NEW PRODUCT DEVELOPMENT PROCESS IN THE CEMENT INDUSTRY: CASE OF SAVANNAH CEMENT LIMITED, KENYA

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DECLARATION

This research project is my original work and has not been submitted for a degree award in any other university. No part of this work should be reproduced without my consent or that of the University of Nairobi.

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Declaration by the Supervisor

This research project has been submitted for examination with my approval as University of Nairobi supervisor.

Signed.....

Date.....

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DEDICATION

I dedicate this work to my family and those who supported me throughout the completion of this project.

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This research project would not have been possible without the cooperation and support of a number of people, who in one way or the other steered me towards my ultimate goal. I would like to express my appreciation to them and especially to the following:-

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Most important of all, I extend my gratitude to the Almighty God for strength, good health, knowledge and vitality that helped make this project a reality.

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ABBREVIATIONS

ARM	Athi River Mining
EAPCC	East African Portland Cement Company
SCL	Savannah Cement Limited
MT	Metric Tonnes
TMPC	Total Monthly Power Consumption
MCL	Mombasa Cement Limited
NEMA	National Environment Management Authority
KEBS	Kenya Bureau of Standards
SCM	Supply Chain Management

ABSTRACT

Product Development is an important business process for every technology driven company in its bid to secure future growth and sustained success in the marketplace. As the forces of global competition and consumer sophistication continue intensifying, business organizations are forced to rethink and redesign their strategies in order to meet the requirements of the changing market place. The main objective of the study is to establish the cement product development management in Kenya using a case of Savannah Cement Limited (SCL). The study was guided by the following specific research objectives, establishing the strategies adopted by SCL in cement production management, determining the effectiveness of cement product development at SCL; establishing the challenged in cement product development at SCL, establishing the drivers of product development at SCL. The research used descriptive survey method; the population of interest was staff in SCL manufacturing firm in Kenya. The study used primary data, which was collected using a questionnaire containing both structured and unstructured questions. The data was processed through Excel application and Statistical Package for Social Sciences (SPSS). The presentation of the information was by tables, charts and graphs in form of frequencies and percentages. The study found that SCL relied on a unique product as well as consistent management focus in its bid to gain competitive advantage. The effectiveness of these strategies were seen in the year 2013 month by month growth in sales and consumer acceptance. It was therefore concluded that the product development process and strategies used at SCL could be used as long term strategies to expand market shares.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

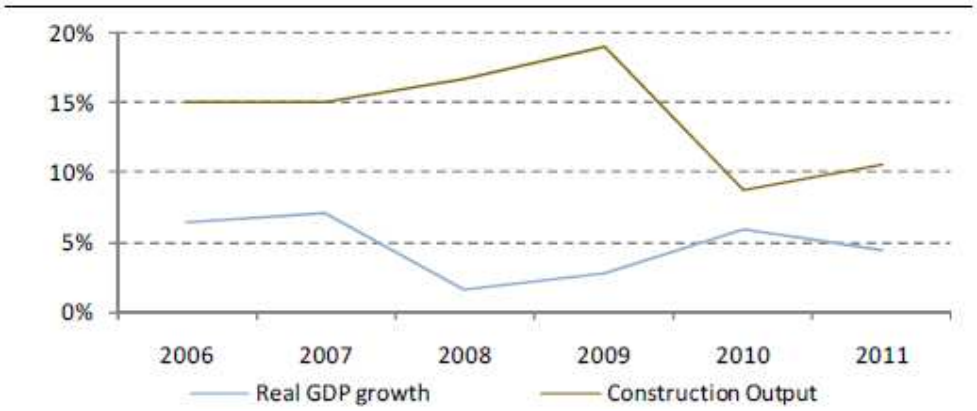
Product development is inherently a risk-driven process and companies take risks in developing new products, or alternatively in not developing new products. New Product development is defined as the transformation of a market opportunity into a Product available for sale (Krishnan and Ulrich, 2001).The Product development is central to business prosperity for firms active on a market characterized by competition like the cement industry in Kenya and more specifically for a new entrant like the Savannah Cement. Potential benefits of Product development efforts include improved market position in terms of new products opening up new markets, improved resource utilization and renewal and transformation of the organization (Clark and Wheelwright, 1995). The ideal outcome of Product development is high performing products; products that achieve stipulated market share, sales growth, customer use and profit objectives. Ultimately, high-performing products contributes to competitive advantage and, subsequently, high financial performance for the organization involved. The success of product development in any organization relies on proper management of the process of product development. This study sought to evaluate new product development management at the SCL which is a new organization in the cement manufacturing industry.

