the consumer (Ralston and Blackhurst, 2020). Over the last few decades, many studies have been done to look into and analyse the effectiveness of TOC (Naliaka and Namusonge, 2015; Atnafu and Balda, 2018; Taifa and Vhora, 2019) in terms of increasing corporate revenue and reducing inventory, lead time, and cycle time

at the same time, which gives a significant competitive advantage (Naliaka and Namusonge, 2015; Atnafu and Balda, 2018; Taifa and Vhora, 2019).

Literature on strategic inventory management says that the theory of constraints is important for reducing waste by recognising all stages in the value stream and minimising actions and procedures that don't add value. This leaves only a flood of value-adding activities that improve performance. This is made possible by the value stream theory's ability to see all of its stages (Rahani and Al-Ashraf, 2012). Also, the theory of constraints is important because it helps manufacturing companies figure out what order-fulfillment strategies they can use to do a great job of meeting customers' growing expectations and variations in products. This is because the theory of constraints helps manufacturing firms see the different ways, they can fill orders (Akintokunbo and Obi, 2021). In a similar way, the theory of limitations can cut down on investments in stock and make sure that holdings are spread out in the best way possible by using a wide range of inventory control techniques and systems (Wang, 2016) to find the right amount of stock. The theory of constraints also plays a big role in making sure that the value of each measurable process and stage goes up. Measurements should be done regularly by comparing the value of the product before and after the process in terms of increased sales and market share. This is done in an effort to improve the manufacturing output efficiency or system performance (Ravelomanantsoa et al., 2019).

2.3 Empirical Literature Review and Hypothesis Formulation

This section presents an empirical review of the study in relation to the established objectives. Several studies have been conducted to investigate the relationship between material requirement planning and a firm's supply chain performance, as well as the

mediating factors that influence material requirement planning and firm performance. In this rendition, the empirical review is divided into three sections as follows: The section 2.3.1 empirical studies on material requirement planning and firm performance, the section 2.3.2 empirical review on material requirement planning and information technology, and the section 2.3.2 presentation of related studies on information technology, material requirement planning, and supply chain performance

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2.3.1 Material requirement planning and firm performance.

Fatorachian and Kazemi, in their paper from 2021, look into how the fourth industrial revolution might affect the way firms work. Inductive reasoning was used in the study. This type of reasoning tries to look ahead to future research by shedding new light on the topic at hand and giving new insights into the topic at hand. It is anticipated that the implementation of technologies that enable Industry 4.0 will result in significant performance improvements in the firm. These improvements will happen because a holistic approach to firm management will be made easier. This will be made possible by integrating the firm in a lot of ways and making sure everyone shares information and is honest in the firm.

Atnafu and Balda (2018) look into how an organization's inventory management practises affect its performance and ability to compete on the market. With the help of structural equation modelling (SEM), the proposed hypotheses and links in the conceptual framework were looked into.According to the findings, increased levels of inventory management practise can lead to greater organisational performance as well as enhanced competitive advantage. Additionally, a competitive edge can have a direct and beneficial influence on the success of an organisation.

Tarafdar and Qrunfleh (2017) look into how a firms practise affect how firm strategy and firm performance work together. Specifically, they focus on the role that firms practises play as a mediator. By looking at the theoretical lenses of complementarity and the information processing view of the firm , the study tested the idea that strategic supplier partnerships are a "mediator" between firm strategy and firm performance.

Leung et al. (2016) conducted research to explore the effect that broad inventory management practises have on the availability of important medications in Zambia's health clinics. These results were repeated very well by simulation studies, and they were linked to the usage of averages of the most recent past monthly issues as well as the lack of present inventory control rules to reflect the variability of lead times. It was found that the changes to the inventory policy that are now being pushed for wouldn't make a big difference in the availability of products.

Yang and Fan (2016) examine the effects of three different information management systems on the reduction of the disruptive effects of disruptions. When considering stability, the previously established stability bounds in a two-echelon instance are reexamined and changed using a new method. This reveals that prevalent information management strategies do not appear to be more stable than traditional ones. [Citation needed] The results show that the best firm is one where planning, forecasting, and restocking are done together and everyone has access to a lot of information about the firm.

Akam's (2020) study is to investigate the relationship between supply chain planning and business performance in Nigeria. The most common descriptive statistics are the mean, the standard deviation, the median, the mode, and the percentage. The findings

of the study indicate that the planning of supply chains has a strong and favourable association with the success of businesses.

Akintokunbo and Obom (2021) conducted research in Nigeria to investigate the relationship between material requirement planning and firm performance. The study used an explanatory research design and a causal style of investigation to carry out its research. The results showed that there is a statistically significant and positive correlation between material requirement planning and firm performance. According to the study's results, managers of companies should use a strategic approach to run their material and inventory operations in order to improve the performance of their firms. Following the aforementioned discussion, the research came to the conclusion that:

H1: There is a positive relationship between Material requirement planning and firm performance

2.3.2 Material requirement planning and information technology.

Shen et al. (2016) investigate the most recent research published on inventory management in the fashion business. The existing body of research is arranged in this study according to four of the most common types of research methodologies. These are the analytical, empirical, case study, and simulation research methodologies. According to the findings, the most important aspects to improve inventory management are ownership of the inventory, information technology, and incentive programmes for boosting the effectiveness of the use of the inventory.

However, Fetrina et al. (2017) show in their research that inventory reports, such as maintenance process reports, are also done by hand and written down on pieces of paper that have not been compiled into a single database. This is something that the

researchers found. This indicates that the information included in those reports is at risk of being altered or lost. In addition, the process of assigning tasks and monitoring their completion is still done manually, either with the aid of a memo or even verbally, which ultimately results in reports that are not documented. Rapid Application Development and Object-Oriented Approach with Unified Modeling Language were the development and design methodologies that were implemented for the system. The results of this research project show that an inventory management information system has the potential to both help with and manage the tasks that go along with managing an inventory. These tasks include controlling and monitoring, maintaining, assigning, and reporting.

Dhodi (2018) investigates the ways in which the utilisation of information technology changes the stock management practises of industrial enterprises in Mogadishu. The data collected was then analysed using descriptive statistics in SPSS. According to the findings of the study, the majority of manufacturing enterprises in Mogadishu employ information technology for inventory management. Furthermore, the study demonstrates that information technology has an effect on the inventory management practises of the organisation.

The goal of Nurrohmah and Nugraha (2021) is to make it easier for officers to do physical checks of equipment using data that is already available, to make it simpler to learn the information of equipment that is located in branch offices, to make it possible for information about equipment to be accessed over the internet even when working hours are limited, and to reduce the number of instances in which data is lost or duplicated.

The goal of Zhang and Gong's study (2020) is to look at how cloud computing and the 5G Internet of Things can be used to manage and share information about supply chain inventory. The article proposes conducting a quantitative analysis of the bullwhip effect, develops a mathematical model of the bullwhip impact in the supply chain, and makes use of quantitative analysis to investigate the value of information sharing within the firm. The results show that using cloud computing technology in firm management creates a platform for sharing information within firms, improves the operational efficiency of firms management as a whole, and makes it possible for businesses to work together and share information within supply chains. Based on the numerous assertions, the investigation came to the conclusion that:

H2: there a significant relationship Material requirement planning and firm performance.

2.3.3 Information technology, material requirement planning and firm performance.

Kochan et al. (2018) investigate the role that computing plays as a facilitator of electronic supply chain management systems in multi-echelon hospital supply chains. These systems improve collaborative information exchange among firm participants. According to the conclusions of this research project, the sharing of information via cloud computing enhances visibility in healthcare firms. The responsiveness of a hospital tends to improve whenever there is more visibility into the firm. Since an organization's inventory is often its most valuable asset, Atnafu and Balda (2018) look into how the use of technology to control inventory might affect the overall performance of an organization.

Radio Frequency Identification (RFID) is a sort of technology that can be used to keep track of inventory, enhance the organization's financial performance, and increase the organization's capacity to respond to the needs of customers. RFID stands for radio frequency identification. According to the findings, radio frequency identification has the potential to improve organisational performance in terms of lowering inventory carrying costs in the warehouse. This could be done in a number of ways, such as by lowering the price of stock that is about to expire, making more space in a warehouse, making sure inventory levels don't go too high, or lowering the cost of labor.

