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INSTITUTE OF DISTANCE LEARNING

**SUSTAINABLE PACKAGING AND ITS EFFECT TOWARDS
SUSTAINABLE SUPPLY CHAIN PERFORMANCE**

BY

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**A THESIS SUBMITTED TO THE DEPARTMENT OF DEPARTMENT OF SUPPLY
CHAIN AND INFORMATION SYSTEMS, INSTITUTE OF DISTANCE LEARNING,
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF
DEGREE OF**

MASTER OF SCIENCE (PROCUREMENT AND SUPPLY CHAIN MANAGEMENT)

NOVEMBER, 2023

DECLARATION

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

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DEDICATION

I dedicate this thesis to my children, Yoofi and Ewuradjoa Blankson.

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ACKNOWLEDGEMENTS

I am grateful to Dr. Samuel Bruce Rockson, my supervisor, for all the guidance, support, instruction, and invaluable feedback he provided me throughout my research and thesis writing.

I would like to thank The Department of Supply Chain and Information Systems, Institute of Distance Learning, at Kwame Nkrumah University of Science and Technology, for providing me with the resources to pursue graduate study.

Lastly, I would like to appreciate my family, especially my spouse, children. Their belief in me has kept my spirits and motivation high during this process.



ABSTRACT

The study sought to examine sustainable packaging and its effect towards sustainable supply chain performance using COA Manufacturing Company as a case study. This methodology involves conducting an empirical investigation into a particular situation or phenomenon within the organization. Members targeted from the procurement department include a procurement director, procurement managers, senior procurement officers and procurement officers while an operations manager, senior operations officer and, warehousing officers and floor supervisors are from the warehousing department and transport officers are in the transport department. A sample of 22 respondents were then selected and interviewed for purposes of collecting data. The results were analyzed using content analysis. It was found that a lack of suitable infrastructure that supports economically viable solutions for collection and recovery of medical supplies from waste materials is one of the major challenges the department faces. Additionally, the warehousing, transport and distribution managers also identified a problem with the lack of clear sustainable packaging practices in the organization. Owing to the fact that the study found less use of sustainable packaging practices were adopted by COA Manufacturing Company Limited, the researcher inquired on what qualified as best strategies that the organization can adopt. The study therefore found that besides reduced inputs in terms of materials used to package of the medical supplies, the organization will lower on disposal costs considering that sustainable packaging leads to reduction in waste materials. The study therefore concluded that COA Manufacturing Company Limited does not have a concrete reliable sustainable packaging practice in place. It was, however, established that the organization could benefit from having such a practice in place to a great extent. It was also established that a lack of suitable infrastructure that supports economically viable solutions for collection and recovery of medical supplies from waste materials is one of the major challenges that affects COA Manufacturing Company Limited. This not only increases the costs associated with procuring medical supplies but also reduces the performance of the department due to increased losses. It is recommended that organizations reduce the amount of filler materials used to package a product for shipment to customers since this will reduce the cost to the manufacturer, who in this case is the supplier. In the long run, sustainable companies reduce the cost of shipping products by increasing the number of products shipped at one time.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Sustainability has gained popularity in the business industry due to globalization. Climate warming, ocean/sea pollution recently has increased attention of environmentalists and is an initiative for many countries globally, to ensure that environment, people and profits is balanced. Bansal and Clelland (2004) in their study stated that increase in market share for firms that are engaging in sustainable activities is inevitable and the company's reputation is enhanced. There is increasing emphasis on environmental-friendly products and services. The general public is more conscious of environmental concerns and global warming (Vachon and Klassen, 2007). This has seen many companies adopting the sustainability principle in their operations.

Regulations and policies governing sustainability concept are in place and for this reason many firms have no option but to adopt the required standards of sustainable operations. Increasing government legislations, NGOs, and research growth in this area, has seen much growth and emphasis on the importance of sustainability. Therefore, whether in public or private sector, organizations have to play a major role to support sustainable development. Regulations that govern stability are also set out in the European Directive 94/62/EC and its updated version 2004/12/EC.

A socially responsible organization that practices sustainability must not make profit the ultimate objective but rather have a trade-of between profits, people and environment (Matten and Crane, 2005). It's worth to not that the number of sustainability standards have recently escalated. As a matter of fact, Giovannucci (2008), suggested in 2008 that they there were 400 sustainability

standards that provides a road map to sustainable practices and acts as a benchmark for best practices and quality in the industry. Numerous sustainability standards in the recent years have been developed in with the view to address issues of the quality of the environment, social equity, and economic prosperity of production and trade practices at a global level. Organizations are made to develop, maintain, and apply practices that are socially acceptable in the workplace. To do this they are encouraged by an auditable certification standard known as the SA8000.

Packagers are enabled by new machinery and material technologies to not only use less materials to create multi-packs, pallets, and bundles, but also to create shelf-ready packaging that minimizes waste at the retailer level. Moreover, Hellström (2011). Added that packaging is in itself a source of innovation in the processes, the products, and materials, hence, reinforcing its imperative contribution to competitive improvement. Companies like Nike, Coca Cola has sustainable standards as strategic policies by producing socially acceptable products that have minimal impact to the environment. Nike has improved innovation in their packaging materials thus increase in their market value. Shareholders also influence the type of sustainability practices the organization is implementing. Their decisions may improve an organization performance or destroy it. On the other hand, sustainability is considered a competitive plan of action for a company that has well planned sustainability policy in place.

The concept of packaging logistics, according to Saghir (2002) is relatively new in the industry and the scientific community. Over the past few years, it has gained increasing attention in the industry and the scientific community. Its center of attention is on the cooperations that result

from the integration of logistics and packaging with the aim of increasing the performance and effectiveness of the supply chain by improving activities related to packaging and logistics.

Due to globalization which has led to an increase in turbulent and volatile markets, organizations need to strategically be placed competitively by increasing the competitiveness of their supply chains. Consequently, sustainability has gained so much popularity in the business industry that it is among the issues that have gained public prominence and are necessary factors in the process of designing healthcare product packaging, equipment, and even the facilities. Increase in emphasis on environmental-friendly products and services is gaining momentum and the public is more conscious of environmental concerns and global warming activities (Klassen, 2007). This trend has seen a rise in the number of potential consumers who are willing to purchase products that are environmentally friendly at premium prices than before (Agyeman, 2014). New initiatives put in place by private and public sectors are implementing sustainability forcing it to follow a similar course as an integrative concept.

The materials and containers used in the packaging and preservation of pharmaceutical substances are mostly harmful to the environment. From the manufacturing processes and the material used to the ineffective and unmanaged waste products, the life cycle of the pharmaceutical product contributes to the environmental issues and public health. Azziz (2012), packaging is considered to be among the global and the key elements that promote an effective and a desirable supply chain considering the fact that there are different packaging requirements for each supply chain company.

Packaging makes up over twenty-three percent that makes it to the landfill each year. Although pharmaceutical packaging constitutes to very minimal wastes, its disposal can result in far too

many problems to the environment. More focus has shifted towards aligning the ideas of sustainable development with more holistic principles while including the improvement and evaluation of the systems product packaging life cycle (Shinn, 2004). The past decade has seen effective packaging design turn into a fine art through the changes in the behavior of consumers, changes in the concerns of the environment, increased globalization, changes in distribution techniques, changes in marketing strategies and the changes in technology. Packaging designers today considers many factors in their designs such as the opinion on the culture, living style choices that are healthy, and the current policies that govern the practice of green business. This study seeks to examine the relationship between sustainable packaging and its effect towards sustainable supply chain performance and contribute to theory and practice of sustainability.

1.2 Problem of the Study

Packaging industry is pressurized by the pressure to develop eco-friendly and sustainable product and it is beginning to affect one of the most complex sectors, pharmaceutical packaging. It is difficult for companies serving the pharmaceutical industry to develop sustainable packaging as the environmental impact must not compromise safety or accessibility of packaging.

Sustainable Packaging Alliance (SPA) identifies that sustainability is a complex concept and has no definite interpretation. Many organizations across the world have responded the activists and policy makers requests to go green. Wu and Dunn (1995) suggested that firms should effectively manage products effectively from the beginning to the end and green principles must be implanted and evident throughout the supply chain. These principles will ensure firms performance is achieved and also reduces liability in terms of litigations.

There is growing interest among the consumers all over the world regarding protection of environment. Association between sustainability and product packaging systems is a concept that is not only complex, but it is also open to different explanations. On similar accounts, economic growth, jobs and living standards are not compromised by the required environmental objectives. The environmental objectives are hence required to integrate business drivers that are related to costs, markets and the expectations of customers. It is therefore crucial to use effective and efficient reusable materials in order to meet the sustainable goals that are desired to be achieved by not only Ghana, but also the entire world (Singh et al., 2011).

Pharmaceutical industries consideration of sustainable packaging is increasing momentum as all the involved stakeholders are encouraged to incorporate sustainable initiatives in their processes in order to achieve the bottom-line triple benefits. The concept of sustainability packaging is understood differently at diverse supply chain levels. Many studies have been carried out on Packaging integration and its impact on the supply chain performance including those by James, Fitzpatrick, Lewis and Sonneveld (2005), who established that sustainability associated to packaging systems of product is not only an abstract concept, but it is also a complex phenomenon that is very much open to diverse interpretation.

On the other hand, study carried out by Grönman (2013) ascertained that both environmental assessment of packaging and the product should be assessed together in order to avoid neglecting the effects of packaging to the environment. However, the author suggested further study on factors to be considered by firms in making packaging decisions. Furthermore, Geng and Mansouri (2017) investigated the relationship between green supply chain management and performance. They generalized GSCM practices and performance in the study and their

justification of the empirical generalization was based on GSCM practices having been implemented differently in different organizations. However, this study concentrated on one aspect of sustainable packaging and analyze its impact on the performance to the supply chain of COA manufacturing. Hence, the study aims to empirically provide a relationship between sustainable packaging practices and SC performance of firms.