Many challenges hinder successful product development. The risks involved are significant, and uncertainty is greater in the earlier stages. At the same time however, significant product and process decisions must be made that will affect the product outcome. In addition to this, numerous interfaces, both within the developing organization, and externally to its various stakeholders, are crucial to the process. Furthermore, there is a great deal of complexity within these external organizations. As a result, the uncertainty associated with new products has driven many different approaches to dealing with these risks.

1.1.1. Cement Industry in Kenya

Kenya's building and construction sector is amongst the most rapidly growing, experiencing an average growth rate of 14.2 percent for the period 2006 – 2011. Over the same period, Kenya's economic growth, as measured by the real Gross Domestic Product (GDP) averaged only 4.3 percent declining to 4.38 percent in 2011 from 6.33 percent in 2006. Difficult global macro conditions (effects of high oil prices and the August 2007 commencement of the financial crisis) and Kenya's 2008 post-election violence in the midst of a high inflation environment (inflation averaged 9.0 percent) resulted in the country's subdued economic performance during the period.

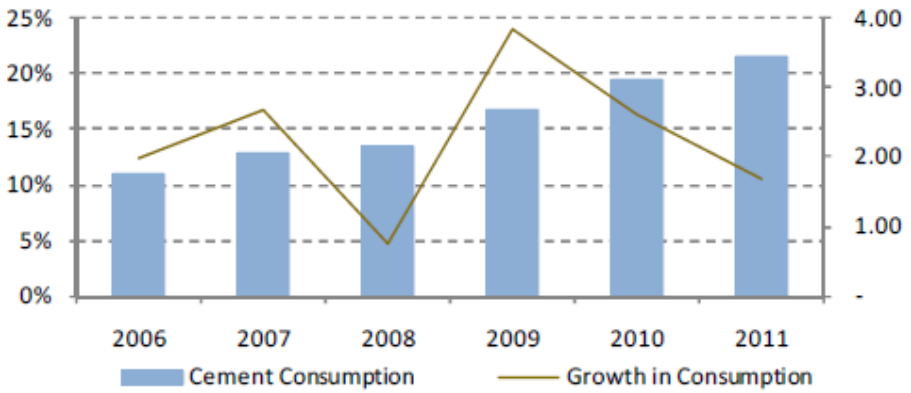
Figure 1.1: Growth in Construction Output Versus Gross Development Produce Growth Percent



Source: World Economic Outlook (WEO) Database (October 201), Kenya National Bureau of Statistics (KNBS) Economic Survey (2009 and 2012)

As seen in Figure 1.1, the Kenya has experienced a fluctuation in construction output despite the little fluctuation in the GDP growth over the years. In 2009, the construction output experienced the highest recorded growth, prior to it dipping sharply in 2010.

Figure 1.2: Cement Consumption in Metric Tonnes and Growth in Consumption in Percent



Source KNBS Economic Survey (2009 and 2012)

As shown in Figure 1.2 Cement production expanded at an average rate of 11.6 percent for the period 2006 – 2011 to 4.09metric tons in 2011 from 2.41metric tons in 2006. This rise in production was driven by the entry of new cement producers and extensive capacity expansion by existing players in response to increasing competition. This rise in production led to the consistent oversupply of cement during this period. Given an estimated industry capacity utilisation rate of about 72 percent, this glut supply could be much higher were installed capacity fully utilised.