The study by Tarafdar and Qrunfleh (2017) investigates the influence that firm (F) practises have on the relationship between agile supply chain (ASC) strategy and F performance. Specifically, they focus on the mediating effect of F practises. The relationship between ASC strategy and F performance, according to the results, is mediated by strategic supplier partnerships, customer relationships, delay, and lean methods.

Basheer et al. (2019) set out to investigate the relationship between total quality management practises, supply chain management practises, information technology capabilities, supply chain technology adoption, and firm performance. It would appear that competencies related to information technology and adoption of supply chain technology are both acting as mediators between total quality management practises, firms practises, and the performance of the firm's supply chain. Based on the results of the empirical studies, the research suggested that:

H3: Information technology will significantly mediate the relationship between material requirement planning and fiem performance.

2.4 Conceptual Framework

The conceptual framework is a graphical presentation of relationships among constructs. In this present study, a conceptual framework is presented on the effects of material requirement planning on firm performance in manufacturing firms. Based on this assumption, Figure 2.1 is presented.

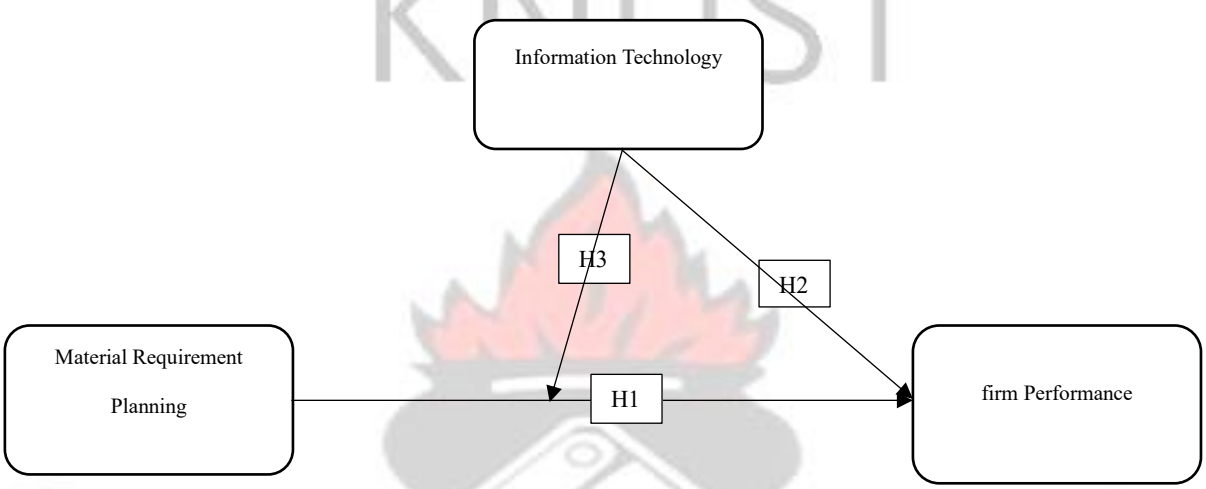

Figure 2.1: Conceptual Framework

Source: Author's Construct based on existing literature

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the data, methodology, and strategies employed to investigate "the Effect of Material Requirement Planning on Firm Performance Evidence from the Manufacturing Sector in Ghana." The chapter is organised into six (6) main sections as follows: Section 3.1 presents the research design, while Section 3.2 presents the population of the study. Section 3.3 presents the sample and sampling techniques, while Section 3.4 discusses the data and data collection for the variables used in the study and how they are measured. Section 3.5 presents the validity and reliability of constructs and variables, while the final section 3.6 presents ethical considerations.

3.1 Research Design

The philosophical worldview of positivism serves as the basis for this research endeavor. The positivist worldview is predicated on the idea that the social world is one that is concrete and objective, and that it is only possible to study it by using techniques that prevent the influence of humans from clouding one's perception or understanding of it (De Laine, 2000). Positivism believes that reality is objective, and objectivity is always associated with quantitative research based on the principles of the natural sciences and relies on the assumptions of an objectivist view of the social world (Goduka, 2012; Ryan, 2018). Eyisi (2016) established that if the research philosophy is positivism, then the research strategy will inevitably be a quantitative approach. Research may be conducted using any combination of quantitative, qualitative, or mixed methodologies. These are the three primary categories of research methodology (Dawadi and Giri, 2021). In light of this categorization, the researcher chooses to

approach the study in a quantitative manner. This is due to the fact that the research relies on the collection and analysis of numerical data, in addition to the testing of statistical hypotheses that adhere to the quantitative technique.

Mohajan (2020) provided evidence that quantitative research methods are effective by arguing that quantitative research explains a phenomenon by first collecting numerical data and then analysing that data using mathematically based methods such as statistics. This demonstration showed that quantitative research methods work very well. A descriptive case study method is also used for this research since the primary emphasis is on quantitative aspects. In addition to the aforementioned, the present study also made use of explanatory research. This is due to the fact that the study aims to examine the cause-and-effect links that exist between the constructs. According to Gustafsson (2017), a "case study" is a kind of research design that investigates a single instance, a small number of cases, or the population as a whole in considerable detail to determine a characteristic or feature of that group. The explicit case study design proposed by Hancock, Algozzine, and Lim (2021) is a method of doing research in which a survey is administered to a case, which may consist of a particular sample or the whole population of persons.

3.2 Population of the Study

People, places, and things that all have a certain quality or piece of information in common are what make up a population, and researchers are interested in studying them (Krauss, 2005). Wang and Cheng (2020) proved that a population is a specific or real group of individuals from whom a study's sample is gathered or researched in a particular research project. This definition of a population is supported by the findings of the aforementioned researchers. Additionally, target populations consist of a group of

other units in addition to a group of individuals for whom the researcher aims to generalise the results of the study (Etikan, Musa, and Alkassim, 2016). Cities, institutions, families, and communities are some examples of what may fall under this category (Guest et al., 2017). In the context of this study, the population of interest is comprised of anyone who works in the manufacturing sector in Ghana. Employees of manufacturing enterprises based in Kumasi, which is found in the Ashanti region of Ghana, make up another part of the study population.

3.3 Sample and Sampling Techniques

Sampling, as shown by Fletcher and Plakoyiannaki (2011), incorporates the researcher's choices of sampling procedures, sample size, and analytical level. Limited resources, such as funding, ease of access to respondents, and amount of time at the researcher's disposal, demand the selection of a sample from the complete population of residents and providers to whom observations and conclusions are made (Denscombe, 2017). The study used both probability and non-probability methods to pick its sample. Moreover, purposive sampling is used in the study to locate respondents who are working in strategic sections of the manufacturing businesses. The use of predetermined criteria facilitates this selection process, which in turn includes and excludes certain groups of people.

In addition, the primary goal of selecting a sample size that accurately mirrored the population was to allow the study to extrapolate findings from the sample to the larger population (Gobo, 2008). One hundred and fifty (150) employees from the selected manufacturing companies participate in the study's sample. The study's final respondents were drawn from a stratum composed of personnel from throughout the firm. Using stratified sampling, the study can be certain that our data is representative

of the population at large and can get more nuanced insights about firm responsiveness and order fulfilment.

3.4 Data and Data Collection

This section highlights and explains the procedures used in collecting data. The section is in two (2) sub-sections. Section 3.4.1 indicates the sources of data whiles second section 3.4.2 describes the Data Collection Instruments for the study.

3.4.1 Variables Description and Measurement

Measures that were used in gathering data to address the research objectives were adopted from existing literature. The questionnaire was closed-ended and was used to solicit responses from the study respondents. The questionnaire was structured in a way that will enable easy understanding by respondents so that reliable responses can be provided. The questionnaire was structured on a five-point Likert scale, and the measurement will range from strongly disagree to strongly agree. The measurement scale will consist of the following: "1" = strongly disagree, "2" = disagree, "3" = neutral, "4" = agree, and "5" = strongly agree.