Lee (2010) while studying the effects of the design of the package on the entire supply chain, the authors findings indicated that selecting the right material and the correct size for packaging design could considerably cut the logistical costs. The findings further suggested that the members of a department need to think hard whenever they are in the supply chain. The researcher considers this a very important determinant of success in many commercial activities, but yet, very much under-discussed. However, the study failed to look at the factors considered in selection of appropriate packaging design and materials that will improve the performance of supply chain during their disposal. Another study by Rao and Holt (2005) on their study to investigate the relationship between green SC and economic performance and competitiveness concluded that, organizations need to integrate greening practices in their SC for the purpose of increasing the competitive advantage. The study did not highlight disposal of packaging materials and their impact to the SC performance.

From the above studies, it is clear that no study has been carried out on the concept of packaging and SC performance in pharmaceutical firms in Ghana. This study therefore seeks to complete this research gap by clearly answering the following research questions: What are some of the sustainable packaging practices at COA manufacturing? What influence do sustainable packaging practices have on COA manufacturing supply chain performance? What factors are

considered in selection of sustainable packaging materials and design have on supply chain performance?

1.3 Objectives of the Study

The general objective of the study is to examine sustainable packaging and its effect towards sustainable supply chain performance. However, the specific objectives are as follows;

1. To examine the effect of economic packaging practices on sustainable supply chain performance.
2. To examine the effect of environmental packaging practices on sustainable supply chain performance.
3. To examine the effect of social packaging practices on sustainable supply chain performance.

1.4 Research Questions

In order to meet the objectives of the study, the study would find answers to the following questions;

1. What is effect of e effect of economic packaging practices on sustainable supply chain performance?
2. What is the effect of effect of environmental packaging practices on sustainable supply chain performance?
3. What is the effect of social packaging practices on sustainable supply chain performance?

1.5 Significance of the Study

This study on the mediating role of strategic sourcing on the relationship between sustainable packaging and sustainable supply chain performance is relevant for many reasons. It has both theoretical and managerial complications.

Various stakeholders in pharmaceutical industry will benefit from this study including COA Manufacturing Company Limited and other pharmaceutical firms. The supply chain managers will understand the benefits of adopting sustainable packaging initiatives and the impact on SC performance. By understanding what impact that adoption of packaging integration has on supply chain performance, this will help management in planning for the future. This will in the long run to facilitate their competitiveness in the market. This will increase the levels of profitability of firms and cut on operational costs.

Future studies will be made with the use of this study as the reference material. Academicians and other scholars will also benefit from this study since they will use it as a reference for further studies in relation to role of packaging on supply chain performance. Policy makers will also benefit from this study on the areas to do with sustainability, role of stakeholders that require policies to intervene in order to make supply chain more efficient and eco-friendlier.

1.6 Overview of Methodology

For every research, the methodological approach is very necessary. The research design adopted for this study is both descriptive and explanatory designs. Because the study aims to test the relationship between sustainable packaging and supply chain performance, a quantitative approach was used. Also, qualitative approach was employed to delve into the subject matter through interviews with key personnel of the case study organisation. The population of the

study is management and staff of COA manufacturing Company Limited. The research mainly used questionnaire and interview as the research or data collection instruments to collect primary data. A sample of about 100 respondents was selected through purposive and convenience sampling techniques. The collected data was analysed using statistical tools such as descriptive statistics, correlations and regressions with the aid of computer programs such as Microsoft Excel spreadsheet and Statistical Package for Social Scientists (SPSS). The qualitative findings were transcribed and reported in line with the objectives of the study. The findings were reported descriptively and explanatorily in line with the objectives of the study.

The study focuses on COA manufacturing Company Limited as a case study. Theoretically, the study focuses on sustainable packaging in three dimensions namely economic, environmental and social as well as supply chain performance as the key variables of the study.

1.8 Limitations of the study

The researcher in conducting the study encountered certain limitations which is norm for any research work. As was envisaged by the researcher, non-responsiveness was a threat to the study because the quality of the study is dependent of the participant willingness to response appropriately to the questions. This is because as respondents are left to respond to the question on their own, it was very likely that, they will respond but in “any how” manner. There was apathy to shown by some respondents. Inadequate time and other resource constraints did not suffice for a large sample size and wider scope of the study.

The study should have considered some moderating variables such as top management support and length of relationship. However, for parsimony, these were not included in the model. Future studies may consider these variables. Also, the small sample size used for the study may limit the

generalizability of the finding. Future studies may expand the sample to other firms improve its generalizability.

Other limitation for this study is the use of a single case study organisation – COA manufacturing Company Limited. Because of their widespread nature in mainly the selected industry, it would make their accessibility difficult for the researcher. Since the researcher is limited by inadequate time and financial resources, it would be a drain and as such, a sample of selected public sector institutions especially in the security services would be selected for this study. Therefore, the depth of the research would be shallow. However, these limitations did not affect the validity and reliability of the study as the results and findings of this study could be replicated following similar methodology.

1.9 Organization of the Study

The study would be organized into five Chapters. Chapter One provides the introduction of the study which comprise the background of the study, problem statement, objectives of the study, research questions, significance of the study, overview of methodology, scope of the study, significance of the study and organization of the study. Chapter Two provides both theoretical and empirical review of existing literature in the area of debt management in the banking industry and also in line with the objectives of the study. Chapter Three gives details on the methods and methodological approaches that were used to conduct the study. This comprises the research design, population and sample of the study, sources of data, data collection techniques, data analysis as well as ethical consideration and research quality indicators. Chapter four provides the presentation of the data gathered from the field, the analysis and discussions in line with the objectives of the study. Chapter Five finally provides the summary of findings,

conclusions and recommendations of the study for managers and decision makers to consider for adoption and implementation.

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CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This Chapter reviews extant scholarly works on the subject matter of the study by past researchers. These include conceptual review, theoretical review and empirical review on the concepts of e-procurement and organisational performance. The underlying theories reviewed the e-procurement perspective theory and the resource-based view (RBV) theory. The Chapter ends with the conceptual framework of the study in line with the objectives of the study.

2.2 Conceptual Review

This section reviews the key concepts of the study including definitions, meanings, overviews, etc. of the key variables of the study in terms of literature from the world, Africa and Ghana specifically.

2.2.1 Sustainable Packaging

Due to globalization, products movement from the manufacturers, to the end consumer, require proper storage, protection and distribution which is backed personally by appropriate packaging materials as the products move along the chain of supply. Organizations are forced to have sustainable policies and strategies on how to achieve the set policies. Among the many key strategies that are being used to boost sustainability program is the embedment of sustainable packaging in the strategic vision (Tyssen 2011). sustainable packaging market (Smithersa, 2013), is estimated to grow to about 244 billion dollars by 2018 and projected to grow at a CAGR of 7.17% from 2015 to 2020.

Waste of packaging is the remains when a product is used and is highly conspicuous provoking strong reactions. In developed countries, for instance, the United Kingdom, packaging wastes make about twenty percent of all the local wastes and six percent by weight of the total waste (Packaging Survey, 2013). A packaging material that is well - designed has significant benefits as it avoids the waste of the product itself. If packaging goes to landfill, energy and other resources that need to be conserved go to waste. One way of avoiding this and achieving sustainable packaging is recycling through incineration. The increased use of packaging material has resulted in the burden disposal of waste thereby increasing urban landfill sites imminent exhaustion (Twede and Goddart 1998). The visibility of litter in household dustbin packaging waste led to charges including wasteful use of resources and excessive packaging. According to (Soroka 1999) good packaging should reduce waste in an organization's supply chain and improve on performance.

SPA originally identified the four pillars of sustainable packaging under the titles of effective, efficient, cyclic and clean. These pillars aimed at reducing waste products and improving the functionality. Emphasis to pinpoint the idea that sustainability is a process that requires continuous improvement rather than an endpoint that is pre-determined (SPA survey, 2013).

The pharmaceutical substances packaging materials together with the containers serving as preservers are mostly harmful to the environment. As a whole, packaging has negatively impacted the environment. In 2005, Environmental Protection Agency (EPA) noted that 31 percent of the generated wastes came from material used for packaging: glass; metals; plastics; papers, and paperboards. Firms need to use environment safe packaging materials that have minimal or no harm to the environment. Such materials may be biodegradable, recyclable and reusable (McIntyre et al, 1998). Thus desired sustainable goals within an organization will be

achieved through efficient and effective use of reusable materials for environmental sustainability (Singh et al., 2011).

Packaging is one of the encompassing key elements for strategic implementation of sustainable supply chains (Pålsson and Hellström 2016). Packaging design should not only focus on its primary role of protecting the products but it should also offer an opportunity for product differentiation and simplicity in the logistics along the supply chain with the view to minimize the negative impact on the general society and the environment.

Hellström (2011) added that packaging is in itself a source of innovation in the processes, the products, and materials, hence, reinforcing its imperative contribution to competitive improvement of the supply chains performance. In view of the above, Porter and Kramer (2006) observed that organizations are beginning to understand the relationship between organizations and sustainability through embracing sustainable practices is the key to long-term success of the organization.

2.2.2 Factors Affecting Selection of Packaging Materials

Singh (2011) suggested that the sustainable goals the Kenya and the whole world seek to achieve, are greatly impacted by the use of materials that can be reused and recycled. Advanced nations have established systems for data collection at critical points for their pharmaceutical companies. Packaging in the marketing sector is important because it communicates, attracts consumer's attention, influences consumer perception, appeals and motivates consumer's desires for the product. In the retail environment, packaging serves as the tools for product promotional (Vranesevic, Vignali and Vrontis 2004). When assessing packaging and its impact on the environment and performance, it's advisable that the two should be accessed together thus at the

end, will be able to determine how packaging impact the environment (Grönman and García-Arca, 2014). Players in packaging sector are continuously working towards creation of newer products and carry out R and D activities to come up with innovative solutions that can support pharmaceutical manufacturers in cost saving while delivering value to end users. However, all participants involved do not adhere to the set regulations on packaging sustainability (Owusu, Muntaka and Bonsu, 2016). Many in the industry still associate greening of the supply chain as an expensive affair and many firms are tiptoeing round the sustainability idea.