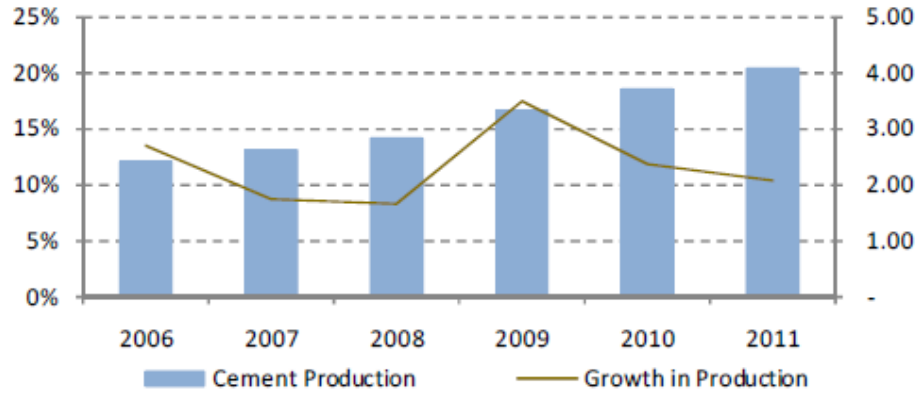
As at end of 2011, the local cement industry included six cement companies with mines concentrated in three sites across the country, as shown in the Table 1.1.1 below

Table 1.1: List of Cement Companies and Locations of their Mines

Cement Company	Mines	Cement Brand
Bamburi Cement Limited	Mombasa	Nguvu
Athi River Mining Limited	Athi River	Rhino
East African Portland Cement Company Limited (EAPCC)	Athi River	Blue Triangle
National Cement Company Limited	Lukenya	Simba
Mombasa Cement Limited	Athi River	Nyumba
Savannah Cement Limited	Athi River	Savannah

As seen in Figure 1.3 below, the cement industry has steadily grown from an annual production of about 2.3 million metric tonnes in 2006 to about 4.1 million metric tonnes in 2011. This is in spite of the fluctuation in growth in production.

Figure 1.3: Cement Production (Million Metric Tonnes) and Growth in Production (Percent)



Source KNBS Economic Survey (2009 and 2012)

Figure 1.4: Cement Imports Versus Exports, Metric Tonnes

Source KNBS Economic Survey (2009 and 2012)

Figure 1.4 shows the year by year changes in cement imports and exports in Kenya from the year 2006 to the year 2011. It is evident that the exports have grown steadily during this period whereas the imports have stagnated. It is clear that cement in Kenya industry is sustained by local manufacturing companies.

1.1.2. Savannah Cement Company

The sixth and latest entrant into the market, SCL is the biggest stand-alone cement grinding plant in Kenya in terms of grinding capacity, with an annual production capacity of 1.5 million metric tonnes. The plant is strategically placed in Athi River, some 35 kilometres from Nairobi, which accounts for 50 percent of Kenya's cement consumption. Athi River town and its near environs (Kitengela and the greater Kajiado) are raw material rich areas with vast deposits of limestone, pozzolana and gypsum with are primary materials used in the production of cement.

Production at the plant started in July 2012, with the first batch of cement produced on 15th July, 2012. To date the company has been in operation for just over a year, and as such a review and scrutiny of the product development process is warranted. The products currently available for production are of two types; Cement type 1 or CEM 1 42.5 and Cement type IV or CEM IV 32.5. CEM I 42.5 is high strength cement, with a twenty eight day compressive strength of 42.5 million Pascals, (MPA) hence its name CEM I 42.5. This kind of cement is used in areas requiring high strength like in building of bridges, high rise buildings, and building slabs. The CEM IV 32.5 is a medium strength cement that has a 28 day compressive strength of 32.5MPA. This is general purpose cement used in brick laying, plastering and any other general purpose. The 32.5N and 42.5N cement is the cement type produced by all cement plants in Kenya, except Savannah Cement, which has gone a step beyond the market and produces 32.5R and 42.5R cement. The N denotes normal hardening cement, whereas the R denotes rapid hardening cement. This means that Savannah's Cement hardens much faster than any other cement in the market.

There has been no review of the product development process in SCL since the plant began operations. The strategy used at its inception was that of an innovator; coming up with new products that are not available in the market. All other cement companies remain late majorities, all offering the same products. It is of interest to SCL staff, and even competitors, as to whether the strategies and drivers in the new product development are actually bearing fruit, and whether there is need to be a rapid change in direction in these strategies.

1.1.3. Strategies Used by Savannah Cement

As indicated in section 1.1.1, the total yearly production of cement in Kenya in 2011 was 4.0 million metric tonnes against an annual consumption of 3.1 million MT. This means that there was a surplus of close to a million MT and as such, companies had to have innovative strategies to remain competitive, the situation was not improved with the introduction of SCL into the market. Some of the strategies used by SCL to remain competitive are mentioned in the sections below and include importation of clinker, use of a roller press in the manufacturing process and producing unique cement.