3.4.2 Data Collection Instruments

The most popular instruments for the gathering of data for research purposes are questionnaires and interviews. In order to gather data to address the research objectives, secondary data was extensively reviewed to obtain measures or items that could be used to develop a questionnaire. As a result, questionnaires primarily served as the instrument of data collection, considering the quantitative nature of the research. Personnel serving in various top managerial capacities of the selected manufacturing

firms were administered a questionnaire that contained measures that sought to obtain relevant data that could facilitate the investigation of the effect of material requirement planning on firm performance in the manufacturing sector in Ghana. The structured questionnaire sought to gather data concerning the background information of the respondents and their firms. This background information and profile of the sampled companies comprised Section A of the questionnaire. The remaining sections contained measures or items that sought to gather the needed data to address the study objectives. All sections were entirely made up of closed-ended questions.

3.5 Validity and Reliability of Constructs/Variables

According to the recommendations made by McCrudden et al. (2019), the researcher makes use of a variety of methods in order to guarantee the validity and reliability of this study. First, the researcher conducts a pilot study to evaluate the instrument that will be used to gather data and establish its reliability and validity. As a result of this, the research project used the data collection instrument to gather information from a sample of thirty respondents who work in the manufacturing business but not for any of the sampled companies. This affords the study the opportunity to determine how respondents understood the research questions, which in turn affords the study the opportunity to facilitate the chance to correct and refine questions while simultaneously enhancing the clarity of questions, which ultimately results in reliable and valid answers to research questions (Persaud, 2012a).

In addition, consideration is essential in research projects because it enables researchers to evaluate the precision and reliability of the scales that are being used in the measurements. This is an important reason why consideration is essential in research projects. The Cronbach's alpha test is used in order to ascertain whether or not the

conceptual frameworks utilised in the current investigation are internally consistent. It was determined that the concept lacked adequate internal consistency when the Cronbach Alpha test rate was 70% or 0.7. Any construct reported at a level lower than this demonstrates an inadequate degree of internal consistency. The component analysis method was used in order to arrive at a conclusion on the reliability of the measurement scale. It is required to have a sufficient number of key hypotheses in order to carry out an appropriate factor analysis. For instance, in order to be regarded as statistically valid, the Kaiser-Meyer-Olkin (KMO) values must be at least fifty percent (0.5), and the likelihood of Bartlett's Test of Sphericity must be statistically significant. Both of these conditions must be fulfilled (p-value less than 0.05). Aside from that, the factor loadings of the components or items must be larger than 0.6, and the average variance extracted (AVE) must be greater than 0.5 or equal to 1. This is in addition to the previously mentioned requirements (Shrestha, 2021).

3.6 Ethical Consideration

The purpose of this research can only be accomplished with the help of the many respondents who will be surveyed for it, in addition to the provision of previously published material that is pertinent to the topic by a number of the study's authors. When it comes to ensuring the effectiveness and validity of a study's conclusion, some ethical considerations are very essential. In this way, the research is carried out with the highest possible level of honesty. To begin, the relevant department will be contacted to request an introduction letter, which will then be used to facilitate the researcher's access to the sampled manufacturing companies. In addition, respondents will be given the assurance that the confidentiality of their replies, in addition to the anonymity of their names, as well as the use of the data supplied for the sole purpose of academic

research, will be maintained at all times. Existing literature, from which crucial material will be collected in order to make this research more manageable, will be adequately credited and referenced throughout the process. In order to achieve the goals of the research, the information that was acquired will be appropriately analysed, and the results will be presented without any of the data being altered in any way. This will guarantee that the study's conclusion is both trustworthy and valid.

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CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter presents the results and discussions on the topic the Effect of Material Requirement Planning on Firm Performance: Evidence from the Manufacturing Sector in Ghana. The chapter is structured in six (6) main sections as follows: Section 4.1 presents Demographic Characteristics of Respondents; Section 4.2 presents Descriptive Statistics; Section 4.3 presents Validity and Reliability Tests of Variables; Section 4.4 presents a Correlation Matrix; Section 4.5 presents Data Analysis; and Section 4.6 presents Discussions of Findings.

4.1 Demographic Characteristics of Respondents

A total of 200 questionnaires were given out to respondents from various manufacturing companies in order to collect information to explore the study's goals. 200 questionnaires were successfully recovered from the study participants in total. After meticulous inspection and filtering, the surveys that were retrieved showed no issues. For the data analysis, all questionnaires were used. For the sake of this study, a large variety of demographic factors were taken into account. They comprise the respondents' age, gender, educational attainment, and work history. To make it easier to understand the characteristics of the data source, the study's respondents' backgrounds were gathered.

Table 4.1: Demographic Characteristics of Respondents

	Frequency	Percent
Gender		
Female	72	36.0
Male	128	64.0
Age		
18-24years	28	14.0
25-34 years	93	46.5
35-44 years	63	31.5
45-54years	11	5.5
55 and above	5	2.5
Educational Level		
First Degree	85	42.5
HND	26	13.0
Master's Degree	79	39.5
Other (Specify)	4	2.0
SSCE/MSLC/Basic	6	3.0
Experience		
	4	2.0
0-5 years	81	40.5
11-15 years	31	15.5
16-20 years	11	5.5
6-10 years	65	32.5
Above 20 years	8	4.0

Table 4.1 presents a comprehensive overview of the demographic attributes of the respondents who took part in the research on the Impact of Material Requirement Planning on Firm Performance. This table offers valuable insights into the varied composition and inclusivity of the participant sample. Based on the available data, it is evident that 64% of the participants identify as male, while 36% identify as female. This distribution indicates a relatively equitable representation of genders, albeit with a slight overrepresentation of males. The aforementioned observation may serve as a potential reflection of the gender distribution within the manufacturing industry in Ghana. However, it is important to note that drawing definitive conclusions would require supplementary evidence to support this claim.

The age distribution of the respondents indicates that a significant proportion, comprising 46.5% and 31.5%, respectively, falls within the age brackets of 25–34 years and 35–44 years. These two age groups collectively account for 78% of the total respondents. This suggests that the study predominantly incorporates perspectives from individuals in the middle stage of their careers, which holds significance due to their accumulated experience and extensive involvement in the respective field. Upon analysing the educational attainment of the participants, it is evident that there exists a diverse composition of respondents, with a significant proportion holding First-Degree qualifications (42.5%) and a substantial number possessing Master's Degrees (39.5%), thus representing the majority of the sample. This observation suggests a notable prevalence of advanced educational achievements among the respondents, which may be linked to their capacity to comprehend and provide substantial responses to the survey.

Based on the data, it is evident that a significant proportion of participants possess professional experience ranging from 0 to 5 years (40.5%) and 6 to 10 years (32.5%), collectively accounting for 73% of the surveyed population. A mere fraction of the participants (4%) possesses a professional background exceeding two decades. This observation suggests that the findings primarily represent the viewpoints of individuals who are in the early stages of their professional journeys. This may indicate a focus on current and developing practises in material requirement planning and firm performance within the industry. In brief, the respondents' demographic profile exhibits a comprehensive representation with regards to age, gender, educational attainment, and professional experience. The presence of a diverse range of participants in this study offers valuable perspectives on the impact of material requirement planning on firm performance within Ghana's manufacturing sector. However, it is important to note

that the overrepresentation of individuals with limited professional experience may potentially bias the findings towards the viewpoints of those who are less established in the industry. It is imperative to consider this aspect when interpreting the findings of the study.

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4.2 Descriptive Statistics

In order to gather data that would effectively address the specific objectives of the study, questionnaires were employed to elicit responses from the respondents representing different firms with regards to the study's objectives. In order to gain a comprehensive understanding of the responses provided by participants, the following three tables present the average scores and standard deviations. These statistical measures primarily serve to emphasise the level of agreement or disagreement among respondents regarding the constructs examined in the study.