2.2.2.1 Cost

The cost-effectiveness of packaging material depends on more than just its price. In selection of a packaging material to use, there is need for selection of a packaging material that is cost effective. Complex packaging practices result to higher costs of packaging which may lead to lower sales of goods Dominic (2015). There is need for adopting a simple packaging system and use of durable materials that will offer protection of goods. In packaging, price, is usually perceived not to be a very crucial consideration but has much impact on the final cost of a product. There is need to tradeoff between sustainable packaging and cost. The vendor or supplier has to balances between price and quality. For instance, some packaging types are lighter than others, reducing transportation costs, while others are easier to handle and help boost production efficiency (Kye 2013), thus able to save the environment and brand name of the organization.

2.2.2.2 Eco-Design

Technical improvement to products and processes in order to mitigate environmental costs is the primary focus of eco design concept. Implementation of eco design requires internal integration of all functions including direct control of producers, managing relationships with suppliers,

consumers, recyclers and governmental authorities (Gonzalez, 2005). The success of eco-design requires internal cross functional cooperation among intra-organizational units within a company as well as cooperation with outside partners throughout the supply chain.

There is no doubt that environmental considerations and sustainability is fundamental to the determination of the type of packaging material that can be adopted by a firm. Lee (2003) identified three main packaging functions which include a commercial, a logistic, productive and environmental. Ahi and Searcy (2015) expanded the three functions to nine further functions which includes the production, protection, commercial, logistic packaging, purchase, environmental, ergonomic and legal functions. The researchers added that correct integration of these into packaging would result to sustainable packaging and would therefore constitute the SPL approach.

There is need to choose packaging materials that are eco-friendly and should comply legally with transport as well as the laws and regulations that govern shipping. Additionally, the products should not impinge on the rights and the copyrights that are already in existence. Manufacturing firms are required to use biodegradable materials, reuse and recycle to save on existing resources. Suppliers and customers alike should share responsibility in the reuse, reprocessing and conservation of packaging supplies. They are more concern on environmental issues and hence will consider purchasing products that are more environmental-friendly even if they are highly priced (Phanidou 2012). It is observed that consumers prefer precision of green product claims, information provided on the products package and its advantages (Suki, 2013).

2.2.2.3 Quality and Functionality

The type of packaging used should be one that offers protection to the products from damages that may occur to goods in transit. Packaging is effective only if it provides protection to the product against damage in transit, William (2008). There is need for investing in high-quality packaging materials that keep products secure till they reach the end customer or distribution facility. It is costly to replace a damaged product later than to invest in durable and tamper-evident packaging now. There is need to get adequate information about products by getting their samples and ensure that their quality is good and they are durable (Dominic, 2015). This process is normally skipped by many entrepreneurs leading to packaging materials that are of poor quality. Firms need to undertake market survey and investigate the numerous packaging solutions available. By use of samples, one gets the opportunity to assess the suitability of the material with the type of goods one has and need to check the material used and test if it can endure external factors during distribution (Sigh, 2011).

2.2.2.4 Size, Shape and Design

Packaging should always follow standard shapes and sizes in order to improve flexibility, and convenience, transportation and handling and to promote the product through effective visual recognition. (Paine and Paine 1992). Rundh (2005) suggested that packaging should be treated as one of the important parts of the product as a whole. It can be in different forms in the business of the supply chain, that is: the form of sale and the form of a primary package. This constitutes a unit of sale to the ultimate consumer. The secondary packaging is mostly used for the purpose of distribution. Finally, tertiary packaging also termed as the transport is used in the supply chain management. Depending on where in the supply chain the business is conducted packaging can either be in the form of a sales or primary packaging which constitutes a sales unit to the final

consumer. Depending on the size, shape and design of packaging materials, the cost aspect should be considered and total impact to of the entire supply chain performance.

One of the major functions of packaging is provision of protection for the goods and services. Through packaging very fragile goods can be transported from one point to another while in transit. Although packaging needs to be durable the degree of protection required will highly depend on the fragility of the goods. For food products, for instance, freshness is very crucial. William (2008) while selecting the packaging to use, firms should choose packaging items with safety features. Security of the products is a crucial determinant of the packaging material. Opaque wraps are also helpful in obscuring the products for enhanced security and privacy, Pharma (2016). This is what will enable a firm to find out the applicable packaging materials to choose, Hansen (2012). Products that involve too much handling during the supply process need more flexible packaging methods for maximum protection. Likewise, items that may need storage before supply may want extra packaging solutions. The same goes for pieces that may mix with other products during shipment.

2.2.3 Sustainable Packaging practices

The choice of packaging systems and organization decide to adopt, affects the environmental, the economic, and social supply chain performance. The concept of the Triple Bottom Line developed by John Elkington (1997) has changed the way sustainability is measured by firms, nonprofit organizations and governments.’ The flexibility of the TBL allows firms and organizations to on the three fronts; the planet, the people and profits in a manner that suit their specific needs. According to Brown (1987), companies view and implement sustainability practice in different ways according to their different needs to be achieved.

Packaging is one of the key determinants of the implementation of the strategies for sustainability and efficiency. Packaging is not only considered the traditional means of protecting various products, (Williams 2008; Verghese 2015), but it is also having the capacity to improve the products differentiation capacity as well as improve the product efficiencies at both production and the logistic levels. This efficiency is seen in both logistics and the environmental terms (Grönman 2013). The logistic terms may include the supplying process, transportation, storage, handling and distribution, while the environmental terms may include minimized packaging sizes as well as raw materials. As a result, the design of packaging affects both the direct and the indirect costs. The direct costs may include factors such as purchasing and disposal of wastes whereas the indirect cost include factors such as storage, transport, losses, and so on. These indirect costs help the understanding of certain decisions and their impacts.

The use of unit load is also a very important aspect that enables consolidations of goods and packages and this makes transportation more efficient. It is crucial for the influence and economics of a logistics operation, as selecting the most appropriate type and size of a unit load minimizes the rate of material movement which improves supply chain performance. Furthermore, the correct unit load ensures that the standard storage is used with optimum utilization of equipment. It also minimizes the times for loading and unloading and enhances protection of product, security and aging of stock (shelf life).

The general features of flexible packaging include: light-weight; less energy to manufacture; minimal transportation costs; minimal generation of greenhouse gases; and general ease to get to the end consumer. Regulators have also played an important role in ensuring ecological safety by all parties involved. In the year 1994, the 94/62/EC Directive for packaging and packaging wastes was issued by the European Union (EU). Its main objective was to provide a high level of

environmental protection through harmonization of the management of packaging as well as waste packaging.

Kleivas (2005) attennated that packaging influences almost all logistics activities. It is necessary to carry out packaging solutions properly for effective distribution and handling of materials. Excellent product design can determine if the logistics are going to be possible or not. They affect logistics in modularization, packaging manufacturing, handling and transportation, (Bowersox, Close, Bixby and Cooper, 2002). Sustainable Packaging practices and Social Dimensions entails safety of the products, trends in recycling, refuse and yard waste. In addition, the packaging system effectively contain and protect the products thereby adding value to the products.

2.2.4 Supply Chain Performance

The focus on operations optimization has shifted from a specific organization or facility to whole supply chain in the last two decades. Optimization along the entire processes and steps ensures production of greatest value with the least costs possible. A focus on supply chains is a step towards the broader adoption and development of sustainability, since the supply chain considers the product from initial processing of raw materials to delivery to the customer. According to (Linton and Yeomans, 2004) sustainability also must integrate all the operations and processes beyond supply chain management: product design, manufacturing by-products, by-products produced during product use, product life extension, product end-of-life, and recovery processes at end-of-life.

Several measures have been formulated to gauge supply chain activities and the determination of the appropriate type of gauge is not easy since focusing on one aspect such as cost reduction may

improve cost effectiveness with the sacrifice of the performance of the entire supply chain system (Arrowsmith, 2013). The general performance indicators of the supply chain with regard to: time; flexibility; quality, and cost are the indicators of both effectiveness and efficiency (Arun and Ozdamar 2005).

Supply chain performance refers to the activities that are extended in meeting the requirements of the end-customer such as availability of product, timely delivery, and all the inventory and capacity necessary in the supply chain to responsively deliver that performance (Zhang and Okoroafo 2015). Kurien and Qureshi (2011) gave the definition of supply chain performance measurement as the overall set of measures used to estimate both the competence and capability of the supply chain. The supply chain performance indicators include: time; flexibility; quality, and cost are the indicators of both effectiveness and efficiency (Arun and Ozdamar 2005). A supply Chain cannot be optimized unless there is optimization of packaging. Slight adjustments in a package's dimensions can help improve the manner in which products are stored and transported which in the long run enhances the levels of efficiency (Tom, 2016).

According Cagnazzo, (2009) Performance Management is not a new topic in application to supply chains. As a matter of fact, competition to supply chains between individuals and organization has resulted in increased attention to the performance management in supply (Bai,2012; Taticchi, 2012). Eccles (1991) noted in his performance measurement manifesto that progress that involve concentrating on performance simply between financial and non-financial perspectives is key to the success of organization. Firms have come to the realization it is necessary to manage and monitor measured organization performance for effective competition in the ever-changing complex environment (Sharma 2005).

