

**EFFECT OF GREEN SUPPLY CHAIN PRACTICES ON SUSTAINABLE
COMPETITIVE ADVANTAGE OF CEMENT MANUFACTURING COMPANIES,
KENYA**

BY

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**MASTER OF BUSINESS ADMINISTRATION (PROCUREMENT AND SUPPLIES
MANAGEMENT)**

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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ABSTRACT

The relationship between green supply chain practices and manufacturing companies has attracted a lot of attention in a world that is striving to control industrial impact on the environment. This study investigated cement manufacturing companies in Kenya and how green supply chain practices affect their sustainable competitive advantage. Its specific objectives were to establish the effect of green technology, eco-packaging and green logistics practices on the sustainable competitive advantage of cement manufacturing companies in Nairobi County, Kenya. This was achieved by adopting a descriptive research design that allowed the researcher collect information from employees in 5 cement manufacturing companies in the country. Descriptive statistics and regression analysis were then conducted on the data collected and inferences regarding the effect of the three selected green supply chain practices on sustainable competitive advantage were made. It was revealed that holding eco-packaging practices and green logistics practices constant, a unit increase in adopting green technology will increase organization sustainable competitive advantage by 0.053 units. Subsequently, holding green technology practices and green logistics practices constant, a unit increase in adopting eco-packaging practices will increase organization sustainable competitive advantage by 0.069 units. Furthermore, holding green technology practices and eco-packaging practices constant, a unit increase in adopting green logistics practices will increase organization sustainable competitive advantage by 0.329 units. The study also found that the effect associated with Green Technology, Eco-Packaging and Green Logistics Practices were all statistically significant as illustrated by significant p values 0.032, 0.041 and 0.029 which were all less than 0.05. Based on the study findings, therefore, the study concluded that green supply chain practices positively affect the sustainable competitive advantage of manufacturing firms in Nairobi County. Specifically, the study found that a positive change in the adoption of green technology practices leads to a positive increase in the sustainable competitive advantage of a cement manufacturing company. The study therefore recommended manufacturing companies to implement production methods that are environmental friendly since this approach elevates a company to a favourable position on the competitive advantage scale in the county.

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
CFC	Consideration for Future Consequences
GSCM	Green Supply Chain Management
IT	Information Technology
KAM	Kenya Association of Manufacturers
KNBS	Kenya National Bureau of Statistics (KNBS)
RBV	Resource Based Theory
SPSS	Statistical Packages for Social Sciences
TOE	technology-organization-environment
UNEP	United Nations Environmental Program

DEFINITION OF TERMS

Green Supply Chain: integrating environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product as well as end-of-life management of the product after its useful life (Chiou, Chan, Lettice & Chung, 2011).

Competitive Advantage: conditions that allow a productive entity to generate more sales or superior margins compared to its market rivals (McGrath, 2013)

Green Technology Practices: the application of technological innovation for purposes of changing the production of goods and services towards an environmentally friendly course (Anand, Rajan, Narayanan & Bapu, 2015).

Eco-Packaging Practices: the application of an environmentally friendly criteria to the development of a product with the aim of changing how people regard that product (Agus, 2011).

Green Logistics Practices: streamlining processes and introducing cost-saving initiatives that can bring the organization many benefits by optimizing warehouse operations, distribution centers can minimize land usage, lower energy costs and reduce waste production (Lai & Wong, 2012)

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Today man lives in a culture that has been shaped by the forces of the manufacturing industry. Human beings have placed an extreme value on the consumption of material goods. However, the environmental effect of this kind of culture is not always immediately visible (World Bank, 2016). As such, the global response of the modern world to the effects of manufacturing operations on the environment has been on the rise over the past decade. This has been the main forces driving the adoption of green supply chain among organizations. Indeed, of all the subjects in the international social and political discourse, human impact on the environment should be considered as among the most important subjects. This increase in concern is largely because the general public has become more aware of environmental issues and global warming so much so that questions regarding where and how products are being manufactured have increased. As a result, companies continue to be scrutinised as to how green their manufacturing processes and supply chains are, how big their carbon footprint is and how or if they recycle (Zhang, Shen & Wu, 2011).

This study intends to address the economic and environmental dimensions of sustainability, particularly with regards to green supply chain management. As pointed out by Chiou, Chan, Lettice & Chung, (2011), these concerns are major for manufacturing companies although he pointed out that some of these companies have actually managed to turn the consumer interest to the environment into increased profits by deploying green supply chain practices. This has therefore shown that indeed, there is proof of the link between improved environmental performance and financial gains. It is important to note that these gains are best realised in the supply chain department where organizations get to have increased profits by making their supply chains green. For instance, General Motors reduced its disposable costs by \$12 million by establishing a reusable container program with their suppliers. Additionally, a recent survey by McKinsey (2014) revealed that 43% of organizations in the United States alone seek to align sustainability with their overall business goals. This indicates that majority of the companies are becoming environmentally sensitive.

Although it took a significantly long time for the effects of global warming to capture public awareness, the modern world is fully aware of the reparations of taking environmental conservation for granted. On that breath, Cement manufacturing companies have the biggest

impact on the environment given the nature of their operations. As pointed out by Micelli, (2013), Cement manufacturing companies contribute to 45% of world's pollution into the environment. This is a large percentage that cannot be overlooked. Historically, it has taken man a longer time to identify the actual effect a certain technology has on the environment. This equally means that there is often a significant amount of damage done before policy can catch up. Identifying and curbing the impacts of industry on the environment is therefore the best approach to take (Winsemius, & Guntram, 2013).

Many manufacturing companies are still not yet aware of the potential cost benefits they can get from going green. By re-evaluating their supply chains from purchasing, planning and managing the use of materials to shipping and distributing final products, manufacturing companies stand to benefit a lot from savings (Agus, 2011). As such, implementing green policies is fast becoming a number one priority for these organizations, prompting the researcher to study how large cement manufacturing organizations stand to gain a competitive advantage from going green.

1.1.1 Green Supply Chain Practices

In order for organizations to address the increasing stakeholder requirements for environmentally sustainable products and processes, many manufacturing organizations need the participation of their supply chain partners. As such, green supply chain management has emerged as a set of managerial practices that actually allow the integration of environmental issues with supply chain management. Through its successful implementation, managers can be able to achieve competitive advantage while enhancing the environmental sustainability of their organizations. As pointed out by Testa & Irado, (2010), companies stand experience an improved corporate image, increased efficiency and innovation leadership that will lead them to prosperity.

Green Supply Chain Practices can be defined as any action performed across the supply chain to eliminate or reduce any kind of negative environmental impact either within the company or involving external partners (Azevedo, Carvalho & Machado, 2011). When performed internally, the main aim often is to ensure that the practices reflect the firm's decisions to act in an environmentally friendly way. Performing them externally on the other hand means that the organization is cooperating with other stakeholders. Internally, these practices generally include the use of environmentally friendly materials and equipment, incorporating environmental policies and audits as well as cross-functional collaboration on important

environmental issues. Externally, these practices largely involve supply chain partners through training, information sharing and setting joint environmental goals. Generally, therefore, these practices can be summarised into three main components; green technology, eco-packaging and finally green logistics. These three main components are what this thesis will be discussing throughout since they capture all supply chain operations involved in a manufacturing setting.

Lee (2015) asserts that firms can generally use either environmental collaboration or environmental monitoring to improve the environmental performance of their organizations and hence get a competitive advantage over their competitors. However, it is important to note that there are significant differences between the approaches in the nature of relationship, incentives and the sharing of benefits. The first approach is collaborative, cooperative and shares its benefits evenly. However, the second approach has an arm's length relationship, is competitive and shares its benefits unevenly (Green et al., 2012). The two approaches could however be used simultaneously too for better results.

For the sake of many Cement manufacturing companies seeking to improve their performance, there is need to clearly identify the relationship between green supply chain practices and competitive advantage. The fact that there seems to be a feasible relationship between these two makes it important to customize the relationship so as to bring the best out of it. The researcher therefore felt that by relating green technology, eco-packaging and green logistics to local but Cement manufacturing companies here in Kenya, then the chances of them getting better results is higher.

1.1.2 Sustainable Competitive Advantage

Sustainable competitive advantage is a key requirement for an organization that looks to thrive in the modern business environment without which a company is likely to succumb to pressure from competitors. McGrath, (2013) defined sustainable competitive advantage as a company's assets, attributes or abilities that provide a superior or favourable long term position over other companies. There are different types of competitive advantage that a company can take advantage of (Reuter, Foerstl, Hartmann & Blome, 2010). First, there is low cost provider, also known as low pricing where a company keeps its competitors at bay by having economies of scale and efficient operations. This is because being a low cost provider can be a significant barrier to entry and can also be used to build brand loyalty both of which could result to a huge competitive advantage. This also goes hand in hand with

having pricing power to decide the market price. Having this power means that an organization can increase its prices without losing market share. Companies that have pricing power are usually taking advantage of high barriers to entry or have earned a dominant position in their market.