4.2.1 Material Requirement Planning Practices

Table 4.2: Descriptive Statistics for Material Requirement Planning Practices

Item	Min	Max	Mean	Std. Dev
Our firm order is placed only when inventory reaches a predetermined level.	1.0	5.0	3.700	1.0370
Our firm keeps a fixed order or constant quantity is placed anytime the inventory reaches that predetermined level."	1.0	5.0	3.678	0.9305
Our firm Inventory is monitored continuously"	1.0	5.0	4.095	0.9275
Our firm uses frequent senior management involvement in inventory practices"	1.0	5.0	3.850	0.9064
Our company checks inventory at fixed time intervals"	2.0	5.0	3.925	0.8444
Our inventory reviews are necessary for effective inventory management"	3.0	5.0	4.320	0.5752
Our firm materials are only ordered based on a request or at the time of the demand"	2.0	5.0	3.365	1.0294
Our company reduce inventory by providing a situation that makes its processes much simpler"	1.0	5.0	3.630	0.8164
Our policies and procedures clearly stated and systematically communicated."	2.0	5.0	4.050	0.7212

Table 4.2 displays descriptive statistics pertaining to diverse material requirement planning practises observed within the manufacturing industry in Ghana. Each item assesses a distinct aspect of material requirement planning, and participants provided ratings for each practise on a scale ranging from 1 to 5. A rating of 5 indicates a strong level of agreement with the statement, while a rating of 1 indicates a weak level of agreement. A higher mean value indicates a stronger level of consensus with the statement, indicating that the practise is more commonly adopted, whereas a lower mean value indicates a weaker level of consensus or less frequent implementation. The statement "Our firm places an order only when inventory reaches a predetermined level" exhibits a mean value of 3.700, indicating a moderate level of agreement with this practise. This suggests that a majority of firms tend to order inventory when it reaches a specific threshold. The statement "Our firm maintains a predetermined order quantity that is placed whenever the inventory reaches a fixed level" also demonstrates a moderate level of agreement, with a mean score of 3.678.

This suggests that a significant number of firms adhere to a consistent order quantity practise. The item "Our firm's Inventory is monitored continuously" received the highest mean score (4.095), indicating a strong level of agreement among the surveyed firms. This suggests that continuous inventory monitoring is a prevalent practise among the firms included in the survey. The data collected from our firm indicates that there is a mean score of 3.850 for the level of senior management involvement in inventory practises. This suggests that senior management is consistently and significantly engaged in inventory practises, demonstrating a moderately high level of involvement. The statement "Our company conducts inventory checks at regular time intervals," with an average score of 3.925, implies that the practise of conducting inventory checks at fixed intervals is widespread among these organisations.

The assertion that "Inventory reviews are essential for effective inventory management" has obtained a mean score of 4.320, which is the second highest mean value. This indicates a significant level of agreement among companies that inventory reviews play a vital role in achieving efficient inventory management. The statement "Our company's materials are only ordered upon request or when there is a demand" has a mean value of 3.365, indicating that this practise is less prevalent compared to others. The statement "Our company reduces inventory by providing a situation that makes its processes much simpler" has a mean value of 3.630, suggesting a moderate level of agreement with this approach to inventory reduction. Finally, the statement "The policies and procedures of these firms are clearly articulated and consistently conveyed" received an average score of 4.050, indicating a high level of consensus that effective communication of policies and procedures is prevalent in these organisations. The standard deviations pertaining to each item indicate a spectrum of responses and demonstrate the diversity of practises across various firms.

As an illustration, the item with the highest standard deviation (1.0370) indicates a greater degree of variability in responses, suggesting a wider range of opinions. In contrast, the item with the lowest standard deviation (0.5752) signifies a higher level of consensus among respondents regarding the significance of inventory reviews. In summary, it appears that there are prevailing practises, such as ongoing inventory monitoring and effective policy communication, that enjoy widespread consensus among firms. Conversely, there are less frequently observed practises, such as ordering materials solely upon request, that do not enjoy the same level of adoption. The aforementioned findings provide insights into the present condition of material requirement planning within the manufacturing sector of Ghana.

4.2.2 Information Technology

Table 4.3: Descriptive Statistics for Information Technology

Item	Min	Max	Mean	Std. Dev
We have the necessary software to make money transfers and payments to suppliers"	1.0	5.0	3.915	.9231
Our purchasing personnel has devises and support for the use of it at their disposal"	2.0	5.0	3.870	.7251
The purchasing department has peripheral equipment for their exclusive use (printers, scanners, etc.)"	1.0	5.0	4.170	.9139
Our company runs an efficient system which helps in Order processing for Purchasing"	1.0	5.0	4.056	.8989
Our company uses automated invoice entry processing system."	1.0	5.0	3.880	.9054
Our company uses electronic interchange of business documents (EDI) to aid processing document."	2.0	5.0	3.740	.8462
Our company runs supplier portal which help to manage the companies supplies"	1.0	5.0	3.706	.9117
Automatic data capture systems are used (e.g. bar code) in the inventory control system"	1.0	5.0	3.299	1.1369
Enterprise application integration among internal functions"	2.0	5.0	3.800	.8082
Real-time integration and connection among internal functions from raw material management through production, shipping, and sales"	2.0	5.0	3.818	.8474

Table 4.3 presents a comprehensive overview of descriptive statistics pertaining to the adoption of information technology in the manufacturing industry of Ghana. This analysis specifically focuses on two key areas: material requirement planning and firm management. The participants provided ratings on a scale ranging from 1 to 5 to evaluate the extent of implementation and utilisation of various information technology components. A higher score indicated a higher level of adoption for the specific IT tool or practise. The mean score of "We possess the requisite software for conducting financial transactions, such as money transfers and payments to suppliers," is 3.915, with a standard deviation of 0.9231. This finding suggests that a majority of firms possess the requisite software infrastructure to facilitate financial transactions with their

suppliers. The mean score of 3.870 and low standard deviation (.7251) for the statement "Our purchasing personnel have devices and support for the use of IT at their disposal" indicates that a significant number of companies offer their purchasing personnel the required IT devices and support. The mean score of 4.170 indicates that a significant number of firms prioritise equipping their purchasing departments with essential peripheral equipment such as printers and scanners. The mean score of 4.056 suggests that the majority of companies have implemented efficient information technology systems to facilitate order processing for purchasing within their organisations. The mean score of 3.880 indicates that there is moderate to high utilisation of automated invoice entry processing systems within our company.

The given statement, "Our company employs electronic interchange of business documents (EDI) for facilitating document processing," has an average score of 3.740, indicating that EDI is utilised by numerous organisations, albeit with less regularity compared to other technologies. The company operates a supplier portal aimed at facilitating the management of its supplies. The mean score of 3.706 indicates a moderate level of utilisation of supplier portals for supply management. The data indicates that the utilisation of automatic data capture systems, such as barcodes, in the inventory control system is relatively infrequent, as evidenced by the lowest mean value of 3.299. The mean value of "Enterprise application integration among internal functions" is 3.800, suggesting a moderate to high degree of integration of enterprise applications. The mean value of "Real-time integration and connection among internal functions from raw material management through production, shipping, and sales" is 3.818, indicating a moderate to high degree of real-time integration within the organisations. The standard deviations serve as measures of dispersion, reflecting the extent of variability within the dataset. Larger standard deviation values are indicative

of greater diversity in the responses. As an example, the presence of a relatively high standard deviation (1.1369) in relation to the statement "Automatic data capture systems are used" suggests a considerable variation in the responses received for this particular item. In summary, the findings of the study indicate that the manufacturing firms surveyed exhibit varying levels of integration of different aspects of information technology (IT). While certain practises, such as the provision of peripheral equipment for purchasing departments, are widely adopted, others, such as the utilisation of automatic data capture systems, are not as commonly observed. The observed variability could potentially be attributed to variations in the information technology capabilities, the perceived significance of various technologies, or the extent of digital transformation within these organisations.