Improvements of supply chain performance cuts across the silo metrics which inhibit chain- wide improvements. According to Vogel (2011), the supply chain performance is highly impacted by macro factors namely corporate supply chain and the supply chain management. It is on this basis that firms have shifted from individual organizational performance to procurement and supply chain performance through designing smart supply chains with the aim of enhancing triple bottom line (TBL) performance and competitive advantage within the organization. An environmentally friendly supply chain (SC) was designed by Wu and Dunn (1995) for one organization with greening beginning from the stage of procurement to storage, distribution and consumption. This chain however, does not involve the cross-company activities. The green principles must be sinking across the whole SC for effective management of products from start to the finish.

2.2.4.1 Supply Chain Performance Measurement

Several measures have been formulated to gauge supply chain activities and the determination of the appropriate type of gauge is not easy since focusing on one aspect such as cost reduction may improve cost effectiveness at the expense of the performance of the entire supply chain system (Arrowsmith, 2013). Supply chain performance indicators includes time, quality, flexibility, cost y management, reduced lead times and reduction in inventory. SCP is used to measure efficiency and effectiveness of the process.

Measurement of Supply chain performance helps to raise the level of c and collaboration and understanding among the partners of the SC and to increase the wide integration of the. Different metrics were used to estimate the SC level performance in the past (Moullin 2007) depending on the process involved or objective to be achieved. However, most of the old measures of the

supply chain such as the use of customer satisfaction or service, or cost, are not enough to measure the efficiency of the SC (Ahi, Searcy and Jaber, 2016).

According to the research carried out by Jonathan, Klassen and Vaidyanathan (2007), Supply chains must be explicitly being extended to include its by-products, consider lifecycle of the product, and to optimize the product from its total cost of ownership till end of life. Supply Chain Performance can be measured either qualitatively or quantitatively.

2.2.5 Sustainable Packaging and Supply Chain Performance

Players in packaging sector are continuously working towards creation of newer products and perform activities to enhance development and provide innovative solutions which can support manufacturers of pharmaceutical products in saving costs and offer value to buyers. The Environment Protection Agency (EPA), consumers, state government bodies, pressure groups and NGOs are all demanding business entities to be environmentally responsible.

The new packaging logistics concept is putting emphasis on the synergy that is attained by mixing the systems of logistics and packaging with the efficiency and the influence of supply chain management through improving of logistic as well as activities involved in packaging. In simple terminologies, the interplay and the good connections between logistic and systems packaging increases add-on values on the entire supply chain, from the acquisition of raw material to the disposal of empty packages (Azziz, 2012). However, in the existing operational environments, such innovations must take into consideration the market and flow functions, and the environmental function. It targets to minimize the limitations of the packaging system to the environment by concentrating on issues such as the use of lesser inputs while achieving the same

outputs and the re-use of materials and facilitating packaging recycling in supply chain management (Pharma, 2016).

The main aim of supply chain management has always been to ensure that customers are fully satisfied; however, it is important to note that there are many variables that can interfere with this process. Packaging can particularly affect the dependability of product's, its quality, speed, costs, and flexibility. At the same time, this may also have an impact on life cycle of the product. The environmental supply chain management improves organizations environmental impact, while at the same time, provides a number of business possibilities and advantages such as: enhanced business, increased public image, minimized legal non-compliance risks, and attracts customers who are environmentally aware, Improves productivity and increased efficiencies, and more sustainable products. Companies need to improve their traceability and deliver more improvements to customers in order to achieve a long-term customer satisfaction strategy (Pharm, 2016).

In supply chain, Packaging plays a significant role. Packaging plays a crucial part for the product process as well as the supply chain of the product. It makes distribution easier. It ensures products are protected from undesirable environmental conditions, such as: moisture; light; oxygen; microbes; mechanical stresses, and dust (Caster, 2012). They also allow labeling to provide consumer with information concerning the content. They also ensure convenience to the consumer, for instance easy opening. Basic requirements for a packaging include: good marketing properties; reasonable price; technical feasibility suitability for food contact; low environmental stress, and suitability for recycling (Ahvenainen 2003).

Through the entire SC processes, organizations are advised to look for opportunities to make packaging materials reusable. Whenever possible, design for recyclability. One of the most effective ways to preserve the energy expended in manufacturing packaging materials is through recycling. While many materials, such as paper and PET, may be widely recycled, oftentimes coatings, labels, and other elements added to enhance package functionality or aesthetics may render them unfit for the recycling stream. But new options are emerging.

During the distribution process, a firm is to evaluate its distribution system for space-saving opportunities in packaging which results in excess materials, transport, handling, and storage. To reduce a package size while maximizing on space, packager must know the mode of transport to be used and then minimize the package size to hold everything at the lowest possible cost.

2.3 Theoretical Review

The main purpose of this study was to examine the influence of e-procurement on organizational performance. Singleton (1988) states that all studies should be grounded on theory. According to the Oxford English dictionary, a theory is an idea used to account for a situation or justify a course of a course of action. It is a supposition or a system of ideas intended to explain something, especially one based on general principles independent of the thing to be explained.

2.3.1 Life Cycle Assessment (LCA) Theory

It is generally considered one of the best environmental management tools that can be used to compare alternative eco- performances of use, recycling, reuse and disposal systems (McManus 2010). LCA theory is an international accepted method for backing up the idea that one product, service or technology is preferable to another as far as the environmental considerations are concerned (ISO 14040 Series). LCA considers the environment as a whole, from the process of

extracting raw materials to the return of wastes to the ground known as cradle- to- grave approach (Curran 1996). Cradle to grave policy refer to the whole system from manufacturing, to usage, recycling, reuse and disposal of pharmaceutical packaging wastes.

The LCA theory will be used for the evaluation of the environmental negative effects associated with the pharmaceutical packaging waste recycling, biodegradable and incineration. This theory is relevant with the goal of quantifying the overall environmental performances of materials for packaging from the initial stages of production up to disposal of the material. The theory will help to determine the best packaging material that will have minimal negative impact to the environment and compare it to the performance of a firms SC as far as quality, responsiveness and cost reduction are concerned.

2.3.2 Transaction Cost Economics Theory (TCE)

According to TCE, production economics are the key determinants of transactions in a firm. According to this theory, firms are economic factors which make use of the most efficient mechanism for transactions (Williamson, 1981). It offers an analytical framework used in making comparison between services that are outsourced and those that are provided in-house (Lacity and Hirschheim, 1995). This theory facilitates the determination of outsourcing success in terms of economic benefits. TCE provides the best decision-making basis to help firms to decide what to outsource and all preparations required. Firms outsource their non-core activities to facilitate their ability to gain cost advantages, (Aubert, 2004).

This theory is related to this topic of study basing on the general idea that acquisition of packaging materials may be in house production or may be outsourced from the well experienced suppliers who will help overcome inefficiencies in the internal organization. There is need to

incorporate cost aspects in the act of selecting materials for packaging for firms and their disposal methods used – incineration, landfill.

2.4 Empirical Review

This section reviews empirical studies carried on the subject matter from different context in order to make inferences for this study.

Many studies have been carried out on Packaging integration and its effect on supply chain performance. In the study, Grönman (2013), ascertained that both environmental assessment of packaging and the product it contains should be assessed together in order to avoid neglecting the effects of packaging to the environment. Besides, the study added that green packaging should simplify the product and all the logistic along the supply chain in order to reduce the overall negative effects to the environment. The supply chain impact on the environment could include release of toxic wastes to water, soil and air and loss of biodiversity. Others include green- house effects and long-term effects to the natural ecosystem.

Geng and Mansouri (2017) study looked at the connection between green supply and the performance of supply chain management. They generalized green supply chain management practices and performance in the study. Justification of the empirical generalization was based on GSCM practices having been implemented differently in different organizations. However, this study will concentrate on one aspect of green supply chain management (Packaging) and analyze its performance impact to the supply chain of Kenya Medical Supplies (KEMSA).

Lee (2010) while studying the effects of the design of the package on the entire supply chain. The findings indicated that selecting the right material and the correct size for packaging design could considerably cut the logistical costs. The findings further suggested that the members of a

department need to think hard whenever they are in the supply chain. The researcher considers this a very important determinant of success in many commercial activities, but yet, very much under-discussed. However, the study failed to look at the factors considered in the selection of appropriate packaging design and materials that will improve the performance of supply chain during their disposal.

Rao and Holt (2005) study on the relationship between green supply and the economic performance and competitiveness concluded that, organizations need to integrate greening practices in the SC so that to be in a position to obtain a competitive advantage. However, the paper did not highlight disposal of packaging materials and their impact to the supply chain performance.

2.5 Conceptual Framework

According to Mathieson (2001), a conceptual framework is a written or virtual product that explains, either in narrative or in graphically form, the main things to be studied, the key elements being variables, concepts and the presumed relationships among them. Conceptual framework, according to (Stratman and Roth, 2004), are structured from a set of broad theories and ideas that help a researcher in properly identifying the problem they are looking at, frame their research questions and find suitable literature. Most academic research uses a conceptual framework at the outset because it helps the researcher to clarify his research question and objectives.