It is also important to note that powerful brands are a very strong point of competitive advantage (Dao, Langella & Carbo, 2011). While it takes a large investment in time and money to build a brand, it takes very little to destroy it. This makes a good brand invaluable as it means that customers will always prefer it over other brands. Having a leading brand also means that the company is likely to be a market leader with a great corporate reputation. Another key competitive advantage that a company can have over its competitors is having strategic assets. These include patents, trademarks, copy rights, domain names and long term contracts. This is often backed up by a strong research and development team that constantly monitors the assets. Product differentiation is also another key competitive advantage asset to have. While a product that never changes is always ripe for competition, one that can be subjected to change allows for improvements or complimentary follow up products which will always keep customers coming back for the better version (McWilliams & Siegel, 2011). This is similar to product differentiation, where unique products are known to build customer loyalty meaning that the product is not likely to lose market share to a competitor. Other attributes to having a sustainable competitive advantage include having an outstanding management team that makes the right decisions and motivate its employees thereby getting the most out of them (Molla, 2011).

Sustainable competitive advantage should therefore be sought by any organization that looks towards getting that much needed competitive edge over its competitors. Going green serves to make this possible. However, how to incorporate it into the supply chain is the main issue (Chang, 2011). This thesis seeks to make the burden of understanding this concept less complicated by analysing the main practices that can be used to yield the most competitive advantage for Cement manufacturing companies in Kenya.

1.1.3 Cement manufacturing companies

The Cement manufacturing sector in Kenya is part of the manufacturing sector in the country comprising of large, medium and small scale manufacturing companies that serve both internal and external markets including the East African region and other parts of the world. The industries in Kenya are the largest, making the country the leading cement producer in

the region. Notably, the country is also the leading consumer of cement and this is best explained by the fact that it is the fastest growing economy in the region too.

All manufacturing companies, including the ones that fall under the cement industry are required to register under the Kenya Association of Manufacturers (KAM), which is the body that provides an essential link for co-operation, dialogue and understanding with the Government by representing the views and concerns of its members to the relevant authorities. Established in 1959, the body has evolved into a dynamic, vibrant, credible and respected business association that unites industrialists and offers a common voice for businesses. It is responsible for the promotion of trade and investment, the upholding of standards as well as the formulation, enactment and administration of sound policies that facilitate a competitive business environment and reduce the cost of doing business (KAM, 2017). Also, according to KAM, a small scale cement manufacturing company has a turnover of between 10 million and 20 million Kenya shillings while a medium scaled cement manufacturing company has a turnover between 10 million and 250 million. Any cement manufacturing company with a turnover of above 250 million is categorised as a large scale manufacturing company (KAM, 2017).

According to the Kenya National Bureau of Statistics (KNBS, 2016), over 80% of manufacturing companies are based in Nairobi and Thika towns while the remaining 20% are based in major towns and regions including Coast, Nyanza/Western provinces, Nakuru, Eldoret, Athi River and Nyeri. Additionally, majority of these manufacturing companies fall under the 13 sectors categorised by Kenya Association of Manufacturers (KAM, 2017). Most cement manufacturing companies are located in Nairobi and Mombasa. There are 19 cement manufacturing companies as indicated by the Kenya National Bureau of Statistics (KNBS), three of which are listed on the Nairobi Security Exchange (See Appendix II). Since all these manufacturing companies have an annual turnover of Ksh. 250 million and above (KAM, 2017), they all qualify the definition of a large cement manufacturing company adopted by this study.

Given the importance of the entire manufacturing sector to the economy, Kenya has included it in her vision 2030. The role of the manufacturing sector in Vision 2030 is to create employment and wealth. The sectors overall goal in the MTP is to increase its contribution to the GDP by at least 10% per annum as envisaged in the Vision 2030 (Ministry of Industrialization Republic of Kenya, 2010). A number of interventions are proposed in the

Vision which will lead Kenya to be globally competitive and prosperous. The objectives to be pursued are to strengthen the capacity and local content of domestically manufactured goods, to increase the generation and utilization of Research and Development results, to raise the share of products in the regional market from 7% to 15 % and to develop niche products for existing and new markets (Ministry of Industrialization Republic of Kenya, 2010). The researcher therefore identified Cement manufacturing companies as being part of the main drivers of this vision, thus a study on how to improve their competitive advantage would serve to help policy makers and other stakeholders achieve the vision.

1.2 Statement of the Problem

The global expansion witnessed in the modern business era has brought with it prosperity among the manufacturing industry. However, it has also brought problems including environmental degradation such as pollution, ozone layer depletion, climate change and loss of biodiversity as indicated by the United Nations Environmental Program (2016). As a result, stakeholders such as customers, regulatory authorities, competitors, non-governmental organizations and even employees are increasingly demanding for more sustainable and environmentally friendly processes and products. This has thus far become a major problem for manufacturing companies throughout the world that has left them in dire need of policies that will ensure that they meet the demands of their stakeholders and still remain competitive in the market. This is the main problem that this study intends to focus on, by providing green supply chain practices as a solution to these problems. For this reason, the relationship between green supply chain and sustainable competitive advantage would provide an insight as to how a balance can be achieved (Chang, 2011).

Many researchers have embarked on a mission to find out ways to help manufacturing companies solve this environmental problem while remaining competitive. An international study by Ainin, Naqshbandi & Dezdar, (2016) analysed how sustainable competitive advantage can be achieved through the adoption of green IT practices. The study concluded that green IT practices positively affect organizational performance. Another study by Weng, Chen & Chen, (2015) revealed that GSCM research related to organizational practices, environmental issues, process, performance and sustainability were found to be needing research the most within the GSCM domain. Locally, a studies on the relationship between green supply chain management and Cement manufacturing companies have been conducted by Mohamed (2010), Jemutai (2010), Muma, Nyaoga, Matwere & Nyambega, (2014) and

Mutisya & Kinoti, (2017). Mohamed (2010) revealed that green supply chain increases performance of organizations while this was a similar conclusion by Jemutai (2010) who concentrated on the automotive industry. On the other hand, Muma, Nyaoga, Matwere & Nyambega, (2014), who focused on the tea processing industry, also concluded that Green Supply Chain Management has a positive effect on. Finally, Mutisya & Kinoti, (2017) focused on chemical companies in Nairobi county and found a similar result indicating a positive relationship between GSCM and performance. Clearly, their views are that the respective companies have had a positive impact on financial performance thanks to implementing green policies. However, none of them considered green technology as a GSCM practice. It should also be noted that they all suggested further studies to be conducted on other areas so as to compare the results and see whether this conclusion is consistent.

Companies seeking to minimize the environmental impact caused by their business operations might find it very useful to effectively manage their increasingly complex supplier relationships (Darnall, Jolley & Handfield, 2008). This is because it is through supply chain management that the organizations will be able to plan and control business processes right from the procurement of raw materials to the end-customer. As illustrated by Linton, Klassen & Jayaraman, (2012), it is no longer just enough for an organization to be environmentally friendly but so should its supply chain. This shift in focus from company level to supply chain level has changed the game, requiring new policies to be put in place by managers. To that end, green supply chain practices have emerged as a way to combine elements of environmental and supply chain management together (Faunce et al., 2013).

Based on the assertions above, the researcher was prompted to conduct a study on green supply chain practices and sustainable competitive advantage among large cement manufacturing industries in Kenya. The study was different from others considering that it will include green technology practices besides other green supply chain practices such as eco-packaging and green logistics that have been investigated by other local studies. This is because green technology practices have had little attention. Through this study, top managers in these companies was able to find the perfect balance between environmental sustainability and the ever growing competition from their key competitors.

1.3 Research Objectives

The general objective was to establish the effect of green supply chain management practices on sustainable competitive advantage of Cement manufacturing companies in Nairobi County, Kenya. The specific objectives were as follows;

- i. To establish the effect of green technology practices has on sustainable competitive advantage of Cement manufacturing companies in Nairobi County, Kenya.
- ii. To determine the effect of eco-packaging practices on sustainable competitive advantage of Cement manufacturing companies in Nairobi County, Kenya.
- iii. To determine the effect of green logistics practices on the sustainable competitive advantage of Cement manufacturing companies in Nairobi County, Kenya.

1.4 Research Questions

Therefore, the research questions were as follows;

- i. What is the effect of green technology practices on sustainable competitive advantage of Cement manufacturing companies in Nairobi County, Kenya?
- ii. Does the implementation of eco-packaging practices affect the sustainable competitive advantage of Cement manufacturing companies in Nairobi County, Kenya?
- iii. Will practising green logistics affect the sustainable competitive advantage of Cement manufacturing companies in Nairobi County, Kenya?

1.5 Significance of the Study

This study was aimed at explaining how green supply chain practices can be implemented to address the increasing stakeholder requirements for environmentally sustainable products and processes. As such, it was significant to a number of people. First, the study was set to contribute to the discussion of the drivers of sustainable competitive advantage. This would enhance the understanding of the relationship between green supply chain practices and sustainable competitive advantage. The findings would be useful by researchers interested in making references as to how this relationship stands.