4.2.3 Firm Performance

Table 4.4: Descriptive Statistics for Firm Performance

Items	Min	Max	Mean	Std. Dev
Our firm experience growth in earnings per share	2.0	5.0	4.060	0.7871
There has been a rise in the volume of sales	2.0	5.0	3.935	0.7507
Our firm has experience Growth in profit margin	2.0	5.0	4.061	0.7602
Our firm has enhanced customer retention	1.0	5.0	4.030	0.8463
There has been an increase in our market share of the firm.	1.0	5.0	3.995	0.9106

Table 4.4 presents a comprehensive overview of several dimensions of company performance through the use of descriptive statistics. The increase in earnings per share has led to growth. The scores exhibited a range spanning from a minimum value of 2.0 to a maximum value of 5.0. The enterprises, on average, recorded a score of 4.060, signifying a substantial increase in earnings per share. The calculated standard deviation of 0.7871 indicates a moderate dispersion of values from the mean, with the

majority of firms' scores tending to concentrate around the central tendency. As the volume of sales increases, the scores exhibit a range between 2.0 and 5.0. The mean score of 3.935 suggests that a significant number of enterprises observed an increase in their sales volume. The calculated standard deviation of 0.7507 indicates that there is a moderate degree of variation in the experiences of enterprises around the mean. Profit margin growth is associated with a range of scores between 2.0 and 5.0. The average score of 4.061 indicates a positive trend in profit margins for numerous organisations. The calculated standard deviation of 0.7602 suggests a considerable degree of dispersion around the mean value. The range of client retention scores is between 1.0 and 5.0, indicating an improvement in customer loyalty.

Many organisations have demonstrated an improvement in client retention, as evidenced by their average score of 4.030. The item with a standard deviation of 0.8463 exhibits the greatest magnitude, indicating a wider dispersion in the firms' replies about client retention. Firms were assigned scores ranging from 1.0 to 5.0, indicating an expansion in their market share. The average score is recorded at 3.995, suggesting that a significant number of enterprises experienced growth in their market share. This item exhibits a significant dispersion, as indicated by its standard deviation of 0.9106. This suggests that the experiences related to market share growth for this item were more diverse compared to other things. The table illustrates that companies, on average, have strong performance across several criteria, as shown by mean scores that approach the higher range of the scale for each item. Although the average values of all the metrics are very similar, there is a notable increase in variability among replies for better customer retention and a rise in market share. This indicates a greater range of experience in these specific areas compared to the other metrics.

4.3 Validity and Reliability Tests of Variables

4.3.1 Validity and Reliability Tests for Material Requirement Planning Practices

Table 4.5: EFA On Material Requirement Planning Practices

Items	Factor Reduction
Our firm order is placed only when inventory reaches a predetermined level.	0.780
Our firm keeps a fixed order or constant quantity is placed anytime the inventory reaches that predetermined level."	0.733
Our firm Inventory is monitored continuously"	0.726
Our firm uses frequent senior management involvement in inventory practices"	0.658
Our company checks inventory at fixed time intervals"	0.728
Our inventory reviews are necessary for effective inventory management"	0.588
Our firm materials are only ordered based on a request or at the time of the demand"	0.715
Our company reduce inventory by providing a situation that makes its processes much simpler"	0.533
Our policies and procedures clearly stated and systematically communicated."	0.725
Cronbach's Alpha	**0.633**
KMO	**0.608**
Variance	**27.963**
Approx. Chi-Square=305.076; df =36; Sig.=.000	

Table 4.5 presents the outcomes of the exploratory factor analysis (EFA) conducted on the implementation of Material Requirement Planning (MRP) practises within manufacturing companies in Ghana. A total of nine items were employed to evaluate these practises, and the factor loadings vary from 0.533 to 0.780, suggesting a moderate to high correlation with the latent construct of MRP. This implies that these items effectively assess the construct of MRP practises. A high loading factor signifies that the statement holds greater significance in relation to the latent variable. Therefore, the item with the highest loading, "Our firm order is placed only when inventory reaches a predetermined level," which has a factor loading of 0.780, is considered to be the most indicative of MRP practises. In contrast, the item with the lowest loading, denoted as "Our company reduces inventory by providing a situation that makes its processes

much simpler," exhibits a factor loading of 0.533. This value suggests that this particular item holds relatively less importance in characterising the practises of Material Requirements Planning (MRP). The Cronbach's Alpha coefficient of 0.633 indicates a satisfactory level of internal consistency among the items utilised for assessing MRP practises, as it surpasses the acceptable threshold of 0.6. This finding demonstrates the reliability of the scale within the specific context of this study. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is found to be 0.608, surpassing the recommended threshold of 0.5. This indicates that the sample size is sufficient for conducting the exploratory factor analysis (EFA). The factor under consideration accounts for 27.963% of the total variance, indicating that approximately 25% of the variability in the responses can be attributed to the MRP practises.

Finally, the Chi-Square test approximates significance at a level of $p < 0.001$, suggesting that the observed data is a good fit for the factor model. This statement suggests that the measurement tools employed in this study possess sound construct validity when assessing MRP practises. In brief, the findings of this study indicate that the selected measurement items for assessing MRP practises exhibit favourable internal consistency and are appropriate for capturing the fundamental construct of MRP practises within the manufacturing sector of Ghana. This evidence substantiates the soundness and consistency of the measurement of MRP practises.

4.3.1 Validity and Reliability Tests for Information Technology

Table 4.6: EFA on Information Technology

Items	Factor Reduction
We have the necessary software to make money transfers and payments to suppliers"	0.513
Our purchasing personnel has devises and support for the use of it at their disposal"	0.734
The purchasing department has peripheral equipment for their exclusive use (printers, scanners, etc.)"	0.656
Our company runs an efficient system which helps in Order processing for Purchasing"	0.732
Our company uses automated invoice entry processing system."	0.516
Our company uses electronic interchange of business documents (EDI) to aid processing document."	0.709
Our company runs supplier portal which help to manage the companies supplies"	0.810
Automatic data capture systems are used (e.g., bar code) in the inventory control system"	0.663
Enterprise application integration among internal functions"	0.764
Real-time integration and connection among internal functions from raw material management through production, shipping, and sales"	0.557
Cronbach's Alpha	**0.839**
KMO	**0.693**
Variance	**41.748**
Approx. Chi-Square=811.353; df =45; Sig.=.000	

The results presented in Table 4.6 reflect the exploratory factor analysis (EFA) for the construct of Information Technology (IT) in the context of Material Requirement Planning (MRP) in the manufacturing sector in Ghana. The table shows 10 items associated with IT, with factor loadings ranging from 0.513 to 0.810. The higher the loading factor, the stronger the relation of the item to the latent variable, IT in this case. The highest loading item is "Our company runs a supplier portal that helps manage the company's supplies," with a factor loading of 0.810, indicating this item strongly reflects the use of IT in the context of this study. Conversely, "We have the necessary software to make money transfers and payments to suppliers," with a factor loading of 0.513, holds the least association with IT, though still above the minimum acceptable threshold of 0.5. Cronbach's Alpha for this construct is 0.839, surpassing the generally

accepted threshold of 0.7. This suggests a high level of internal consistency and reliability among the items representing the use of IT in the context of MRP. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is 0.693, comfortably exceeding the recommended value of 0.6. This indicates that the sample size is satisfactory for performing an EFA on these items. The total variance explained by this factor is 41.748%, suggesting that about 42% of the variation in the responses can be explained by the construct of IT, a substantial proportion given the typically complex nature of these systems. Finally, the approximate Chi-Square value is significant (p 0.001), indicating a strong model fit. This implies that the items used in the study are a valid representation of the construct of IT within the scope of this research. In summary, the results validate the reliability and construct validity of the items used to measure the influence of IT on MRP in the manufacturing sector in Ghana. The high Cronbach's Alpha and KMO values, along with the substantial explained variance and significant Chi-Square result, confirm the suitability of these items for capturing the essence of IT in the context of this study.