The conceptual model outlined below shows the relationship between sustainable packaging and supply chain performance. The independent variable is sustainable packaging practices which

include: use of environmentally friendly materials in packaging and selection of packaging materials and design. The dependent variable is supply chain performance

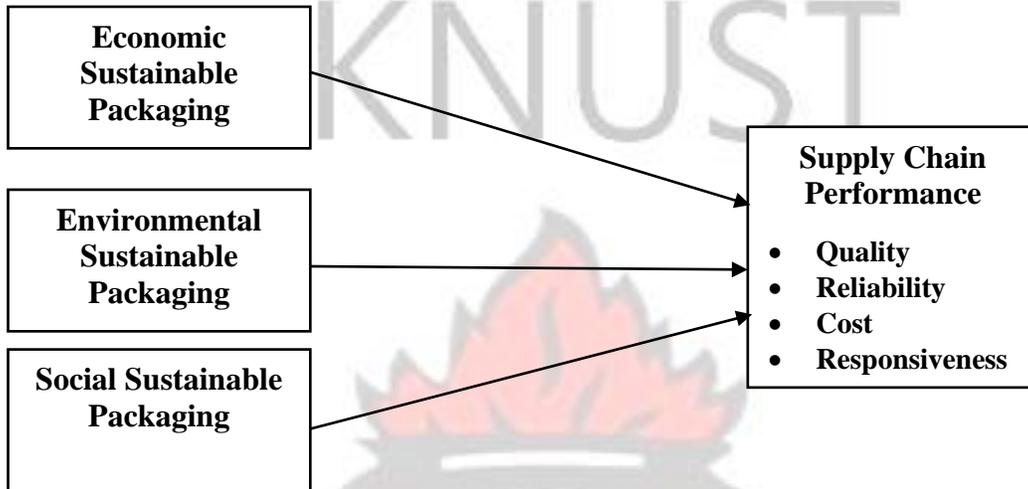


Figure 2.1: Conceptual Framework of the Study
Source: Researcher’s Construct, 2023

CHAPTER THREE

RESEARCH METHODOLOGY AND PROFILE OF ORGANISATION

3.1 Introduction

This chapter is dedicated to the research methodology and methods that were employed in conducting this study. Therefore, it begins with the research design, which is basically the blueprint for conducting the entire study. The chapter further looks at the research design, sample size and sampling techniques, sources of data, data collection tools, data analysis, research quality as well some ethical consideration. The next sub-sections expound on these components.

3.2 Research Design

Research design refers to the blueprint or map which guides the conduct of every research (Bryman, 2016). Research design is the purpose of the study and the approach that the researcher adopts to collect and analyse the required data. A research design may be exploratory, explanatory, descriptive, causal or a combination of these for a particular study.

Robson (2011) explained that exploratory study basically delves into “what is happening; to seek new insights; to ask questions and to assess a phenomenon in a new light”. A researcher may adopt this design when there is inadequate information concerning the understanding of the research problem and the researcher is uncertain about the precise problem.

Also, other studies look at the causal relationship of one variable over the other and this may be termed as explanatory study (Robson, 2011). The focus of this design is to study a situation or problem in order to explain the relationships between or among variables and then gather relevant data on the data and test statistically with tools such as correlation and regression to

have a better view of the relationships. Finally, with descriptive design, it gives a vivid and detailed profile of persons, events or situations (Robson, 2011).

For this study, as the research sought to establish the relationship between sustainable packaging and supply chain performance in Ghana, there was the need to adopt both the explanatory and descriptive design which is in line with the quantitative approach chosen for this study.

3.2.1 Research Strategy

Research strategy mainly looks at the approach adopted by the researcher for the study, whether qualitative, quantitative or mixed. According to Bell et al. (2018), a qualitative approach involves non-statistical methods and small sample sizes and mostly use purposive sampling technique. It looks at getting deeper understanding of the research problem and not necessarily generalisation, hence an inductive approach geared towards discovery and high validity of a unique phenomenon (Creswell, 2014).

The quantitative approach on the other hand deals with numerical statistical analysis that provides quantitative information (Creswell, 2014). This approach involves the use of a questionnaire to gather data from a larger sample size for a statistical data analysis.

However, when both approaches are merged in a particular study or phenomenon, then it means that a mixed approach is adopted. For this study, the researcher employed the quantitative approach as the study involved examining the relationship between sustainable packaging and supply chain performance in Ghana. Since the focus was on staff and management of COA Manufacturing company, and the study sought to explain the causal effect, it was necessary to use questionnaire to gather data and employ statistical analysis to determine the causal effect.

3.3 Population of the Study

For every study, it is necessary to define the population. Population main refers to the members of a group people or subjects defined as a study's respondents to whom the research measurements can be ascribed to in terms of findings, results and inferences (Dudley, 2011). In defining the population of this study, staff and management of COA Manufacturing company within the Central and western regions constituted the population of the study. Looking at the case organisation, the selection of respondents for this study from this scope makes incredible for this study.

Although the organization has numerous departments, this study targeted the procurement department because it includes members who are well informed on the supply chain activities of the organization. This further implied that the target population was in the best position to provide insightful information that is not only relevant to the topic of study but also important in answering the raised research questions.

The Procurement department of COA Manufacturing Company Limited is divided into four sections and three levels of management. The departments include Procurement, Warehousing, Transport and Distribution departments. Members of the procurement department include a procurement director, procurement managers, senior procurement officers and procurement officers while an operations manager, senior operations officer and, warehousing officers and floor supervisors are form the warehousing department and transport officers are in the transport department. Finally, the distribution department is also comprised of a distribution manager, senior distribution officers and loaders. The total number of individuals and their level of

management in the respective departments are as indicated in table 3.1 bringing the total target population to 222 for the two regions.

Table 3.1 Total Population of the Study

Level of Management	Designation	Department	Number
Top Level	Procurement Director	Procurement	1
	Operations Manager	Warehousing	1
	Distribution Manager	Distribution	1
	Transport Manager	Transport	1
	Senior Procurement Officers	Procurement	2
Middle Level	Procurement Officers	Procurement	35
	Assistant Operations manager	Warehousing	1
	Floor Supervisors	Warehousing	15
	Assistant Manager	Distribution	1
	Assistant Manager Transport)	Transport	20
Lower Level	Procurement Supervisors	Procurement	5
	Pickers and Consolidators	Distribution	15
	Loaders	Warehousing	100
	Supervisors (Transport)	Transport	24
Total			222

Source: Field Study, 2023

3.4 Sample Size and Sampling Techniques

Sampling has been defined by Neuman (2011) as the process of selecting a part of a population or subjects of interest to represent that population of the study. Since this study involves a survey of staff and management of COA Manufacturing company within the Central and western regions, the population size is infinite and it would be time consuming and exhaustive to conduct a census survey. The researcher used a sample size based on Stutely's (2003) assumption. Thus, if a population has homogeneous characteristics, a sample of 30 is good enough to conduct a study. As such, the researcher chose a sample of 30 respondents from among the staff and

management of COA Manufacturing company within the Central and western regions to conduct this study.

The sampling was done by following an appropriate sampling technique. Sampling technique involves the method used by the researcher to identify and locate research participants for the study (Bell et al., 2018). The researcher used simple random and convenience techniques to select the participants for the study. Thus, both probability and non-probability techniques were adopted for this study. The researcher used a sampling technique called purposive or judgemental sampling as well as convenience sampling technique to identify participants for the study. Convenience sampling however involved selecting participants who were readily accessible and willing to participate in the study. The researcher relied on participants who were staff and management of COA Manufacturing company especially with the security services within the Central and western regions.

3.5 Sources of Data

For every research, two main sources of data are available to the researcher – primary source and secondary source. Primary source of data consists of information that has been collected by the researcher hands-on to achieve a purpose of the study. Primary data are original in nature and are directly related to the issue being investigated. Primary data are the data that the researcher collects through interviews or the use of questionnaires. For this study, the main source of primary data was from the use of questionnaire which was developed from extant scales used by other researchers in line with the objectives of the study.

3.6 Data Collection Procedure

This section details the instrument that was utilized by this study. Given that the research design adopted by the study is a case study under descriptive design, and that the study is qualitative in nature, interviews were used as the main data collection tool. An interview is described as a chat linking two or more people where questions are asked by the interviewer to obtain facts or remarks from each interviewee. This data collection tool has several advantages including the fact that individual researcher is expected to gain important insights based on the profundity of particular message gathered and the enlightenment of “key informants” and also because interviews are a beneficial means for generating data based upon informant’s preferences, views, and concepts. Moreover, personal communication at the point of the interview indicates that data can be verified for correctness and pertinence as they are gathered (Brinkman, 2014).

The researcher constructed a structured interview where each interview is presented with precisely the same questions in the corresponding sequence as stated by Gill, Stewart, Treasure and Chadwick, (2008). It also means that the questions have a restrained clique of response levels since questioning is regulated and the systemization and phrasing of specific questions are held uniform from interview to interview. One advantage associated with using a structured interview is that the interview can be administered efficiently with interviewers instructed only to follow the guidelines on the interview design or questionnaire (Gill, Stewart, Treasure and Chadwick, 2008).

The researcher administered the interview to the selected respondents in the sample extent. It is crucial to note that the structured interview questions will be created prior to the interview. Additionally, a neutral, casual and friendly setting was set for the interviews and only data from

the interviewee's input was considered. This process is expected to take at least 4-8 days after which the data can be gathered for analysis.

3.7 Data Analysis

The data analysis procedure adopted by this study was content analysis. This is a research analysis technique that is used to draw replicable and valid inferences from textual material (Neuendorf, 2016). This technique is valuable in organizational research because it allows researchers to recover and examine the nuances of organizational behaviours, stakeholder perceptions, and societal trends. The process involved identifying data sources, developing categories from the sources, assessing reliability and finally analyzing the results. Data sources were identified and target population chosen. Data collection was then conducted by collecting qualitative data using data collection tools, mainly interviews and questionnaires. The data obtained from interview transcripts was then categorized and converted into coding units after which trends were identified. These trends were then used to draw conclusions. However, before that an analysis of the reliability of the data was to be conducted. Neuendorf (2016) pointed out that this technique is a reliable way to analyse qualitative data as the coding units are not open to interpretation and so are applied in the same way over time and with different researchers.

3.8 Research Quality

The quantitative approach was adopted for this study in order for researcher to be as objective as possible. Based on this, the researcher used the results generated from the statistical analysis to make an interpretation. A key standard which defined the study is that, various issues concerning the study have been reviewed theoretically in the context of the literature. The researcher reported accurate findings in order to prevent any form of false credibility. In order to achieve

internal validity, the researcher drew conclusion purposely from the results generated from the data analysis. In addition, other statistical methods were employed to test if there is any existence of bias as well as checking for validity and reliability of the research instrument (interview guide).