Results of this study would also make it possible to make informed policy decisions for policy makers in the sector. These decisions would also be based on empirical evidence from the field. For instance, the sector's direct relationship to Vision 2030 implies that policy makers could depend on results from this study to be able to determine whether the objectives sought have been met. It would also allow them to make the necessary changes that will allow for its full realization.

Finally, results from this study would also inform top managers in Cement manufacturing companies in region on the best green supply chain practices and policies to adopt.

1.6 Scope of the study

The study covered large cement manufacturing firms in Nairobi County, Kenya. A large cement manufacturing company earns a turnover of Ksh. 250 million (KAM, 2017). Additionally, since 80% of manufacturing companies are in Nairobi, this study mainly covered those found in this region.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presented the literature review that includes the theoretical, empirical as well as the conceptual framework and operationalization of the variables. The research hypothesis for the study were also be stated under this section.

2.2 Theoretical Review

This section presented the theoretical literature related to the study. This included three main philosophical theories that can be used to explain Green Supply Chain and its relationship to the sustainability of competitive advantage in an organization. The three theories are the Resource Based Theory, Systematic Theory and the Agency Theory.

2.2.1 Technology-Organization-Environment Framework

The technology-organization-environment (TOE) framework dates back to the works of Tornatzky and Fleisher (1990) who used it to describe the factors that influence technology adoption and its likelihood. TOE is often used to describe the relationship between technology, the firm and its environment. The technological context includes the internal and external technologies that are relevant to the firm (Baker, 2012). Technologies may include both equipment as well as processes while the organizational context refers to the characteristics and resources of the firm, including the firm's size, degree of centralization, degree of formalization, managerial structure, human resources, amount of slack resources, and linkages among employees. Finally, the environmental context includes the size and structure of the industry, the firm's competitors, the macroeconomic context, and the regulatory environment. According to Baker, (2012), it is through these three factors that organizations get to have opportunities to incorporate technology into their day to day activities. For instance, through the environmental concept, the organization gets to implement industry characteristics and market structure with the necessary technological support and government regulation.

In this context, Cement manufacturing companies are expected to run by a specific environmental code. This code is governed by the formal and informal links of the organization, which in turn depend on the industry characteristics and market structure. Therefore, in their pursuit for market share and hence profits, these organizations are

expected to play by some given set of rules pertaining the relationship between technology and the environment. Their decision to adopt technological innovation is vested on the effect their operations has on the environment. As such, green technology is born, as the organization seeks to ensure that its day to day operations are in compliance to the industry standards or government regulations. This not only enhances its position in the market but also gives it the much needed competitive edge over its key competitors. Additionally, most consumers would want to be associated with an organization that takes into account its environmental effects and does something about it. As noted by Bowonder, Dambal, Kumar & Shirodka, (2010), technology plays a critical role in ensuring sustainability, source reduction, innovation and viability. It not only makes it easier for organizations to become environmentally aware but also gives them the edge over the main competitors. All these are bound to have an impact on the operational performance of the organization that adopts them. This ranges from efficiency to accurateness. This study therefore intends to find out how cement manufacturing companies in Kenya can benefit from adopting these strategies from a technological point of view. The extent of this impact will then be analysed and provided for in the conclusion section of the paper.

2.2.2 Resource Based Theory

The Resource Based Theory (RBV) is one of the theories that show the relationship between the internal characteristics of an organization and its performance by viewing the firm as a bundle of resources. As highlighted by Hitt, Xu and Carnes, (2016), an organization's resources will sum up its ability to perform so much so that it will be able to secure an efficient bundle and flow of the right type of resources from its environment. This therefore implies that there are certain circumstances that need to be present if resources are to yield maximum output. Chae, Yang, Olson and Sheu (2014) pointed out that RBV is based on one key assumption; that firms have idiosyncratic as opposed to identical strategic resources\ that are not perfectly mobile and are therefore heterogeneous. This, in essence, means that the scarcer the organizational collection of resources the less the competitive advantage they will actually hold.

As elaborated by Weru (2014), RBV focuses on the capabilities of an organization. Capabilities are accumulated knowledge in organizations resulting from using its existing resources in an efficient and effective way to achieve its final goals (Butler, Leacock, Van Wie, Brody and Farmer, 2016). An organization's capabilities can be said to be positional,

functional, cultural or regulatory and are developed mainly from the existing skills and experiences, or through tastes and preferences, or even as a result of the perceptions of the individuals in the organization. All these are basically the resources attached to the organization and will shape the outcome of its performance. The theory implies that an organization with a culture supportive of continuous improvement, with existing process-based change regulations, and with previous experience in conducting continuous improvement projects, will attain higher levels of continuous improvement capabilities.

This theory can easily be interpreted in as far as the application of green supply chain practices to improve supply chain performance is concerned. Any organization that is looking to adopt green practices into its procurement chain should view the practices as its resources and capabilities. As described, these resources and capabilities are limited, thus their application should be based on a cost-effective plan. The end game would be to ensure that these resources are fully functional so as to bring out the best in the organization. In this case, the application of the different green supply chain practices will be key as it would ensure that the overall supply chain performance of an organization improves.

The relevance of this theory is best indicated by Butler, Leacock, Van Wie, Brody and Farmer (2016) who asserted that functioning at optimum levels can lead organizations to create competitive advantage. Sustaining competitive advantage, however, may require continual improvements to differentiate themselves from competitors, which is only achieved when capabilities are able to produce value, are rare, are imperfectly imitable, and are exploited by the organization.

2.2.3 System Theory

The Systems Theory was first introduced by biologist L. von Bertalanffy in the 1930s as a modelling device that accommodates the interrelationships and overlap between separate disciplines. It also holds a similar school of thought as the RBV theory in that they both explain the relationships within an organization. This theory focuses on how organizations use the systems' perspective to be able to organize complex operations, many of which are based on the central theme that businesses are systems comprising processes (Kerzner, 2013).

A system is any set of distinct parts that interact to form a complex whole. An organization is also a system with parts such as employees, assets, products, resources, and information that form a complex system. The theory asserts that these are the different parts of that make it whole and that the interaction between these parts is what constitutes its success. This

systems theory concept is used to explain how materials-flow, related activities, and information within and outside firms are so complex that they can be considered only in the context of their interaction (Shafritz, Ott and Jang, 2015).

Indeed, systems are open to, and interact with, their environments so that they can acquire qualitatively new properties through emergence hence resulting to continual evolution. It focuses on the arrangement of and relations between the parts which connect them into a whole. This makes it applicable to a wide range of concepts and principles. It distinguishes dynamic or active systems from static or passive systems such that while active systems are activity structures or components that interact in behaviours and processes, passive systems are structures and components that are being processed. This represents what happens in most manufacturing companies, as their processes need to be active in order for their day to day activities to be achieved (Hanson, 2014).

This system can be compared to the procurement of materials by a manufacturing company, where different parts have to be actively involved in order to come up with a working system. Adopting green supply chain practices serves to make the process smoother by creating a favourable environment where the different parts of the procurement system can function together hence producing desirable results. The desirable result in this case is an improved supply chain performance that reduces costs and subsequently results to sustainable competitive advantage. These green supply chain practices can also be compared to the theory because they are both systematic methods for improving operational performance of an organization. They incorporate design, develop systems and create ways for different parts of the system to work in unity towards a common goal and that is why the researcher felt obliged to include it in the study.

2.3 Empirical Review

This section presented the empirical review on the relationship between green supply chain practices and sustainable competitive advantage. It also provided a summary of the methodologies and findings of the researchers studies.

2.3.1 Green Technology Practices and Sustainable Competitive Advantage

Green technology is the application of technological innovation for purposes of changing the production of goods and services towards an environmentally friendly course (Anand, Rajan, Narayanan & Bapu, 2015). It is also used to describe means of energy production that are

deemed less harmful to the environment as opposed to the traditional ways of generating energy (Bag, Anand & Pandey, 2017). Yan, Chien & Yang, (2016) noted that green technology is a relatively young marketplace but investor interest runs very high in response to global warming fears and the increasing scarcity of many natural resources. As such, it has not been implemented by many organizations. However, rapid calls for global warming and climate change radicalization in the recent past means that green technology will be a very important aspect of all organizations. Moreover, its potential effects on the overall performance cannot be overlooked (Anand, Rajan, Narayanan & Bapu, 2015). This study therefore intends to elaborate to managers and owners of Cement manufacturing companies how they can tap this potential.

Several studies have investigated the effect green technology practices has on firm performance. Ainin, Naqshband & Dezdar, (2016) investigated the impact of adopting Green Information technology practices on organizational performance. According to them, sustainable development is largely achieved by investing heavily on modern technology. Indeed, advances in technology are forcing organizations to adopt practices that are more environment-friendly. Ainin, Naqshband & Dezdar, (2016) pointed out that green IT is one of the most important changes that an organization can effect. Through their study, they identified the adoption of green IT and its subsequent influence on the firm's performance in the context of a developing country, Iran. Using online questionnaires, they gathered information from managers handling the adoption of IT adoption in companies listed on the Tehran Stock Exchange. They reported that there existed a positive relationship of Green IT practices with institutional pressure, Consideration for Future Consequences (CFC) and openness. All these contributed to their conclusion that indeed, going green IT will have a positive influence on the organizational performance of a firm.