4.3.1 Validity and Reliability Tests for Firm Performance

Table 4.7: EFA on Firm Performance

Items	**Factor Reduction**
Our firm experience growth in earnings per share	0.888
There has been a rise in the volume of sales	0.838
Our firm has experience Growth in profit margin	0.862
Our firm has enhanced customer retention	0.565
There has been an increase in our market share of the firm.	0.847
Cronbach's Alpha	**0.857**
KMO	**0.743**
Variance	**65.719**
Approx. Chi-Square=548.710; df =10; Sig.=.000	

The findings of an exploratory factor analysis (EFA) done on items assessing company performance are presented in Table 4.7. The factor loading of each item signifies its link with the latent factor or component obtained from the exploratory factor analysis (EFA). The extracted component exhibits robust relationships with loadings above 0.8 for various key indicators, including the growth in earnings per share, rise in sales volume, growth in profit margin, and increase in market share. The item "Enhanced customer retention by our firm" exhibits a loading coefficient of 0.565, which, while somewhat smaller than the other items, remains significant. This finding indicates a moderate correlation between the observed variable and the latent factor. The obtained Cronbach's alpha coefficient of 0.857 indicates a substantial degree of internal consistency among the items.

Based on the KMO value of 0.743, it can be inferred that the sample size is sufficient for carrying out the factor analysis. In general, KMO values greater than 0.6 are considered satisfactory, with higher values being more desirable. The factor(s) that have been retrieved explain 65.719% of the variance observed in the dataset. The Chi-Square value is estimated to be approximately 548.710, with a corresponding degree of freedom of 10. The observed significance level is 0.000. This finding suggests that the factor structure exhibits statistical significance, indicating that the collected data is appropriate for doing factor analysis. The proportion of variance accounted for by the extracted factor(s) is considerable, indicating that this collection of factors is a dependable indicator of company performance.

4.4 Correlation Matrix

Table 4.8: Correlation Matrix

	Material Requirement Planning	Information Technology	Firm Performance
Material Requirement Planning	1		
Information Technology	0.421** 0.000	1	
Firm Performance	0.522** 0.000	0.530** 0.000	1

Table 4.8 presents a correlation matrix that measures the association between the constructs of Material Requirement Planning (MRP), Information Technology (IT), and Firm Performance (FP) within the context of the manufacturing sector in Ghana. First, the correlation coefficient between MRP and IT is 0.421, and it is significant at the 0.01 level (as denoted by **). This suggests a moderately positive relationship between these two variables, indicating that as the application of MRP increases, the use of IT in these companies also tends to increase, and vice versa. Secondly, there is a correlation of 0.522 (significant at the 0.01 level) between MRP and FP. This reveals a moderately strong positive relationship, implying that as MRP practises improve, there is also an increase in FP, indicating a potential beneficial effect of effective MRP on the performance of the firm. Finally, the correlation between IT and FP is 0.530, which is also significant at the 0.01 level. This shows a moderately strong positive association. This indicates that as the use of IT in these companies increases, FP tends to improve. This suggests that the effective use of IT might have a beneficial impact on FP.

4.5 Data Analysis

Table 4.9: Path Analysis for the measurement models

Effect	Path coefficient	T-value	P-values
IT → FP	4.290	9.754	0.000
MRP → FP	4.096	9.871	0.000
IT x MRP → FP	-1.012	9.367	0.000

Significant value is P-value < 0.05. MRP= material require ement planning, IT= information technology, FP= Firm Performance, IE= Indirect effect and TE= Total Effect.

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Table 4.9 provides the results of the path analysis to answer three research questions related to Material Requirement Planning (MRP), Information Technology (IT), and Firm Performance (FP) in the manufacturing sector in Ghana.

4.5.1 The Effect of Material Requirement Planning on Firm Performance

The path coefficient of IT to FP is 4.290, which is statistically significant with a T-value of 9.754 and a P-value of 0.000. This suggests a strong positive relationship between information technology and firm performance. Therefore, the usage or implementation of information technology increases, firm performance also tends to increase. Therefore, the H1 is supported.

4.5.2 The Impact of Information Technology on Firm Performance

The path coefficient of MRP to FP is 4.096, which is statistically significant with a T-value of 9.871 and a P-value of 0.000. This indicates a robust positive relationship between material requirement planning and firm performance. This indicating that there is a positive relationship between material requirement planning and firm performance. Therefore, the H2 is supported.

4.5.3 The Mediating Effect of Information Technology on Material Requirement Planning and Firm Performance

The interaction term (IT x MRP) has a path coefficient of -1.012, which is statistically significant with a T-value of 9.367 and a P-value of 0.000. This suggests that the interaction between information technology and material requirement planning has a negative effect on firm performance. Specifically, this means that while both IT and MRP individually have a positive impact on firm performance, the combined effect (or the interaction) of IT and MRP diminishes firm performance. This finding provides insights into hypothesis H3, indicating that IT moderates the relationship between MRP and firm performance, but not necessarily in the anticipated positive direction.

The analysis reveals that both material requirement planning, and information technology individually have a positive impact on the performance of manufacturing firms in Ghana. These findings confirm the hypotheses H1 and H2. However, when considering the interaction of MRP and IT, there's a negative effect on firm performance, suggesting that the combined usage or simultaneous emphasis on both MRP and IT might not be as beneficial as implementing them independently. This offers a nuanced view on the role of IT as a moderator in the relationship between MRP and firm performance, as posited in hypothesis H3.

Table 4.10: Summary of Hypotheses Testing

Hypothesized Path	Path coefficient	t-value	P-value	Decision
H1: There is a positive relationship between Material requirement planning and Firm performance	4.290	9.754	0.000	Supported
H2: there a significant relationship Material requirement planning and firm performance.	4.096	9.871	0.000	Supported
H3: Information technology will significantly moderate the relationship between material requirement planning and firm performance.	-1.012	9.367	0.000	Supported

4.6 Discussions of Findings

4.6.1 The Effect of Material Requirement Planning on Firm Performance

The results of this study demonstrate a noteworthy and favourable impact of Material Requirement Planning (MRP) on Firm Performance (FP) within the manufacturing industry in Ghana. The study revealed a significant correlation of 4.290 between MRP and FP, suggesting a robust association between these two variables. The discovery holds considerable importance and lends support to the theoretical viewpoint that the efficacy of Material Requirements Planning (MRP) plays a critical role in enhancing Firm Performance (FP). The aforementioned outcome is consistent with the principles of the Resource-Based View (RBV) theory, which posits that companies can enhance their performance through efficient management and coordination of their internal resources (Barney, 1991). In the present context, the concept of Material Requirements Planning (MRP) can be regarded as a crucial internal asset that, when efficiently employed, has the potential to enhance Firm Performance (FP). This discovery is in alignment with prior empirical research. A study conducted by England et al. (2015) demonstrated that the implementation of efficient Material Requirements Planning (MRP) systems can significantly improve the operational efficiency and effectiveness of a company's supply chain, resulting in enhanced Firm Performance (FP).

The findings are consistent with the research conducted by Leung, Tsang, Ng, and Wu (2007), which demonstrated that the implementation of MRP systems has a significant impact on lead time reduction, stockout prevention, and overall improvement in supply chain performance. In a study conducted by Kelle, Akbulut, and Min (2011) within the manufacturing industry, it was found that the implementation of Material Requirements Planning (MRP) systems has a substantial positive impact on both production efficiency and customer service levels. Consequently, this improvement in performance

contributes to the overall enhancement of firm operations. Nevertheless, it is important to acknowledge that the enhancement of firm performance (FP) through the utilisation of Material Requirements Planning (MRP) systems is subject to several critical factors. These factors include the provision of support from top management, adequate training for employees, and the alignment of MRP systems with the overarching strategic objectives of the organisation (Themistocleous, Irani, & O'Keefe, 2001).

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4.6.2 The Impact of Information Technology on Firm Performance

The results of this study suggest a robust, affirmative, and statistically significant correlation between Information Technology (IT) and Firm Performance (FP), with a path coefficient of 4.096. This statement suggests that the incorporation and proficient utilisation of information technology can greatly improve firm performance, thereby aligning with the principles of the Resource-Based View theory. The Resource-Based View (RBV) theory places significant importance on the role of distinctive and valuable resources, such as information technology (IT), in enabling firms to attain a competitive advantage (Barney, 1991). The observed impact of information technology on firm performance (FP) aligns with the results reported in prior research. Zhou, Bi, and Da Xu (2011) conducted a study that demonstrated that the utilisation of information technology (IT) has the potential to greatly enhance firm performance through improvements in efficiency, responsiveness, and flexibility. In a study conducted by Cai, Liu, Xiao, and Liu (2009), it was discovered that the utilisation of information technology (IT) in the supply chain has the potential to decrease operational expenses, enhance coordination among members of the frim, and ultimately improve customer satisfaction. These improvements contribute to an overall enhancement of firm performance (FP).