3.9 Ethical Consideration

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

3.10 Profile of COA Manufacturing

The COA Research and Manufacturing Limited Company was incorporated under the Companies Act in the year 2020 as a Limited Liability Company. The COA-RMLC is an offshoot of the Center of Awareness Global Peace Mission. The COA-RMLC is the producer of COA Mixture, an herbal medicine registered by the FDA for general well-being. The COA-RMLC presently has a staff strength of 160 and hundreds of Distributors, Agents, and retailers in

Ghana, UAE, USA, UK, Europe among others. The company is known for its innovative approach in the field of research and manufacturing.

The COA Research and Manufacturing Company Limited (RMCL) was established to:

- i. Conduct research into plant and natural medicines.
- ii. Use the research findings to produce plant medicines.
- iii. Conduct market feasibilities for making the products visible on the market

WORKING PROCESS

The COA Research and Manufacturing Limited Company was incorporated under the Companies Act in the year 2020 as a Limited Liability Company. The COA-RMCL is an offshoot of the Center of Awareness Global Peace Mission. The COA-RMLC is the producer of COA Mixture, an herbal medicine registered by the FDA for general well-being.

The COA-RMLC presently has a staff strength of 160 and hundreds of Distributors, Agents, and retailers in Ghana, UAE, USA, UK, Europe among others. The company is known for its innovative approach in the field of research and manufacturing.

With a team of brilliant minds, COA's primary focus is on developing ground-breaking solutions in the area of plant and natural medicines. Our relentless pursuit of knowledge and deep understanding of scientific principles have propelled the company to the forefront of our respective fields.

COA's commitment to research and development is unparalleled. The company is in the process of establishing a state-of-the-art laboratory and research facility, equipped with cutting-edge

technologies to facilitate its investigations. By fostering a collaborative work environment and encouraging interdisciplinary research, COA-RMLC has successfully bridged the gap between theory and practical application.

In terms of manufacturing, COA-RMLC is renowned for its precision and attention to detail. The company have the capability to produce high-quality products, meeting the requirements and demands of clients.

It is worth mentioning that COA-RMLC is not just a profit-driven company. The company strive to make a positive impact on society and the environment. Through our extensive corporate social responsibility initiatives, COA-RMCL supports educational programs, environmental conservation efforts, and community development projects.

In conclusion, COA Research and Manufacturing Limited Company stands as a testament to the power of scientific inquiry and innovation. With our unwavering dedication to research, state-of-the-art manufacturing capabilities, and commitment to social responsibility, COA continues to shape the future relative to integration of traditional and orthodox medicine.

The company has a Quality Assurance Department that is responsible for the implementation of Good Quality Management Systems. The COA-RMLC is working towards achieving ISO 9001-15. The COA-RMLC is poised to be the Standard in plant medicine production in Africa.

CHAPTER FOUR

RESULTS, ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results of the data analysis processes of the primary data gathered through the survey. The results are presented in the form of tables and also through narrative. The chapter submits the findings of the study and provides a submission on the discussion of the findings that seek to provide answers to the objectives and research questions of the study.

4.2 Demographic Background of Respondents and Institution

The researcher sought to investigate sustainable packaging practices and supply chain performance of pharmaceutical firm in Ghana by taking the case of COA Manufacturing Company Limited. This section provided a description of the respondents who took part in the study. The researcher identified four different departments namely procurement, warehousing, distribution and transportation. Figure 4.1 illustrates the distribution of respondents who were interviewed from each department.

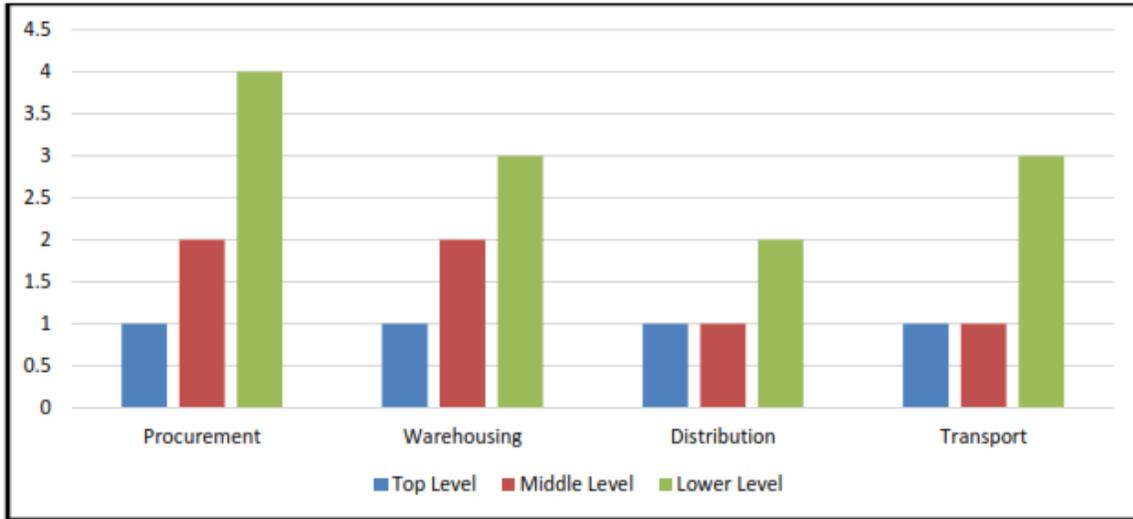


Figure 4.1: Summary of Demographic Background of Respondents

Source: Field work, 2023

4.3 Reliability Test Results

The researcher conducted a Cronbach's test to determine the reliability of the questions included in the research instrument. There was a total of 13 questions included in the interview form. A Cronbach's alpha of 0.824 indicated that the interview questions were indeed reliable (Table 4.1). According to Bonnet and Wright (2015), a Cronbach's alpha value of above 0.7 is considered reliable".

Table 4.1: Test of Reliability

Number of Items	Cronbach's Alpha
13	0.824

Source: Field work, 2023

4.4 Sustainable Packaging Practice of COA Manufacturing Company Limited

The researcher sought to identify some of the sustainable supply chain practices adopted at COA Manufacturing Company Limited. To ascertain this, respondents were asked various questions including their understanding of sustainable packaging, some of the best sustainable packaging practices that are implemented and how the practices would affect Supply Chain Performance. According to members of the procurement department, COA Manufacturing Company Limited does not have well elaborated sustainable packaging practices because the organization acts as a middle person between suppliers of medical supplies and public health institutions in the country. The procurement manager pointed out that a lack of suitable infrastructure that supports economically viable solutions for collection and recovery of medical supplies from waste materials is one of the major challenges the department faces. This not only increases the costs associated with procuring medical supplies but also reduces the performance of the department due to increased losses.

Additionally, the warehousing, transport and distribution managers also identified a problem with the lack of clear sustainable packaging practices in the organization noting that it made it difficult for purchasing managers to procure innovative products due to limitations on material innovation as new, optimized materials may not possess the required infrastructure for collection and recovery. According to the warehousing manager, a reduction in the amount of filler materials used to package a product for shipment to customers also reduces the cost to the manufacturer, who in this case is the supplier. It follows therefore that sustainable companies reduce the cost of shipping products by increasing the number of products shipped at one time.

The distribution and transportation managers on the other hand had similar notions about the importance of having a sustainable packaging practice. Specifically, the distribution manager noted that “Purchasing managers need to devise a complete objective list that addresses concerns about sustainability and helps in designing an effective Request for Proposals for the procurement of sustainable packaging materials”.

Upon asking the respondents about their definition of sustainable packaging, their response was that it is the use of materials and manufacturing methods for the packaging of goods that has a low impact on both energy consumption and on the environment. The procurement manager was quick to point out that adopting these practices result to packaging that is “easily recycled, and is safe for individuals and the environment.” On the other hand, one of the assistant procurement officers noted that in sharp contrast, sustainable packaging maximizes the use of recycled materials and low-impact production processes, thereby minimizing on operational cost.

The researcher also found that according to the respondents, one of the best packaging practices that are implemented at COA Manufacturing Company Limited is disposal and returns. These meant that the packaging materials used for all medical commodities in the organization need to be biodegradable so that it is easier to dispose them off or return them to the supplier if case be or when incineration take place, they do not pollute the air. Recycling was the least preferred packaging practice as pointed out by majority of the respondents who cited that recycling containers and other forms of packages used to store medical supplies can be harmful to both people and environment.