Another study by Weng, Chen & Chen, (2015) on the effects of green innovation on Environmental and Corporate Performance took a stakeholder perspective. According to the researchers, going green is an important factor that all organizations have to consider worldwide. This is Because of the many environmental concerns that the contemporary business world has had to become part of. Their study therefore examined the influence of green innovation by adopting the stakeholder theory to observe its effects. Having analysed Taiwanese service and manufacturing industries, they came to the conclusion that that

pressure from competitors and the government, along with employee conduct, all had significant and positive effects on green innovation practices.

These studies provided an insight on what this study expects to find. It is clear that many cement manufacturing companies in the sectors researched have the motivation to adopt green supply chain management practices, green technology being a priority included. This study therefore intends to get empirical evidence as far as Cement manufacturing companies in Nairobi is concerned.

2.3.2 Eco-Packaging Practices and Sustainable Competitive Advantage

The development and production of products in a more sustainable way has received special attention over the recent years. Specifically, how these products are packaged has been a subject of contention. Packaging products range from single materials with simple designs as well as complex ones. Either way, the manner in which products are packaged has an effect on the environment in the short term and long term (Winsemius & Guntram, 2013). As such, many organizations have become wary of this and try to adopt eco-packaging. The method involves the application of environmentally friendly criteria to the development of a product. In the long run, the aim is to change how people regard that product (Agus, 2011).

Several studies have been conducted to ascertain the application of this type of green supply chain practice. A study conducted by Molla (2011) on Green supply chain management practices in the food manufacturing industry in Kenya also stated that Green supply chain management has emerged as a key approach for manufacturing firms seeking to become environmentally sustainable and globally competitive. The balance between being environmentally sustainable and remain competitive is what drives many organizations into practising green supply management practices. The objective of this study was to determine the extent of Green Supply Chain Management practices adoption and its effect on the performance of food manufacturing firms in Kenya. A descriptive research design was also adopted for this study. Results indicated that Green Supply Chain Management practices adoption was still low as most food manufacturing firms were still planning to consider adoption, except for eco-packaging practices which was currently under consideration. In addition, the international incorporated companies were currently considering adoption as compared to the local companies who were still planning to consider (Molla, 2011).

Another study was also conducted by Amina (2011) on Green supply chain practices and operational performance of personal care manufacturing firms in Nairobi, Kenya. According to the study, a green strategy provides prudent business processes. Successful green supply chains will feature cross functional collaboration, emphasize innovation, and stay tune to the strategic focus of supply chain and enterprise as a whole. Moreover, environmental regulations are also changing the way supply chains are designed and managed meaning that organizations have to abide by them at all times. This is why the adoption of green supply chain management practices such as eco-packaging is very necessary. This study used a descriptive research design and chose a sample of 50 manufacturing firms as its sample size. The results indicated that rising environmental pressures and social expectations can be turned to commercial advantage if a strategic approach is taken to develop a "green" supply chain. The strategic approach of green supply chain such as having eco-packaging involves complex longer term considerations involving not just industry but sustainable environment protection (Amina, 2011).

Another study conducted by Kimani (2012) on green supply chain management practices in the Kenyan Mobile Telecommunication Industry was based on the notion that stiff competition exists between the Kenyan Telecommunication service providers in that it seems the society tends to ignore their green policies and concentrate on their price wars. It also goes on to state that for the companies to perform optimally they have to adopt the green supply chain practices to enhance proper integration with the environment. The study was therefore aimed at investigating the adoption and challenges of green supply chain management practices in the industry. Results indicated that most firms were found to have adopted green supply chain management practices. Company's environmental vision and mission application was found to be the most practice used by telecommunication firms in Kenya followed design for environment practices in product development implementation.

Based on the studies above, it is clear that green supply chain management practices, more so eco-packaging, are important to organizations and can result to improvements in performance. This study intends to find out the link between eco-packaging and sustainable competitive advantage among Cement manufacturing companies in Nairobi County, Kenya (Kimani, 2012)

2.3.3 Green Logistics Practices and Sustainable Competitive Advantage

Green practices can also be practiced to improve warehousing and logistics practices adopted by any company in the world whilst ensuring that organizations become environmentally sustainable and globally competitive (Lai & Wong, 2012). This is often achieved by streamlining processes and introducing cost-saving initiatives that can bring the organization many benefits. There are so many advantages accrued to going green besides achieving a competitive advantage. By optimizing warehouse operations, distribution centres can minimize land usage, lower energy costs and reduce waste production. It also means that lower workers are required. All these reduce the carbon footprint of the overall operation.

Studies have also been conducted to investigate how the above mentioned advantages actualize in real world. For instance, an international study conducted by Lai & Wong (2012) on green logistics management and performance in China revealed that most organizations strive to demonstrate profitability in their primary activities which requires them to have effective inbound and outbound logistics that promote marketing sales and services. Therefore, according to them, going green logistically is a positive way that these organizations can improve their logistic operations. Indeed, their study revealed a positive relationship between green logistics and firm performance.

Another study by Onyango (2016) on the application of green strategies and competitive advantage of total solution logistics service providers in Mombasa, Kenya asserted that Green strategies have emerged as a key approach for logistics firms seeking to become environmentally sustainable and globally competitive. Being a developing country, Kenya has had to find the perfect balance thus the main objective for the study was to determine the connection between competitive advantage and adoption of green strategies by total solution logistics service providers in Mombasa, Kenya. Using a descriptive research design and questionnaires for data collection, the study found that more established and sizeable firms were the most likely adopters of green strategies compared to their smaller counterparts. This also formed a basis for selecting large cement manufacturing firms as the focus for this study.

Another study on the factors influencing the usage of modern warehousing facilities by cereal farmers in turbo east and west sub-counties of Uasin-Gishu County, Kenya was conducted by Owino (2013). The study acknowledged the fact that there are multiple number of warehouses in the world including the state of the art, professionally managed warehouses as well as company stores such as raw materials and components stores, finished goods stores

etc. The study also states that warehousing activity links the producer with the customer and plays critical role of providing a desired level of customer service at the lowest possible total cost. As such, the study analysed the factors that influence the usage of modern warehousing facilities in Turbo East and Turbo West sub counties of Uasin-Gishu County. Results indicated that the factors that affect the small scale and large scale farmers adopting the usage of modern warehousing facilities were previous experience in using the other storage methods, positive attitude towards the modern warehouse usage and the cereals farmers towards the modern warehouse is more efficient and convenient and it improves performance.

This study therefore intends to identify how green warehousing and logistic practices fare on in Cement manufacturing companies in Nairobi County. Similar results from the ones indicated by studies above are expected.

2.4 Conceptual Framework

The conceptual framework adopted by this study was used to show the relationship between the independent and the dependent variable. The only dependent variable was sustainable competitive advantage while four independent included green technology, eco-packaging and finally green logistics practices. At this point, it was expected that all the three independent variables have a positive effect on the dependent variable (See Figure 2.1).