Gunasekaran, Patel, and Tirtiroglu (2001) proposed that within the manufacturing sector, the utilisation of information technology (IT) can effectively facilitate the integration of diverse supply chain processes. This integration subsequently leads to enhanced information sharing, improved inventory management, and reduced lead times, ultimately resulting in the enhancement of firm performance (FP). According to Subramani (2004), the utilisation of information technology (IT) has the potential to facilitate the exchange of real-time information, enhance the coordination of activities, and contribute to enhanced decision-making processes. These factors collectively have the capacity to exert a positive influence on firm performance (FP). Nevertheless, it is crucial to acknowledge that the effective integration and utilisation of information technology (IT) necessitates specific prerequisites, including endorsement from upper-level management, adequate employee training, and an organisational culture that fosters innovation and adaptability (Boonstra, 2013).

4.6.3 The Mediating Effect of Information Technology on Material Requirement Planning and Firm Performance

The findings of the research provide an intriguing perspective on the combined impact of information technology (IT) and material requirement planning (MRP) on the operational effectiveness of organisations. Although both IT and MRP have been found to have favourable effects on firm performance when considered individually, their combined impact or interaction seems to have a detrimental effect, resulting in decreased firm performance. This discovery presents a departure from prevailing beliefs and established scholarly works, which frequently highlight the advantageous outcomes of incorporating information technology (IT) with diverse commercial operations, such as material requirement planning. Gunasekaran and Ngai (2004)

argued that the implementation of information technology (IT) has the potential to greatly increase the effectiveness and efficiency of material requirements planning (MRP). This, in turn, can result in enhanced decision-making processes, streamlined operations, and ultimately, improved overall performance of the organisation.

Motwani (2001) emphasised the interconnectedness between the implementation of material requirements planning (MRP) and the integration of information technology (IT), suggesting a mutually beneficial association. The negative interaction effect identified in this study may be attributed to many underlying variables. Manufacturing enterprises in Ghana may encounter difficulties in integrating systems, training staff, or aligning processes when seeking to harness both information technology (IT) and manufacturing resource planning (MRP). These obstacles have the potential to undermine the unique advantages offered by each of these strategies. Kumar et al. (2008) have documented the presence of integration issues in enterprises. These challenges arise when organisations, in their pursuit of integration, unintentionally introduce complexity, resulting in inefficiencies and setbacks in performance.

Additionally, it is plausible to consider that the firms could potentially encounter decreasing returns as a result of excessive dependence on both information technology (IT) and material requirements planning (MRP). This observation is consistent with the conclusions drawn by Cagliano et al. (2006), who posited that although information technology (IT) has the potential to enhance material requirements planning (MRP) procedures, an undue reliance on technology or an excessive emphasis on planning without taking into account real-time fluctuations can have negative consequences. Given the aforementioned findings, it is imperative to use prudence while considering the amalgamation of information technology (IT) and material requirements planning

(MRP). Although each factor presents notable advantages when considered independently, their convergence necessitates a sophisticated approach, potentially involving a gradual assimilation process, in order to effectively harness the benefits while mitigating any unintended negative impact on the organization's overall performance. In summary, this study highlights the significance of strategic alignment and careful execution in the integration of information technology (IT) and manufacturing resource planning (MRP) within industrial environments. Although the simultaneous utilisation of both approaches holds promise for substantial benefits, it is imperative to exercise caution in order to mitigate potential drawbacks that may counterbalance these gains.

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CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the Summary of Findings, Conclusion, and Recommendations of the Study Topic: The Effect of Material Requirement Planning on Firm Performance. The chapter is organised into four (4) main sections as follows: Section 5.1 presents the Summary of Findings, Section 5.2 presents the Conclusion, Section 5.3 presents the Policy Implications and Recommendations, and Section 5.4 presents the Suggestions for Further Research.

5.1 Summary of Findings

This section provides a concise overview of the study's findings in relation to the objectives it aimed to achieve. The study fundamentally addressed three key inquiries, namely: What is the impact of material requirement planning on performance within the manufacturing sector in Ghana? What is the influence of information technology on the performance within manufacturing firms in Ghana? What is the role of information technology in mediating the relationship between material requirement planning and performance? A total of 200 questionnaires were collected and subsequently analysed in order to obtain responses to the research inquiries. The following summary presents the findings obtained in accordance with the study objectives.

5.1.1 Effect of Material Requirement Planning on Firm Performance

The observed relationship between MRP and FP is characterised by a direct effect size of 4.290. This effect is deemed statistically significant, as evidenced by a p-value of 0.000 and a t-value of 9.754. This observation indicates a robust, linear, and favourable

correlation between MRP and FP. Essentially, enhancements in Material Requirements Planning (MRP) practises have a direct impact on the improvement of firm performance.

5.1.2 Impact of Information Technology on Firm Performance

The impact of information technology (IT) on FP (sustainable competitive performance) is found to be 4.096, indicating a significant relationship. This finding is supported by a p-value of 0.000 and a t-value of 9.871. This implies a robust, straightforward, and favourable correlation between the utilisation of information technology (IT) and firm performance (FP). Hence, the proficient utilization of information technology (IT) within the manufacturing industry in Ghana has the potential to directly enhance firm performance.

5.1.3 Mediating Effect of Information Technology on Material Requirement Planning and Firm Performance

Path coefficient -1.012 for the interaction term (IT x MRP) is statistically significant with a T-value of 9.367 and a P-value of 0.000. This implies that the relationship between information technology and material requirement planning has a detrimental impact on the overall performance of the organisation. This suggests that while IT and MRP alone improve firm performance, their cooperation reduces it. This showing that IT moderates the MRP-firm performance link, but not in a positive way.

5.2 Conclusion

This study has conducted a comprehensive analysis of the effects of material requirement planning (MRP) and information technology (IT) on firm performance

(FP) within the manufacturing sector in Ghana. The investigation has undertaken a more in-depth examination of the interplay between these two variables in order to gain a better understanding of the mediating influence of information technology (IT) on the association between market research performance (MRP) and financial performance (FP). Based on the analysis of the data, it is apparent that a robust and positive correlation exists between MRP (marginal revenue product) and FP (factor productivity). The firm's performance outcomes are positively correlated with the degree of streamlining and enhancement of its MRP practices. This statement underscores the significant impact of Material Requirements Planning (MRP) on organisational performance and underscores the imperative for manufacturing companies to consistently prioritise and enhance their MRP procedures. Likewise, the utilisation of information technology (IT) in the domain of manufacturing has been observed to result in substantial favourable consequences for the performance of firms. In the contemporary era characterised by digital advancements, wherein technology significantly influences various aspects of corporate operations, it is unsurprising that the proficient and strategic utilisation of information technology possesses the capability to augment operational efficiencies, thus yielding favourable outcomes for firms.

Nevertheless, a particularly fascinating observation that has emerged from this study is the dynamic relationship between information technology (IT) and material requirements planning (MRP). In contrast to the initial premise and conventional preconceptions, the convergence of IT and MRP appears to yield an unexpected impact on organisational performance. Rather than enhancing performance to a greater extent, the integration of IT and MRP seems to reduce the individual advantages that each of them provides when examined alone. This highlights the importance of exercising

caution when considering the integration of IT and MRP, as it is crucial to avoid inadvertently nullifying the advantages offered by each system alone. The integration of Material Requirements Planning (MRP) and Information Technology (IT) has undoubtedly become essential in influencing the performance of manufacturing enterprises in Ghana. However, the complex and intricate connections between these two components necessitate a more meticulous and strategic approach to their management. Manufacturing enterprises must exercise caution when integrating these elements, ensuring that they optimise advantages while avoiding the unintended introduction of inefficiencies.