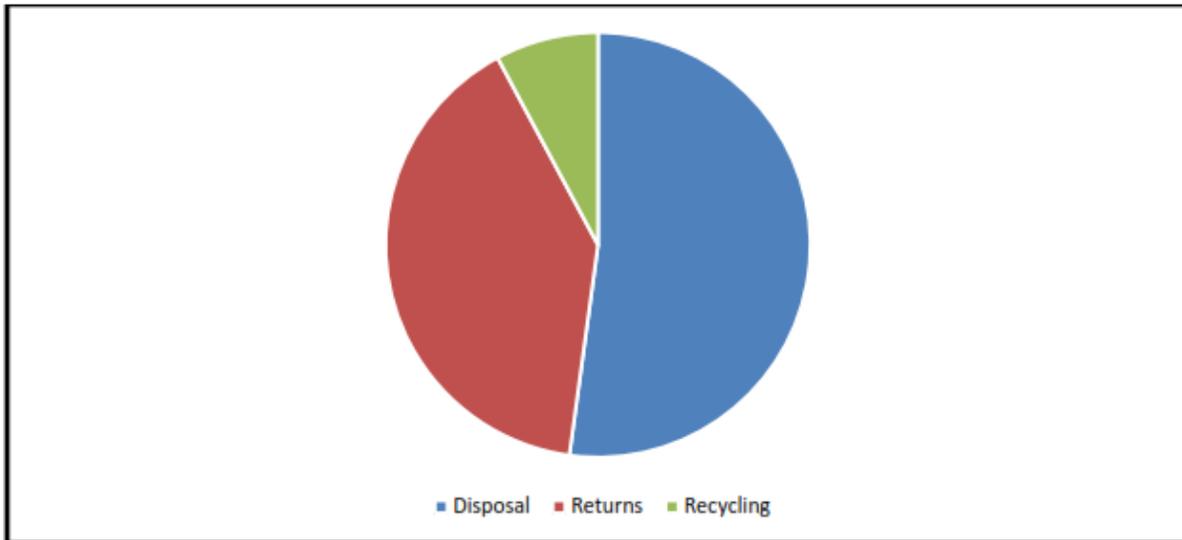


Figure 4.2 Best Packaging Practices

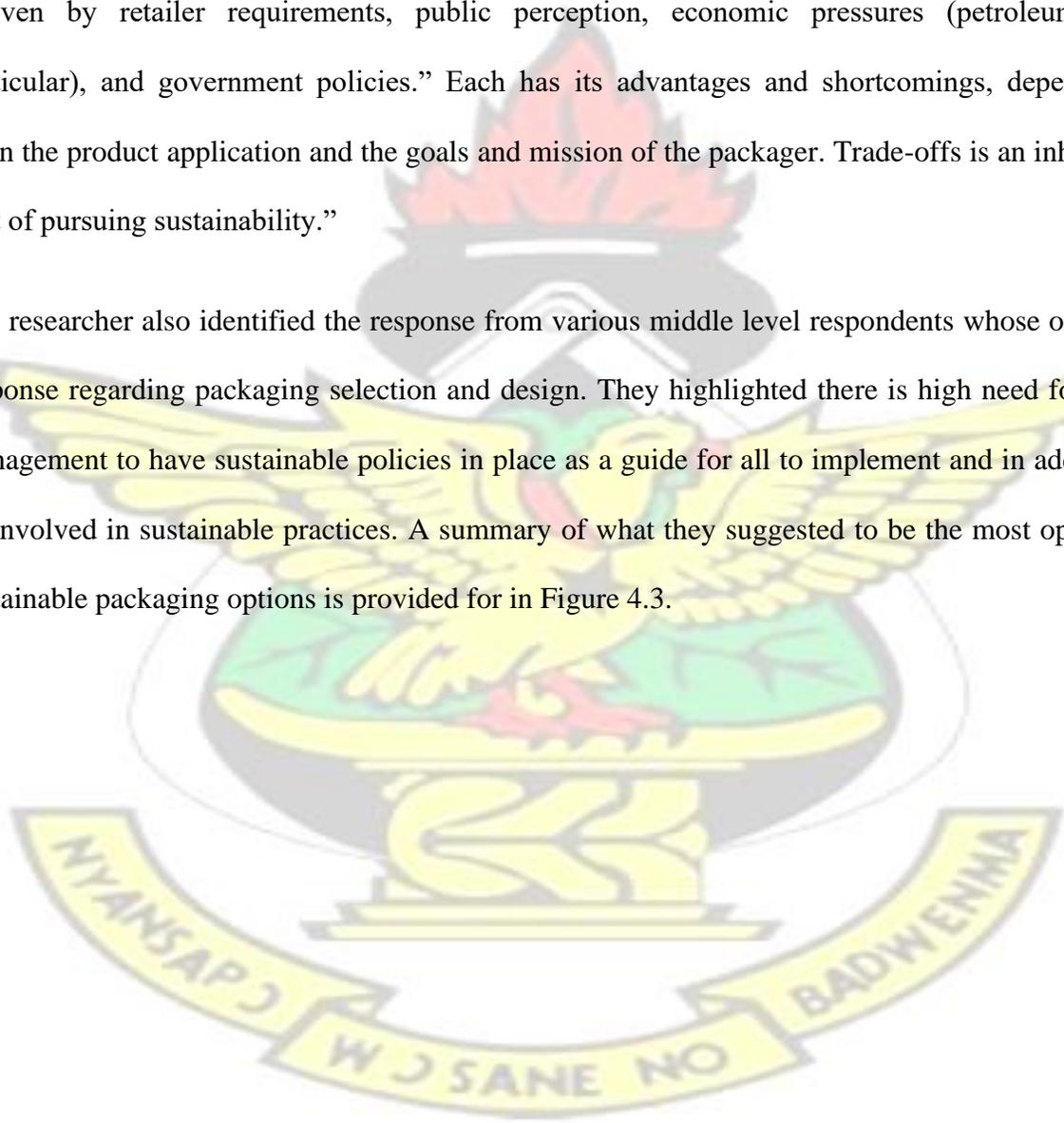
Source: Field work, 2023

Incineration was identified to be the most used form of disposal as pointed out by all respondents from all departments. Incineration is a high-temperature method of waste treatment involving the burning organic materials found in waste. Particularly, it involves converting waste materials into ash, flue gas, and heat. The ash mostly consists of inorganic components of waste and can be in the shape of solid lumps or particulates carried by the flue gas. As pointed out by most respondents, this kind of disposal is not sustainable considering the disadvantages it holds. Not only is it expensive but also pollutes the environment. Incinerators produce smoke during the burning process. The smoke produced includes acid gases, carcinogen dioxin, particulates, heavy metals, and nitrogen oxide. These gases are poisonous to the environment. They therefore suggested better alternatives to disposing off inorganic packaging material including thermal treatment, such as microwave technologies, steam sterilization, such as autoclaving, electroplyolysis and chemical mechanical systems, among others.

4.4.1 Selection of Sustainable Packaging Materials and Design

Environmental consciousness has resulted in the demand for sustainable and bio-based materials for packaging. The researcher found out that COA Manufacturing Company Limited is also among the organizations that have realized the need to establish sustainable packaging practices especially since there are none at the moment. One assistant manager pointed out that this need is “driven by retailer requirements, public perception, economic pressures (petroleum, in particular), and government policies.” Each has its advantages and shortcomings, depending upon the product application and the goals and mission of the packager. Trade-offs is an inherent part of pursuing sustainability.”

The researcher also identified the response from various middle level respondents whose overall response regarding packaging selection and design. They highlighted there is high need for top management to have sustainable policies in place as a guide for all to implement and in addition be involved in sustainable practices. A summary of what they suggested to be the most optimal sustainable packaging options is provided for in Figure 4.3.



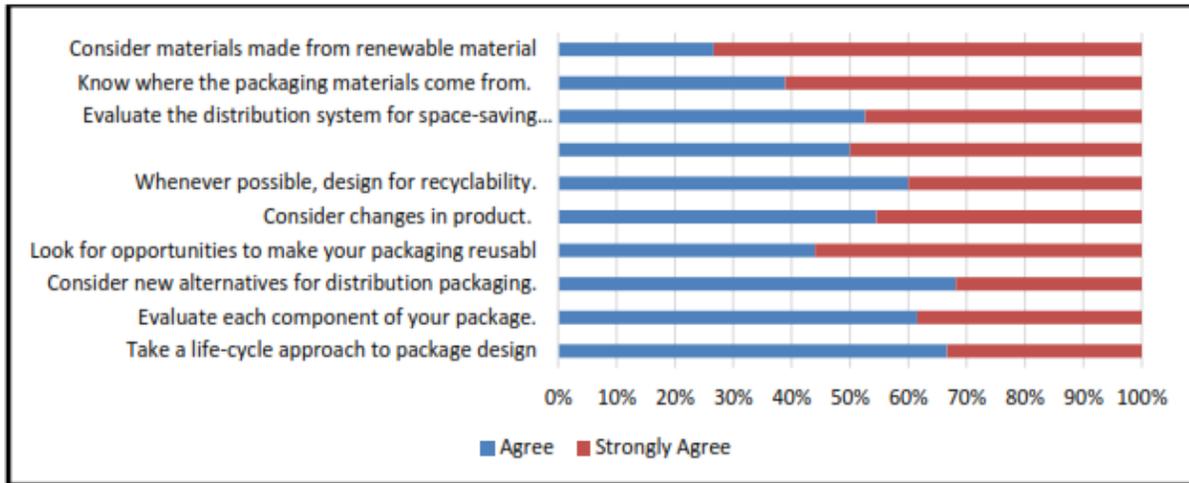


Figure 4.3 Sustainable Packaging Materials and Design

Source: Field work, 2023

4.5 Sustainable Packaging and Supply Chain Performance of COA Manufacturing Company Limited

The increase in the emergence of regulations that require the adoption of environment-friendly manufacturing practices compels purchasing managers to choose eco-friendly packaging solutions over synthetic plastics (Dominic, Östlund, Buffington and Masoud, 2015). Additionally, the need to ensure high performing supply chain has led many organizations to adopt sustainable packaging practices evolving around the three pillars of sustainability, environmental, economic and social.

Even though this study found that there was one sustainable packaging practice adopted by COA Manufacturing Company Limited. At the time the research was being conducted, respondents identified some of the potential benefits that could be achieved by the organization’s supply chain. Besides reduced inputs in terms of materials used to package medical supplies, the organization will lower on disposal costs considering that sustainable packaging leads to

reduction in waste materials. From an economic perspective, the selection of the “best packaging” is usually connected with considerations involving improved sales and reduced costs. This, compared to companies that produce hazardous waste can save considerable disposal costs by reducing the amount of waste or developing a process to reuse the material.

This study also established that the selection of sustainable packaging material and design can go a long way towards improving the supply chain performance of the organization. Specifically, the organization could potentially take a life-cycle approach to package design. This means that the organization has to evaluate each component of the packaging material, consider new alternatives for distribution packaging and look for opportunities to make the packaging reusable. It was also pointed out that the organization will have to consider changes in the product, design for ease in recyclability, ease during transportation and storage. It was also observed that packaging strategies/policies be implemented to encourage product consumption, evaluate the distribution system for space-saving opportunities and above all, know where the packaging materials come from. All these factors would lead to an effective and sustainable packaging practice that would improve supply chain performance.