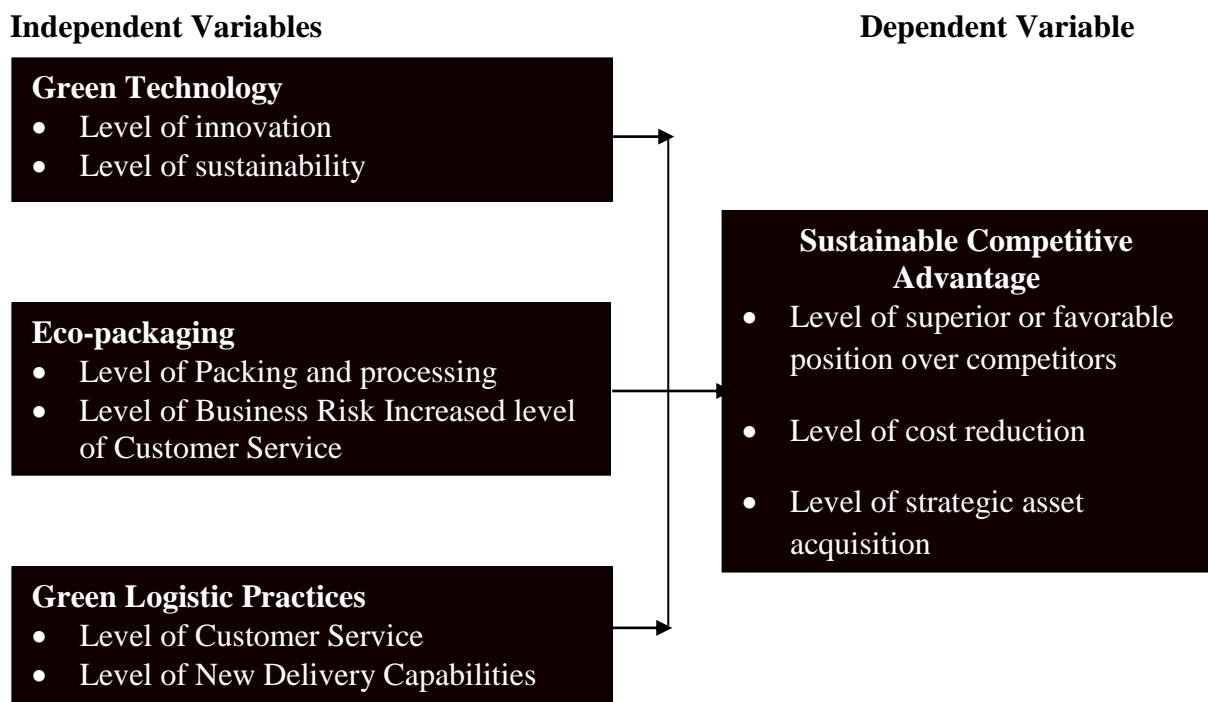


Figure 2. 1 Conceptual Framework

2.5 Operationalization of the Variables

Table 2. 1 Operationalization of the variables

Type of Variable	Variable	Indicator	Level of Measurement	Data collection Method
Dependent	Sustainable Competitive Advantage	-Level of superior or favorable position over competitors -Level of cost reduction -Level of strategic asset acquisition -Level of market share	Ordinal	Structured Questionnaire
Independent	Green Technology	-Level of raw material on hand -Level of Stockpiling of unfinished product -Level of product support	Ordinal	Structured Questionnaire
Independent	Eco Design	-Level of Packing and processing -Level of Business risk Increased level of Customer Service	Ordinal	Structured Questionnaire
Independent	Green logistics	-Level of Customer Service -Level of New Delivery Capabilities	Ordinal	Structured Questionnaire

2.6 Research hypothesis

H₀₁: Green technology practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya.

H₀₂: Eco-packaging practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya.

H₀₃: Green logistics practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presented the research methodology that was adopted by the researcher. It included the research design, target population, sampling and sampling procedure, research instrument, validity and reliability of the instrument and finally the data collection procedures, processing, analysis and diagnostics.

3.2 Research Design

This section discussed the descriptive research design that was adopted by the study. The study intended to use this design because it makes it possible for the researcher to collect information through both personal accounts and observations made by the respondents from large cement manufacturing firms concerning the effect of green supply chain practices on sustainable competitive advantage. Furthermore, it gives them the freedom they need to describe this topic from their own experiences rather than based on theory (Lambert, 2012).

3.3 Target Population

The population for the correct study is all the Cement manufacturing companies. According to the Kenyan Association of Manufacturers, there are a total of 5 cement manufacturing companies in Nairobi County (KNBS, 2016). The unit of study included employees in these manufacturing firms at the top, middle and lower level management in the production, procurement and logistics departments. This is because these were deemed the most relevant to the topic of study. All staff from the three main management levels were targeted, making the study a census. The distribution was as indicated in Table 3.1 below;

Table 3. 1 Target Population

Company	Top	Middle	Lower	Total
ARM Cement (Athi River Mining Ltd) – Head Office Branch	4	8	10	22
Bamburi Cement Ltd – Corporate Office Nairobi Branch	5	9	13	27
East African Portland Cement Co Ltd	4	8	16	28
Mombasa Cement Limited – Vipingo Branch	3	12	15	30
Savannah Cement Ltd	4	10	14	28
Total Sample Size	20	47	68	135

3.4 Instrumentation and Data Collection

This study used questionnaires as the main data collection instrument. Rowley (2014) indicated that questionnaires are efficient tools of data collection when the study uses a descriptive research design. He also stated that they are also efficient because they give the researcher a larger scope under which to objective responses to research questions. They were designed with closed ended questions only to regulate the amount of demographic information respondents provide while at the same time maintaining their answers to the issues related to the topic of study. A five point Likert Scale was also developed as a measurement scale for closed ended questions related to the objectives of the study. The questionnaire comprised of three sections; A, B and C. Section A was used to collect demographic information about the individuals while section B was used to collect information about green practices adopted by the organization. Finally, section C comprised of questions regarding sustainable advantage.

The data collection procedure on the other hand involved the distribution and collection of data from the questionnaires. The researcher used drop-and-collect-later method of data collection where the researcher drops the questionnaires to the respondents and then collects them after they have been filled. This process was timed, and only questionnaires filled after two weeks were included in the study analysis. The purpose of the study as well as the objectives was communicated to the respondents on time, prior to the process.

3.5 Validity and Reliability

Christensen, Johnson and Turner (2011) defined the validity of a research instrument as its ability to measure all the variables chosen for the study. This therefore is determined by the kind of questions included in the research questionnaire. They should be able to measure one element at a time, be clear and precise on the nature of their inquiry. The researcher sought the help of a supervisor to determine that all the questions included in the research questionnaire fit this criterion and the instrument are therefore valid. Once this has been achieved, the questionnaires were ready to be taken to the field for purposes of collecting the data. This also meant that all the data collected by the questionnaires were valid as they contained information relevant to the study, which imply that all the variables had been measured appropriately.

Reliability on the other hand was also described by Christensen, Johnson and Turner (2011) as the level of consistency indicated by the scale of a research instrument. Consistency means

that in the event that the study is conducted again, say twice of three times, then the results obtained will be similar. As indicated by Cho and Kim, (2015), the best way to achieve reliability is to have a consistent scale measuring all the question included in the questionnaire. There are several scales that can be used including two point yes or no scale, three, four, five and seven point Likert Scales. In this case, the five point Likert scale that was adopted by this study so as to give the respondent a wider range of answers on which to provide their view about a statement or question. Once this has been achieved, the scale was verified using Cronbach's alpha derived from SPSS (Version 22) to determine its suitability. A Cronbach's alpha of 0.6 and above indicated that the scale is reliable (Cho & Kim, 2015).

3.6 Data Analysis and Presentation

After all the questionnaires were filled and collected back, the researcher conducted a data analysis with the help of SPSS (version 22). This included analysing the descriptive statistics which includes means, frequencies and percentages of the demographic information and answers given on the objectives by the respondents. A multiple regression equation was also fitted to explain the nature, strength and significance illustrated by the three green supply chain practices on sustainable competitive advantage of Cement manufacturing companies in Nairobi, Kenya. The researcher used the following model;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y= sustainable competitive advantage

X_1 = Green technology practices

X_2 = Eco-packaging Practices

X_3 = Green Logistic Practices

β_0 –Constant value when no green supply chain practice is adopted

β_1 - coefficient for Green technology practices

β_2 - coefficient for Eco-Packaging Practices

β_3 - coefficient for Green Logistics Practices

ε - Error term

3.7 Diagnostic Tests

Diagnostic tests are tests conducted to assess the validity of a regression model once it has been fitted. These test procedures are necessary so as to detect violations of the linear model's assumptions, gauge the severity of the violations and take appropriate remedial action. The two main tests include RESET tests (ANOVA), and The Breusch-Pagan Heteroscedasticity Test.

The RESET test tests whether there exist some significant nonlinear relationships in a Linear Regression Model. More specifically, it tests whether non-linear combinations of the fitted values help explain the response variable. If this linear relationship is not significant, then the study would conclude that the independent variables have no relationship with the dependent variable. However, if the relationship is significant, then the independent variables would have an effect on the dependent variable, in which case, sustainable competitive advantage would be explained by the green supply chain practices selected for the study.

On the other hand, the Breusch-Pagan Heteroscedasticity test is a test that checks for a constant mean and stable variance. One of the key assumptions of regression is that the variance of the errors is constant across observations. If the errors have constant variance, the errors are called homoscedastic, if they are not, they are called heteroscedastic. Heteroscedasticity refers to the circumstance in which the variability of a variable is unequal across the range of values of a second or third variable that predicts. Typically, residuals are plotted to assess this assumption.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents the analysis, presentation and interpretation of the data collected from the questionnaires after it was analyzed with the help of SPSS version 22. Descriptive statistics such as frequency distribution and percentages were used to present the general information collected from the respondents. Further, regression analysis was conducted to explain the effects of Green Procurement Practices Adoption on the Sustainable Competitive Advantage of cement manufacturing firms in Kenya. The findings are presented in form of tables and graphs.

4.2 Response Rate

A total of 135 questionnaires were administered to respondents selected from various cement manufacturing companies in the country. Table 4.1 provides a report that the study managed to receive all 135 duly filled questionnaires which constituted a response rate of 100%. This response was deemed adequate and sufficient to make conclusions about the population selected by the study (De Vaus, 2013).

Table 4. 1 Gender

Response	Frequency	Percentage
Responded	135	100
Not Responded	0	0
Total	135	100

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 were a total of 39 questions included in the questionnaire. A Cronbach's alpha of 0.824 indicated that the questionnaire was indeed reliable (Table 4.. According to Bonnet and Wright, (2015), a Cronbach's alpha value of above 0.7 is considered reliable as opposed to a value less than 0.7 which is not reliable.

Table 4. 2 Reliability Results

Cronbach's Alpha	N of Items
.824	39

4.4 Demographic Information

In order to analyze the nature of respondents, the researcher asked the respondents to provide general information. This section has provided the results regarding gender, age bracket, highest level of education, job position held and the duration they have worked in that position in terms of years. The researcher also inquired on the extent to which the chosen manufacturing organizations had implemented green practices in terms of packaging, logistics, technology and procurement their operations.