Clinker is the largest component in cement and is also the most expensive component owing to the fact that it is not naturally occurring and has to be manufactured. The manufacturing and production process of clinker involves mining raw materials, grinding them into a homogenous mix, heating them in kilns that exceed temperatures of 1,500 centigrade. All these require significant amounts of energy obtained from both fossil fuels and electricity. In Kenya, the cost of both fossil fuels and electricity are very high, and thus impact heavily on production costs. It thus makes a lot of economic sense to import from Middle East countries like Saudi Arabia and United Arab Emirates.

SCL at the moment imports all its clinker, helping it achieve great competitive advantage.

SCL is the first and only company in Kenya that uses a roller press in its cement production. All other companies use only a ball mill in their grinding and crushing process. Basically, a roller press acts as a pre-crusher thus reducing the size of the raw materials that get to the final crusher known as ball mill. What this means is that the ball mill will thus require much less power to grind the final product, and at the same time it will grind much finer cement; the finer the cement the stronger it is.

SCL sets itself apart from the competition by offering superior quality cement. The superiority is in its fineness which has been explained above. The low production costs coupled with the lean workforce means that the final product costs much less to produce, making the cement products cheaper.

1.2 Research Problem

The product development is an important business process for every technology driven company in its bid to secure future growth and sustained success in the marketplace (Keith Goffin, 2005). The product development is a process and like any other management process, it can be improved to achieve better results. Clark and Fujimoto (1991) argue that product development is critical because new products are becoming the nexus of competition for many firms. Thus, product development is among the essential processes for success, survival and renewal of organizations, particularly for firms in either fast-paced or competitive markets (Brown and Eisenhardt, 1995).

As the forces of global competition and consumer sophistication continue intensifying, business organizations are forced to rethink and redesign their strategies in order to meet the requirements of the changing market place. One of the strategies that could be adopted by organizations is new product development. This means an organization wide process aimed at bringing a new product or service into the market. It comprises a range of activities including idea generation, business analysis, market testing and commercialization. Successful new product/service introductions are important for a firm's long-term performance. This holds especially for industries in which firms invest heavily in technologies, such as cement production industry, under the premise that firms will be able to introduce new products using these technologies.

SCL is a new firm in the cement industry which is largely dominated by Bamburi, East African Portland Cement, Mombasa Cement, Athi River Mining and Simba Cement among other players. Being a new entrant in a market dominated by giants, it is important that it manages its product development so as to convince customers to switch to their brand.

1.3 Purpose of the Study

The Main Objective of this study was to establish the cement product development management in Kenya using a case of SCL. The specific objectives were to;

i. Establish the strategies adopted by SCL in cement production management
ii. Determine the effectiveness of cement product development at SCL.
iii. Establish the factors of product development at SCL

1.4 Value of the Study

The findings of this study will be important to future scholars and researchers of new product development processes and how they can be managed. Through the findings of this study, future researcher will find reference materials besides areas where they can carry out research on.

The findings of this study will also be valuable to policy makers in government institutions on matters concerning new product development and the whole process of regulating the product. Through the findings of this study, policy makers will be able to understand the key areas to monitor in new product development so as to ensure that the product so developed meets the minimum required standards.

The findings of this study will also be beneficial to product development managers in different organizations. Through the findings of this study, product development managers will learn on how to improve the process of product development to ensure high success rate of product uptake.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter highlights the strategies adopted in cement production management and Effectiveness of cement product development and the challenges in product development and drivers of product development.

2.2 Cement Production Management Strategies

Cement is a fine, grey powder which sets and then hardens into a solid, strong material. It is mainly used to make concrete and mortar for construction. Cement is made by grinding three major materials in varying proportions which are clinker, pozzolana and gypsum. Pozzolana and gypsum are naturally occurring materials and are obtained by mining. On the other hand, clinker is obtained by heating in a rotary kiln a homogeneous mixture of limestone and other materials such as clay. Clinker gives cement its bonding strength, whereas gypsum is used to prolong the setting (hardening) time of cement, making it easier to use by masons. Pozzolana is an additive largely used in medium strength cement and is much cheaper than clinker, and as such is used to reduce the overall cost of cement.