Sustainable packaging practices like reduction of the quantity of packaging material should be made to reduce the bulk of pharmaceutical packaging material so that lesser waste will be generated which can be easily biodegradable, reusable, nontoxic and inert. Secondly, the use of recyclable or biodegradable packaging material such as aluminum, paper and glass create less waste and hence they are environmentally safe.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the conclusions drawn from the findings of the study relative to the objectives of the study. The goal of this study was to establish the relationship sustainable packaging and supply chain performance of COA Manufacturing Company Limited. The study used correlation and regression analysis to meet the objective of the study. The chapter also presents recommendations for the study.

5.2 Summary of Findings

The study set out three key objectives which were to meet the objectives of the study. This section presents the findings in line with these objectives.

This study sought to investigate the effect of sustainable packaging practice on supply chain performance of COA Manufacturing Company Limited. Indeed, pharmaceutical industries consideration of sustainable packaging is increasing momentum as all the involved stakeholders are encouraged to incorporate sustainable initiatives in their processes in order to achieve the triple bottom line benefits.

The concept of sustainability packaging is understood differently at diverse supply chain levels. This study therefore sought to complete this research gap by clearly answering the following research questions: What are some of the sustainable packaging practices at COA Manufacturing Company Limited? What influence do sustainable packaging practices have on COA Manufacturing Company Limited's supply chain performance?

In order to answer them effectively, the study adopted a case study approach and therefore focused on COA Manufacturing Company Limited. This methodology involves conducting an empirical investigation into a particular situation or phenomenon within an organization. The study investigated the relationship between sustainable packaging practices and supply chain performance of COA Manufacturing Company Limited. The design is important to gain the rich view of the study and its processes.

Besides allowing an in-depth analysis that would not normally be easily obtained by other research designs, case studies are best conducted on rare cases where large samples of similar participants are not available (Meyer, 2015). This study therefore took advantage of this attribute considering that COA Manufacturing Company Limited is the leading public distributor of medical commodities to county facilities. The study also targeted 222 individuals from four different departments namely the Procurement, Warehousing, Transport and Distribution departments in the central and western regions of Ghana.

Members targeted from the procurement department include a procurement director, procurement managers, senior procurement officers and procurement officers while an operations manager, senior operations officer and, warehousing officers and floor supervisors are from the warehousing department and transport officers are in the transport department. Finally, the distribution department is also comprised of a distribution manager, senior distribution officers and loaders. A sample of 22 respondents were then selected and interviewed for purposes of collecting data. The results were analyzed using content analysis. A summary of what the study found for each objective is as follows;

The researcher sought to identify some of the sustainable packaging practices adopted at COA Manufacturing Company Limited. The respondents pointed out that COA Manufacturing Company Limited does not have a clearly defined sustainable Packaging practice policy in place.

The procurement manager pointed out that a lack of suitable infrastructure that supports economically viable solutions for collection and recovery of medical supplies from waste materials is one of the major challenges the department faces. This not only increases the costs associated with procuring medical supplies but also reduces the performance of the department due to increased losses and damages (Grönman and García-Arca 2014).

Additionally, the warehousing, transport and distribution managers also identified a problem with the lack of clear sustainable packaging practices in the organization noting that it made it difficult for purchasing managers to procure innovative products due to limitations as presented by the Public Procurement Amendment Act, Act 216 which states that for public entities, the best process for securing competitive bids is through OIT (Open International Tender).

This makes it a challenge for the organization to select one best source of sustainable packaging materials. The distribution and transportation managers on the other hand had similar notions about the importance of having a sustainable packaging practice. Specifically, the distribution manager noted that “Purchasing managers need to devise a complete objective list that addresses concerns about sustainability and helps in designing an effective Request for Proposals for the procurement of sustainable packaging materials”.

On the other hand, senior transport manager noted that since the Public Procurement Amendment Act, Act 216 set regulations that govern procurement process, then, the team need to include

sustainable packaging concept in the bid document as a mandatory specification (Vranesevic, Vignali and Vrontis 2004).

Owing to the fact that the study found less use of sustainable packaging practices were adopted by COA Manufacturing Company Limited, the researcher inquired on what qualified as best strategies that the organization can adopt. The study therefore found that besides reduced inputs in terms of materials used to package of the medical supplies, the organization will lower on disposal costs considering that sustainable packaging leads to reduction in waste materials.

This study also established that the selection of sustainable packaging material and design can go a long way towards improving the supply chain performance in terms of costs. Specifically, the organization could potentially take a life-cycle approach to package design and also consideration of the unit load during transportation. These results are consistent with what Ahvenainen (2003) and Grönman (2013) found in their studies respectively.

5.3 Conclusion

The study therefore concluded that COA Manufacturing Company Limited does not have a concrete reliable sustainable packaging practice in place. It was, however, established that the organization could benefit from having such a practice in place to a great extent. Specifically, it will lead to a reduction in the amount of filler materials used to package a product for shipment to customers also reduces the cost to the manufacturer, who in this case is the supplier. It follows therefore that sustainable companies reduce the cost of shipping products by increasing the number of products shipped at one time through consolidation of products. It was also established that a lack of suitable infrastructure that supports economically viable solutions for collection and recovery of medical supplies from waste materials is one of the major challenges

that affects COA Manufacturing Company Limited. This not only increases the costs associated with procuring medical supplies but also reduces the performance of the department due to increased losses.

This study also concluded that the selection of sustainable packaging material and design can go a long way towards improving the supply chain performance of any pharmaceutical firm as the case with COA Manufacturing Company Limited. However, specific factors need to be considered while taking this approach; a life-cycle approach to package design, evaluation of each component of your package; consideration of new alternatives for distribution packaging and looking for opportunities to make the packaging reusable. All these factors would lead to an effective and sustainable packaging practice that would lead to improved supply chain performance.

5.4 Recommendations

The study has established the effect of sustainable packaging on supply chain performance. Based on conclusions made, the study made several recommendations to COA Manufacturing Company Limited and other pharmaceutical companies thereof. It is important to note that a suitable infrastructure that supports economically viable solutions for collection and recovery of medical supplies from waste materials needs to be in place before implementing any sustainable packaging practice.

Failure to have it will not only increase the costs associated with procuring medical supplies but also reduces the performance of the organization due to increased losses. It is important to have clear sustainable packaging practices considering that lacking it makes it difficult for purchasing

managers to procure innovative products due to limitations on material innovation as new, optimized materials may not possess the required infrastructure for collection and recovery.

It is also recommended that organizations reduce the amount of filler materials used to package a product for shipment to customers since this will reduce the cost to the manufacturer, who in this case is the supplier. In the long run, sustainable companies reduce the cost of shipping products by increasing the number of products shipped at one time.

Purchasing managers also need to devise a complete objective list that addresses concerns about sustainability and helps in designing an effective Request for Proposals, Standard Bidding Documents for the procurement of sustainable packaging materials that are easily recycled, and safe for individuals and the environment at large. The inclusion of sustainable policy in the bid documents is a starting point and a mandatory requirement to suppliers to abide by.

On the extent of sustainability and SC Performance, it is the role of top management to put in place policies that favour and support implementation of sustainability practices. Early Supplier Involvement plays a big role in the start of the process of sustainable practices.

There has to be a trade of between sustainable practices and the cost aspect. The balance should not favour one dimension of sustainability and neglect the other two dimensions. On addition to trade of an organization has to identify its SC measures and KPIs that will align to sustainable practices. If sustainable practices are adopted well, then an organization can benefit through increase in visibility, reputation locally and international, improved sales and quality among others.

5.5 Suggestion for Future Studies

This study recommends further research to be conducted on other sustainability factors and their impact on the supply chain of organization. On addition other emerging trends like Block chain,

Omni-channel, Artificial Intelligence and their role to supply chain performance of an organization.

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APPENDIX

INTERVIEW QUESTIONS

Introduction

My name is Patricia Osei-Assibey Bonsu, a master's student at KNUST. As a partial fulfillment of the course, I am conducting research on *sustainable packaging and supply chain performance in pharmaceutical companies in Ghana: A Case Study of COA Manufacturing Company Limited*. I am kindly requesting for a few minutes of your time to ask you the following questions that will guide in analysis and finding making a conclusion.

Kindly note that the information provided will be treated with the utmost confidentiality and I am collecting this information solely for academic purposes. Your contribution is highly appreciated.

Department.....

Level of Management.....

Date.....

QUESTIONS

1. What do you understand by i. Sustainability? ii. Packaging?
2. What is your definition of Sustainable packaging?
3. Can you please mention some of the best sustainable packaging practices implemented at COA Manufacturing Company Limited?

Recycling Consolidation Protection Packaging Design

Disposal Returns Cost reduction Minimized movement

Other Method if any:

4. What are some of the Supply Chain Performance measures COA Manufacturing Company Limited has put in place?

5. To what extent is green packaging practices implemented in the organization?

1. Not sure 2. No extent 3. Slight extent 4. High Extent

6. How do the above-mentioned practice(s) affect SCP of the organization?

7. How does the organization achieve the set objectives?

8. What's the relationship between sustainable Packaging and SC performance?

9. Can you please explain in short how selection of sustainable packaging materials is carried out, if any?

10. How relevant is transportation in ensuring sustainable packaging is a great contributor to organizational SC performance?

11. What is the role/view of top management towards the dimension of sustainability?

12. Do you perceive any gray area or weighing issue about sustainable packaging on the performance of the SC?

13. Do you have any other thoughts, suggestions, argument about the topic?

*Note: Additional follow-up questions were asked, as appropriate, with each participant.