4.4.1 Gender

Table 4.3 provides that the study reported that 43% (58) of the respondents were female while 57% (77) were male. This implied that the study was represented by both genders.

Table 4. 3 Gender

Gender	Frequency	Percent
Male	77	57.0
Female	58	43.0
Total	135	100.0

4.4.2 Age of the Respondents

Table 4.4. indicated that majority of the respondents was between the age of 31 and 35 years. This was represented by 48.1%. 21.5% of them were between 36-40 years, 20.0% were between 26-30 years, 6.7% were between 41-50 years while only 3.7% between 20-25 years. This implied that the respondents selected for the study were of age.

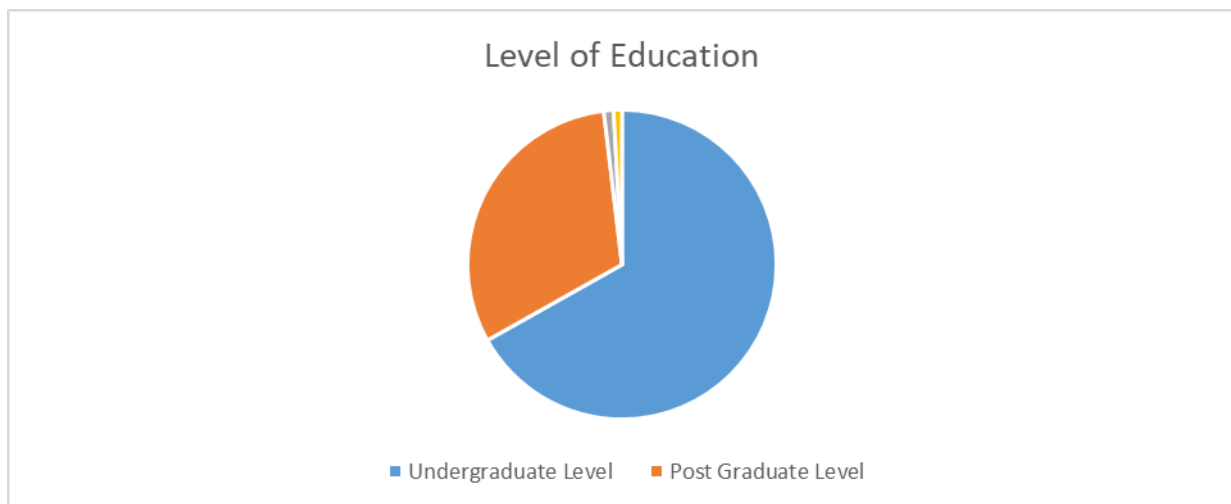
Table 4. 4 Age of the Respondents

Age Bracket	Frequency	Percent
20-25	5	3.7
26-30	27	20.0
31-35	65	48.1
36-40	29	21.5
41 -50	9	6.7
Total	135	100.0

4.4.3 Level of Education

Figure 4.1 revealed that 31.9% of the respondents had attained post-graduate level while 68.1% had attained undergraduate level of education. The significance of this is that the respondents included in the study were knowledgeable enough to understand the questions being posed to them in the questionnaire.

Figure 4. 1 Level of Education



4.4.5 Position in the Organization

Table 4.5 reveals that majority of the respondents were procurement officers (61.5%), followed by production managers at 24.4%, while the logistics officers made the remaining 14.1% share of the respondents. From the analysis above, it was revealed that all the respondents included in the study interacted with the production and procurement departments and therefore had the knowledge necessary to answer the questions presented to

them in the questionnaires. This allowed the researcher to collect relevant information related to the topic of study.

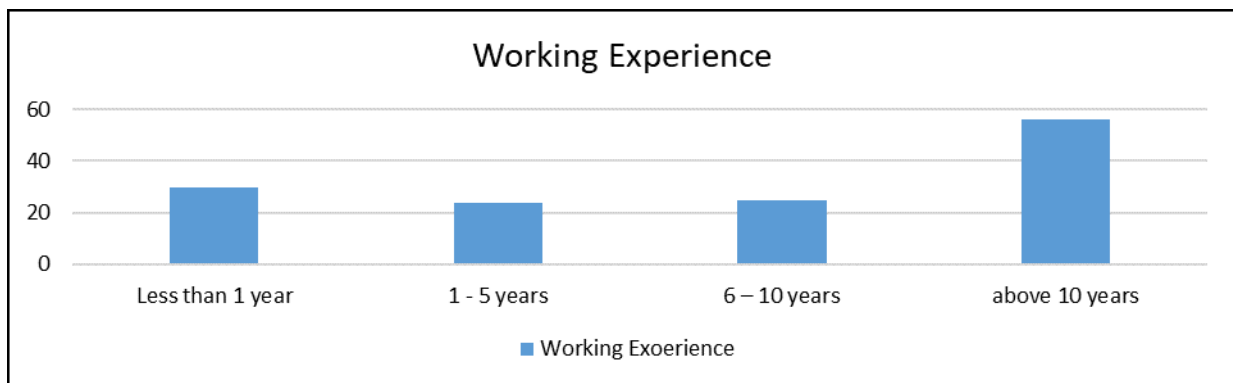
Table 4. 5 Position in the Organization

Job Title	Frequency	Percent
Logistics Officer	19	14.1
Procurement officer	83	61.5
Production Manager	33	24.4
Total	135	100.0

4.4.6 Working Experience

The study found, as indicated by figure 4.2, that majority of the respondents had worked in their designated job positions for more than 1 year. Specifically, 17.8% had worked between 1 and 5 years, 18.5% between 6 and 10 years and 41.5% above 10 years. Of these, 22.2% had worked for less than 1 year. The significance of this is that the respondents have been in their designated jobs long enough to understand various issues outlined in the topic of study, and as such, are in the best position to take part in the study. It further strengthens the claim that the respondents chosen were the best to take part in the study based on the level of experience their experience indicates they have.

Figure 4. 2 Working Experience



4.4.7 Green Procurement Practices Adoption

This section presents the results of the extent to which the respondent’s organizations have adopted various green supply chain practices including green technology, eco-packaging and green logistics. They were expected to indicate whether they adopted them to a very low extent, a low extent, a large extent and a very large extent.

Results in Table 4.6 indicate that Green Logistics was the most widely adopted green procurement practice (M=3.92) followed by Green technology (M=3.10) and finally Eco-Packaging (M=3.01).

Table 4. 6 Green Procurement Practices Adoption

	Green Technology		Eco-Packaging		Green Logistics	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Very Low Extent	9	6.7	19	14.1	2	1.5
Low Extent	54	40.0	43	31.9	6	4.4
Moderate Extent	5	3.7	15	11.1	27	20.0
Large Extent	49	36.3	34	25.2	66	48.9
Very Large Extent	18	13.3	24	17.8	34	25.2
Total	135	100.0	135	100.0	135	100.0
Mean	3.10		3.01		3.92	

4.5 Green technology practices on Sustainable Competitive Advantage

Respondents were asked questions regarding green technology and how it affects sustainable competitive advantage of cement manufacturing companies in Nairobi. Table 4.7 presents feedback on the effect of Green technology practices on firm Sustainable Competitive Advantage as indicated by the respondents on each question. An average mean score of 2.26 implies that majority of the respondents agree that adopting green technology affects sustainable competitive advantage as far as reducing the amount of material on hand in the production facility, reducing the cost to store and maintain excess inventory, eliminating the risk of materials becoming obsolete while in storage, reducing the stockpiling of unfinished product, satisfying the demand from customers, creating Production Flow, and maintaining high levels of product quality are concerned.

Table 4. 7 Green technology practices on Sustainable Competitive Advantage

Green technology practices	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Mean
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%	
It reduces the amount of material on hand in the production facility	46	34.1	49	36.3	5	3.7	25	18.5	10	7.4	2.29
Reduces the cost to store and maintain excess inventory	23	17.04	55	40.74	4	2.96	42	31.11	11	8.15	2.73
Eliminates the risk of materials becoming obsolete while in storage	65	48.15	47	34.81	0	0.00	18	13.33	5	3.70	1.9

Reduces the stockpiling of unfinished product	35	25.93	31	22.96	0	0.00	63	46.67	6	4.44	2.81
It satisfies the demand from customers	37	27.41	43	31.85	6	4.44	37	27.41	12	8.89	2.59
Creates Production Flow	72	53.33	38	28.15	13	9.63	11	8.15	1	0.74	1.75
Maintains high levels of product quality	75	55.56	40	29.63	2	1.48	17	12.59	1	0.74	1.73
Average											2.26

4.6 Eco-Packaging Practices on Sustainable Competitive Advantage

To analyze how eco-packaging affects sustainable competitive advantage, the researcher asked the respondents questions. Table 4.8 indicates an average mean score of 2.42 which implies that majority of the respondents agree that adopting eco-packaging practices affects firm's sustainable competitive advantage. This is with regard to its effect on promoting product support, expanding business opportunity, improving packing and processing, promoting spot packing for seasonal products, minimizing business risk, promoting a perfect value creation process and providing perfect value to the customer.