5.3 Policy Implications and Recommendations

The study presents compelling evidence that underscores the significant contributions of material needs planning (MRP) and information technology (IT) in augmenting firm performance (FP). The evident positive correlation between material requirement planning (MRP) and firm performance (FP) suggests that government policies should be oriented towards promoting and incentivizing businesses to use and improve their MRP systems. It is recommended that regulatory organisations and industry associations in Ghana engage in collaborative efforts to provide comprehensive guidelines and best practices for the implementation of Minimum Retail Price (MRP) policies. Providing training sessions, workshops, and certifications on Material Requirements Planning (MRP) practices can enhance the recognition and significance of MRP within the manufacturing industry. The significance of information technology (IT) in enhancing the performance of manufacturing enterprises highlights the imperative need for a robust IT infrastructure and a high level of digital literacy inside these organisations. It is imperative for the government to give precedence to the

development and augmentation of information technology (IT) infrastructure, with a specific focus on industrial zones. Furthermore, it is suggested to provide manufacturing enterprises with incentives such as tax breaks or subsidies in order to encourage their investment in information technology (IT) through digital upgrades.

The individual virtues of both IT and MRP warrant examination, particularly when considering their combined applications. In order to prevent less-than-ideal results, it is imperative for policies to acknowledge and account for this level of complexity. Guidance should be offered to manufacturing enterprises about the integration of information technology (IT) and material requirements planning (MRP) systems, ensuring that the advantages of both are preserved without any compromise. It is advisable to consider the initiation of additional research on the intricate dynamics among these factors in order to establish a more comprehensive framework for their integration. There exists a discernible necessity for the establishment of platforms that facilitate collaboration and the exchange of ideas between information technology professionals and material requirements planning (MRP) specialists, with the specific aim of devising effective integration methods. Advocate for and provide backing to industry conferences, seminars, and forums that facilitate the engagement of professionals from relevant sectors in constructive dialogue, idea exchange, and the generation of innovative solutions to address the challenge of integration. In conclusion, it is evident that the implementation of Material Requirements Planning (MRP) and Information Technology (IT) in Ghana's manufacturing sector has resulted in significant beneficial effects on company performance.

However, it is crucial to approach the integration of these two elements with careful consideration and a comprehensive understanding of the complexities involved. By implementing well-informed policies, conducting ongoing research, and fostering collaboration among various stakeholders, Ghana has the capacity to effectively utilise the complete potential of these components while also minimising any potential downsides.

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5.4 Suggestions for further research

The paradoxical consequences discovered when merging information technology (IT) and material requirements planning (MRP) present a compelling opportunity for further research aimed at gaining a more comprehensive knowledge of the intricacies involved in this relationship. An examination of the operational procedures, technological resources, and managerial approaches utilised in organisations where the integration of information technology (IT) and material requirements planning (MRP) has had an adverse effect on overall performance would yield significant insights. Additionally, it would be advantageous to investigate whether the obtained findings in Ghana exhibit consistency with those observed in other locations or if there exist regional and cultural variables that exert influence on the observed outcomes. This approach has the potential to yield findings that can be used more broadly and discern best practices across various production centres.

Longitudinal research that monitors the performance of companies over a period of time while they make adjustments to their IT and MRP strategies might provide valuable insights into the long-term consequences and potential adaptation mechanisms employed by organisations. The manufacturing industry encompasses a wide range of sectors, and the characteristics of the products produced within this industry can exhibit

considerable diversity. Additional investigation can be conducted to divide the manufacturing industry into smaller divisions, such as automotive, electronics, and textiles, in order to ascertain whether there are variations in the dynamics between information technology (IT) and material requirements planning (MRP) across these specific segments. Additionally, exploring the impact of organisational culture and change management in the integration of information technology (IT) and material requirements planning (MRP) can provide useful insights. It is possible that companies exhibiting specific cultural characteristics or employing effective change management strategies may experience greater success in the process of integration.

Comprehensive examinations of companies that have effectively integrated information technology (IT) and material requirements planning (MRP) systems without experiencing a noticeable decline in performance can provide significant knowledge and guidance for other manufacturers.

Finally, a comprehensive analysis of external factors, including government legislation, technology improvements, supply chain disruptions, and global market dynamics, can provide a more comprehensive comprehension of the problems and opportunities encountered by manufacturing enterprises in Ghana when integrating IT and MRP systems. In summary, the present study has established a foundation and yielded significant insights into the interplay among information technology (IT), material requirements planning (MRP), and firm performance within the context of Ghana. However, there are various opportunities for future investigation. Continuous research will ensure that manufacturing organisations can negotiate the complexity of these components and exploit their full potential.

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APPENDIX

QUESTIONNAIRE

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS
DEPT. OF SUPPLY CHAIN AND INFORMATION SYSTEMS [SCIS]
Target group: Manufacturing Firms

Dear respondent,

Thank you for your willingness to participate in this study. The study focuses on assessing "**Examining the Effect of Material Requirement Planning on Firm Performance: Evidence from the Manufacturing Sector in Ghana**".

The research is purely for academic purpose and as such privacy and confidentiality of all information shall be observed. To fairly report on the research work, you are implored to answer the questions with all honesty and sincerity.

I would therefore be grateful if you could kindly answer the following questions. Thank you.

SECTION A: DEMOGRAPHY OF RESPONDENT

1. **Gender**
   a. Male [ ]
   b. Female [ ]

2. **Age**
   a. 18-24years [ ]
   b. 25-34 years [ ]
   c. 35-44 years [ ]
   d. 45-54years [ ]
   e. 55 and above [ ]

3. **Educational Level**
   a. Master's Degree [ ]
   b. First Degree [ ]
   c. HND [ ]
   d. SSCE/MSLC/Basic[ ]
   e. Other (specify).....

4. **Experience**
   a. 0-5 years [ ]
   b. 6-10 years [ ]
   c. 11-15 years [ ]
   d. 16-20 years [ ]
   e. Above 20 years [ ]

SECTION B – MATERIAL REQUIREMENT PLANNING

The following items relate to material requirement planning practices. Kindly use the 5-point scale below to provide the appropriate responses. Thank you.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

#	**Items**	1	2	3	4	5
1	Our firm order is placed only when inventory reaches a predetermined level.					
2	Our firm keeps a fixed order or constant quantity is placed anytime the inventory reaches that predetermined level.					
3	Our firm Inventory is monitored continuously					
4	Our firm uses frequent senior management involvement in inventory practices					
5	Our company checks inventory at fixed time intervals					
6	Our inventory reviews are necessary for effective inventory management					
7	Our firm materials are only ordered based on a request or at the time of the demand					
8	Our company reduce inventory by providing a situation that makes its processes much simpler					
9	Our policies and procedures clearly stated and systematically communicated.					

SECTION C – INFORMATION TECHNOLOGY

The following items relate to information technology of firms. Kindly use the 5-point scale below to provide the appropriate responses. Thank you.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

#	**Items**	1	2	3	4	5
1	We have the necessary software to make money transfers and payments to suppliers					
2	Our purchasing personnel has devises and support for the use of it at their disposal					
3	The purchasing department has peripheral equipment for their exclusive use (printers, scanners, etc.)					
4	Our company runs an efficient system which helps in Order processing for Purchasing					
5	Our company uses automated invoice entry processing system.					
6	Our company uses electronic interchange of business documents (EDI) to aid processing document.					
7	Our company runs supplier portal which help to manage the companies supplies					
8	Automatic data capture systems are used (e.g. bar code) in the inventory control system					
9	Enterprise application integration among internal functions					
10	Real-time integration and connection among internal functions from raw material management through production, shipping, and sales					

SECTION D – FIRM PERFORMANCE

The following items relate to Firm Performance. Kindly use the 5-point scale below to provide the appropriate responses. Thank you.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

#	**Items**	1	2	3	4	5
1	The level of customer satisfaction has increased.					
2	There has been a rise in the volume of sales					
3	The Quality Our products delivery has increased					
4	Our firm meets customer requirement					
5	There has been an increase in our market share of the firm.					

Thank You!!