Table 4. 8 Eco-Packaging Practices on Sustainable Competitive Advantage

Eco-Packaging Practices	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Mean
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%	
Leads to product support	52	38.52	46	34.07	20	14.81	13	9.63	4	2.96	2.04
Expands the business opportunity	35	25.93	53	39.26	19	14.07	20	14.81	8	5.93	2.36
Improves packing and processing	27	20	42	31.11	15	11.11	41	30.37	10	7.41	2.74
Leads to spot packing for seasonal products	60	44.44	51	37.78	8	5.93	14	10.37	2	1.48	1.87
Minimizes business risk	23	17.04	29	21.48	5	3.70	70	51.85	8	5.93	3.08
Leads to a perfect value creation process	25	18.52	36	26.67	20	14.81	44	32.59	10	7.41	2.84
Provides perfect value to the customer	48	35.56	52	38.52	18	13.33	15	11.11	2	1.48	2.04
Average											2.42

4.7 Green Logistics Practices on Sustainable Competitive Advantage

Further, the Table 4.9 below presents findings as reported by the respondents regarding the effect of green logistics practices on sustainable competitive advantage. An average of 2.05 implies that majority of the respondents agree that adopting green logistics practices affect an organization's sustainable competitive advantage. This is in light of increasing customer

services, improving warehouse efficiency, allowing for new delivery capabilities, reducing inventory improving cash flow, and eliminating production waste.

Table 4. 9 Green Logistics Practices on Sustainable Competitive Advantage

Green Logistics	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Mean
	Fr	%	Fr	%	Fr	%	Fr	%	Fr	%	
Increases Customer Service	56	41.5	58	43	9	6.7	10	7.4	2	1.5	1.84
Improves warehouse efficiency	51	37.8	41	30.4	15	11.1	20	14.8	8	5.9	2.21
Allows for new delivery capabilities	58	43	33	24.4	18	13.3	21	15.6	5	3.7	2.13
Reduces inventory	52	38.5	50	37	3	2.2	22	16.3	8	5.9	2.14
Improves cash flow	61	45.2	46	34.1	11	8.1	13	9.6	4	3	1.91
Eliminates Production Waste	51	37.8	50	37	7	5.2	25	18.5	2	1.5	2.09
Average											2.05

4.8 Regression Analysis

The study conducted a multiple regression analysis to determine the relationship between the independent and the dependent variables. In this case, the dependent variable was an organization’s Sustainable Competitive Advantage while the independent variables were Green Technology Practices, Eco-Packaging Practices and Green Logistics Practices. The researcher used the following model;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y= sustainable competitive advantage

X1= Green technology practices

X2= Eco-packaging Practices

X3= Green Logistic Practices

β_0 –Constant value when no green supply chain practice is adopted

β_1 - coefficient for Green technology practices

β_2 - coefficient for Eco-Packaging Practices

β_3 - coefficient for Green Logistics Practices

ε - Error term

Results are as indicated in this section;

4.8.1 Model Summary

Table 4. 10 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.603	0.364	0.328	0.52979
a Predictors: (Constant), Green Logistics Practices, Green Technology Practices , Eco-Packaging Practices				

The model summary table above indicates an R-Square of 0.364. This implies that 36.4% of the independent variable, which were Green Technology Practices, Eco-Packaging Practices and Green Logistics Practices explained the independent variable, which was organization sustainable competitive advantage. This also means that the remaining 63.6% is explained by other factors that affect organization sustainable competitive advantage.

4.8.2 ANOVA Test Results

The ANOVA below represents RESET test that was used to check for any omitted variables or irrelevant variables. This test indicates an F calculated value of 6.418 which is less than Critical value = 2.53969 ($p=0.00$). The significance of this is that the regression equation generated by the study predicts the dependent variable significantly well.

Table 4. 11 ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.893	3	2.964	6.418	0.000
	Residual	60.505	131	0.462		
	Total	69.398	134			
a Dependent Variable: Sustainable Competitive Advantage						
b Predictors: (Constant), Green Logistics Practices, Green Technology Practices , Eco-Packaging Practices						

4.8.3 Coefficient Table

The coefficient values obtained from the regression model were provided for in table 4.12.

Table 4. 12 Coefficient Table

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	1.183	0.25	4.727	0.015
Green Technology Practices	0.053	0.014	3.786	0.032
Eco-Packaging Practices	0.069	0.026	2.654	0.041
Green Logistics Practices	0.329	0.107	3.065	0.029
a Dependent Variable: Sustainable Competitive Advantage				

From the coefficient table, the following equation was obtained:

$$Y = 1.183 + 0.053X_1 + 0.069X_2 + 0.329X_3$$

Where Y= Sustainable Competitive Advantage

X1= Green Technology Practices

X2= Eco-Packaging Practices

X3= Green Logistics Practices

β_1 - coefficient for adopting green technology practices =0.053 implies that holding eco-packaging practices and green logistics practices constant, a unit increase in adopting green technology will increase organization sustainable competitive advantage by 0.053 units.

β_2 - coefficient for adopting eco-packaging practices =0.069 implies that holding green technology practices and green logistics practices constant, a unit increase in adopting eco-packaging practices will increase organization sustainable competitive advantage by 0.069 units.

β_3 - coefficient for green logistics practices =0.329 implies that holding green technology practices and eco-packaging practices constant, a unit increase in adopting green logistics practices will increase organization sustainable competitive advantage by 0.329 units.

β_4 - constant = implies that holding all other factors constant, organization sustainable competitive advantage will be at 1.183.

It should also be pointed out that the effect associated with Green Technology, Eco-Packaging and Green Logistics Practices were all statistically significant as illustrated by significant p values 0.032, 0.041 and 0.029 which were all less than 0.05.

4.9 Correlation Analysis

Correlation analysis is a method of statistical evaluation used to study the strength of a relationship between two variables. This study therefore sought to identify the correlation between the individual independent variables and the dependent variables. A Pearson Correlation analysis was conducted using SPSS (Version 22) and the results obtained were summarised in table

Table 4. 13 Correlation Analysis

		Green Technology Practices	Eco-Packaging Practices	Green Logistics Practices	Sustainable Competitive Advantage
Green Technology Practices	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	135			
Eco-Packaging Practices	Pearson Correlation	.136	1		
	Sig. (2-tailed)	.115			
	N	135	135		
Green Logistics Practices	Pearson Correlation	.056	.058	1	
	Sig. (2-tailed)	.519	.000		
	N	135	135	135	
Sustainable Competitive Advantage	Pearson Correlation	.495*	.549**	.845**	1
	Sig. (2-tailed)	.274	.004	.000	
	N	435*	135	135	135
**. Correlation is significant at the 0.01 level (2-tailed).					

From the results obtained, the study established that Sustainable Competitive Advantage had a positive relationship with all the three GSC practices. A Pearson Correlation coefficient of 0.495* for Green Technology Practices implied that the GSC practice had a relatively strong positive relationship at 95% confidence level. On the other hand, a Pearson Correlation coefficient of 0.549** implied that Eco-Packaging Practices had a stronger positive relationship with Sustainable Competitive Advantage at 99% confidence level. Finally, the

strongest positive relationship was indicated by a Pearson Correlation coefficient of 0.845**for Green Logistics Practices.

4.10 Heteroskedasticity Test results

Table 4.14 results for the test of heteroscedasticity indicated that heteroscedasticity not present. The null hypothesis is that heteroscedasticity not present. The rejection rule is that the null hypothesis is rejected if the significant value is less than 0.05

Table 4. 14 Heteroskedasticity Results

	LM	Sig.
BP	.712	.950

4.11 Hypothesis Testing Results

This study had three hypotheses tests as indicated below;

H₀₁: Green technology practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya.

H₀₂: Eco-packaging practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya.

H₀₃: Green logistics practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya

Their test results are provided for in this section. The decision to reject or fail to reject the null hypothesis was based on a comparison between the critical t test value obtained from statistical tables (1.656305) and the calculated t values obtained from SPSS and summarized in table 4.15.

Regarding the first hypothesis on whether Green technology practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya, statistical t value 3.786 > critical t value 1.656 implied that the null hypothesis is to be rejected at 95% confidence level. This meant that the alternative, which states that Green technology practices has a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya, is true. Similarly, for the second hypothesis which stated that Eco-packaging practices do not have a significant effect on sustainable competitive advantage gained by

Cement manufacturing companies in Nairobi County, Kenya was rejected at 95% confidence level because statistical t value 2.654 > critical t value 1.656. This implied that the alternative, which states that Eco-packaging practices has a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya, is true. Finally, the last hypothesis which stated that Green logistics practices do not have a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya was also rejected at 95% confidence level because statistical t value 3.065 > critical t value 1.656. This meant that its alternative, was true, meaning that Green logistics practices has a significant effect on sustainable competitive advantage gained by Cement manufacturing companies in Nairobi County, Kenya.

Table 4. 15 Statistical t test results

Variable	t
Green Technology Practices	3.786
Eco-Packaging Practices	2.654
Green Logistics Practices	3.065

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study, conclusions, recommendations, limitations of the study and suggestions for further study.

5.2 Summary of the Findings

This study sought to investigate the effect of green supply chain practices on sustainable competitive advantage of cement manufacturing companies in and around Nairobi County in Kenya. The determinants included green technology practices, eco-packaging practices and green logistics practices. Generally, the study established that manufacturing organizations in the county utilize green technology in their operations; organizations understood the role they played in environmental deprivation and pollution. The firms agree that green technology has enabled them to clear excess inventory in good time. The organizations also made a great effort to utilize environmental friendly packaging methods. They agree that the eco-packaging has changed to a very large extent how customers view their products. Further, the organizations concur that green logistics practices have positively affected the attitude of customers towards their products and that their cash flow has increased substantially.

In as far as sustainable competitive advantage is concerned, the companies concur that adopting green procurement practices positively affects their position in terms of competitive advantage. The results indicate that a manufacturing company is far more competitive as compared to other firms in the industry if it adopts green logistics practices. A firm that would implement all the three green practices would be even more competitive in terms of revenue collection and positive customer sentiment. It is also clear that companies are able to spend less on storage and expensive packaging techniques.

Important to note is the fact that most employees are satisfied with the way the organizations are responding to the need to adopt practices that protect the environment. The respondents unequivocally agree that the green practices have enhanced product quality while mitigating business risk to a very substantial extent. There is a general consensus that companies exhibit

a highly sustainable competitive advantage when they adopt green supply chain practices. Comparing these results to what other studies had done, it can be seen that they are similar to Anand, Rajan, Narayanan & Bapu, (2015) in their study on The Impact of Plasma Treatment as A Sustainable and Green Technology on The Supply Chain Management of the Spinning Mills as well as Arseculeratne & Yazdanifard (2013) who investigated How green marketing can create a sustainable competitive advantage for a business. It was also found that Bag, Anand & Pandey (2017) found similar results regarding green technology and eco-design practices in their study on Green Supply Chain Management Model for Sustainable Manufacturing Practices.

5.3 Conclusion

The study therefore concluded that green supply chain practices positively affect the sustainable competitive advantage of manufacturing firms in Nairobi County. Specifically, the study found that a positive change in the adoption of green technology practices leads to a positive increase in the sustainable competitive advantage of a cement manufacturing company. In short, this means that implementing production methods that are environmental friendly elevates a company to a favorable position on the competitive advantage scale in the county. Further, the study established a positive relationship between implementing eco-packaging practices and a firm's sustainable competitive advantage. These results are similar to the one provided by Ainin, Naqshbandi & Dezdard, (2016) in their analysis on how sustainable competitive advantage can be achieved through the adoption of green IT practices as well as that conducted by Weng, Chen & Chen, (2015).

The study also found that there is increased product support, expanded business opportunity, minimized business risk and improved product packing and processing just like Jemutai (2010) and Muma, Nyaoga, Matwere & Nyambega, (2014) in their respective studies. Finally, the study found that to a very large extent, adopting green logistics practices leads to a positive increase in the sustainable competitive advantage of a firm. In particular, the study established that there is an increased customer service while at the same time improving warehouse efficiency. This particular result was also found by Mutisya & Kinoti, (2017) in their study on green supply chain and performance of firms. In addition, there is a marked increase in cash flow even as inventory is kept at a low and manageable amount. In conclusion, the study established that a manufacturing company in Nairobi County is better placed to compete favorably if it adopts green supply chain practices.

5.4 Recommendations of the Study

Based on the findings of the study, the following recommendations are made. It is crucial to first understand from the outset that as much as the companies provide much needed products that build the country, environmental considerations are paramount. This is because a clean environment not only ensures a healthy existence but also ensures that the production of cement is sustainable. Companies will be able to produce far into the future with the correct measures to protect the environment. In order for this to be possible, cement manufacturing companies are urged to implement measures to the effect that the process by which they produce the cement is environmental sensitive and minimizes the exposure of the atmosphere to harmful elements.

Secondly, the companies should ensure that they implement a product packaging process that promotes a clean environment. It has been established that customer sentiment is hugely affected by a company's attitude towards such issues as preventing littering and providing packaging means that are easily recyclable. This way, the companies can not only increase their cash flow but also keep their environment in good shape to keep supporting their operations. Finally, the study recommends that companies adopt green logistics practices that are more environment-centric. Evidently, such practices ensure that the warehouse is not burdened with overstayed inventory. Implementing the green logistics practices ensure that customer satisfaction is at the top of a company's priority list. The overall effect of all the measures is an increased cash flow which naturally puts a firm ahead of the sustainable competitiveness curve.

5.5 Limitations of the Study

During the execution of the study, the researcher encountered a number of limitations. For instance, at first, most respondents were reluctant to fill in the questionnaires stating that they would be breaching confidential information that could implicate their companies. However, the researcher handled this limitation by making it clear to them that this research was mainly for academic purposes, and that the information required to be filled would not compromise them in any way.

Most of the respondents also had busy working schedules that forced the researcher to increase the amount of time allocated for them to fill in the questionnaires. Indeed, this worked out well in that all the questionnaires were filled fully and submitted for analysis. It

should also be noted that the accuracy of the data collected was mainly dependent on what was provided by the respondents. As such, there was need for the respondents to answer the questions honestly and accurately. The researcher therefore handled this limitation by providing guidance in the event that the respondents did not understand the question.

5.6 Areas of Further Study

The study suggests further studies to be conducted so as to provide more literature that can then be compared to the conclusions drawn from this study. As such, the same topic could be done on a different manufacturing sector, or a similar topic can be conducted using secondary data as the main source of data.

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APPENDIXES

APPENDIX I: QUESTIONNAIRE

SECTION A: DEMOGRAPHIC INFORMATION

Please tick as appropriate in the boxes using a tick (√) or cross mark (x).

1. Gender

Male [] Female []

2. Age Bracket in years

20-25 [] 26-30 []

31-35 [] 36-40 []

41 -50 [] 51 and Above []

3. Highest level of education

a) Undergraduate Level [] b) Post Graduate Level []

d) Any other (Specify)

4. Name of the Company.....

5. What position do you hold in this organization?

a) Logistics Officer

b) Procurement officer

c) Procurement Officer

d) Production Manager

e) Other.....

6. How long have you been in this position?

a) Less than 1 year [] b) 1 - 5 years []

c) 6 – 10 years [] d) above 10 years []

7. Kindly indicate the extent to which the following green procurement practices have been adopted in your manufacturing firm. Indicate based on the scale below;

1-Very Low Extent, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

	Component	1	2	3	4	5
1	Green technology practices					
2	Eco-packaging Practices					
3	Green logistics Practices					

SECTION B: OBJECTIVES OF THE STUDY

1. The Effect of Green technology practices on Sustainable Competitive Advantage

On a scale of 1-5, respond to the following statements about green Technology

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

	Questions	1	2	3	4	5
1	It reduces the amount of material on hand in the production facility					
2	Reduces the cost to store and maintain excess inventory					
3	Eliminates the risk of materials becoming obsolete while in storage					
4	Reduces the stockpiling of unfinished product					
5	It satisfies the demand from customers					
6	Creates Production Flow					
7	Maintains high levels of product quality					

8. Any Other.....

2. Effect of Eco design Practices on Sustainable Competitive Advantage

On a scale of 1-5, respond to the following questions about Eco design Practices

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

	Questions	1	2	3	4	5
1	Leads to product support					
2	Expands the business opportunity					
3	Improves packing and processing					
4	Leads to spot packing for seasonal products					
5	Minimizes business risk					
6	Leads to a perfect value creation process					
7	Provides perfect value to the customer					

8. Any Other.....

3. Effect of Green Logistics Practices on Sustainable Competitive Advantage

On a scale of 1-5, respond to the following questions about Green Logistics Practices

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

	Questions	1	2	3	4	5
1	Increases Customer Service					
2	Improves warehouse efficiency					
3	Allows for new delivery capabilities					
4	Reduces inventory					
5	Improves cash flow					
6	Eliminates Production Waste					

7. Any Other.....

SECTION C: SUSTAINABLE COMPETITIVE ADVANTAGE

1. The following are statements about how Sustainable Competitive Advantage is applicable to your manufacturing firm. Kindly indicate your level of agreement with them according to the following scale:

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

	Statement	1	2	3	4	5
1	Company is a low cost provider					
2	The company has ability to increase prices without losing market share					
3	The company has a powerful brand					
4	It possess Strategic assets such as Patents, trademarks, copy rights, domain names, and long term contracts					
5	Real time information exchange with suppliers has led to a reduction in the inventory holding needs					
6	Less inventory holding needs have reduced inventory-related costs					

7. Any Other.....

Thank you

APPENDIX II: LIST OF COMPANIES

Cement manufacturing companies in Kenya.

1. ARM Cement (Athi River Mining Ltd) – Head Office Branch
2. Bamburi Cement Ltd – Corporate Office Nairobi Branch
3. East African Portland Cement Co Ltd
4. Mombasa Cement Limited – Vipingo Branch
5. Savannah Cement Ltd