The cement industry is capital intensive and only a few cement companies' use state of the art facilities. Cement manufacturing is energy intensive and modern cement plants are highly automated. Cement firms operate in markets closely linked to the economic cycle with a back-forward linkage with many other sectors like energy and transport (World Business Council for Sustainable Development, WBCSD, 2002).

The industry plans to increase capacity due to current and future high demand of cement. Firms are also seeking cost reduction option for power, raw material and logistics. More firms are targeting regional markets like Sudan, Rwanda and Burundi. Effort is in place towards product diversification and target value added and application specific products. Firms in the industry are more conscious to quality as seen in their effort to acquire certification of manufacturing activities. Generally, there is concern over security of raw materials and other resources (WBCSD, 2002).

The continuous development and market introduction of new products is an important determinant of sustained company performance (Brockhoff, 1994). Although new products open up new opportunities for companies, the substantial risk associated with these new products should not be neglected. Empirical studies thus point to high failure rates of new products, especially in consumer markets. It is therefore obvious that management is highly interested in learning about those factors which impact the success of new products.

Cement is generally made up of three components in varying compositions. These are clinker, gypsum and pozzolana. Clinker gives cement its strength, gypsum its setting time and pozzolana is an additive that is used to reduce cement strength and cost. Raw material management is one of the most important and vital strategies. Any shortfall could have catastrophic effects on production capacities and customer needs satisfaction. Majority of cement companies are located in areas where raw materials are readily available; in the case of Kenyan companies this comprises of areas such as Mombasa and Athi River where materials such as limestone, gypsum and pozzolana are readily available. Companies can also choose to either import some raw materials or mine and manufacture them. This is the general case for local companies such as Bamburi, ARM and EAPCC all of whom have opted to manufacture their raw materials. This gives them added control over their stock levels management. SCL chooses to import its clinker; a strategy which has added transportation and shipping risks.

Most local cement industry players have multi-product businesses in the building materials segment and a key focus is to maintain the strategy of vertically integrating core activities of cement, ready-mixed concrete and sand and gravel. Other cement companies like ARM also manufacture sodium silicate, lime, industrial minerals, fertilizer and special building products. In 2011, these non-cement products accounted for 32.4 percent of the company's total income (Blair, 2012). In other instances, cement companies can open up distribution networks and warehouses in various parts of the country and this boosts their sales in the targeted areas.

The reorientation of the management style is based on proximity to operating activities, clear goals, consistent implementation and speed and the focus would be on increasing efficiency and cost leadership and growth. Areas of production that can be improved are energy management where emphasis is placed on improved production

methods aiming at reducing the power used in production of cement. Other improvement areas are customer vehicle turnaround time at the packing plants, aiming at reducing the times customers wait before being served.

The largest costs involved in cement production are the energy costs and staff remuneration. By maintaining a lean and efficient staff, companies can make huge savings. Energy audits can also be done to determine areas of improving energy efficiency. Many installations are usually oversized in terms of energy required to run them, leading to them using larger than necessary amounts of energy.

Cement hydration starts at the surface of the cement particles, it is the total surface area of cement that represents the material available for hydration. Thus, the rate of hydration depends on the fineness of the cement particles and, for a rapid development of strength, high fineness is necessary. In addition, the cost of grinding to a higher fineness is considerable and also the finer the cement the more rapidly it deteriorates on exposure to the atmosphere (Neville, 2012). By maintaining strict fineness levels, cement companies can produce higher quality cement, which can give a competitive edge over others. Cement fineness is measured using industry standard sieves and a sample of cement is passed through the sieves and the amount of residue that remains in the sieve is measured as a percentage of the entire sample size.

The price of a product is one of the most important decision variables for both the consumer and the company. Competitive conditions in the marketplace have made price an even more important differentiating factor in formulating marketing and business strategies. As a result, price has increasingly become a focal point in consumers' judgments of offer value as well as their overall assessments of the company (Monroe, Pricing: Making Profitable Decisions, 2003). Existing research in marketing has documented several consumer shortcomings in dealing with retail prices. This research has established that, in general consumers have very limited knowledge of prices and a very poor ability to process complex price information, often leading to dissatisfying purchase experiences with price being a major contributor of dissatisfaction (Monroe, Buyers' subjective perceptions of price, 1973). The ability to provide competitive prices and to effectively resolve consumers' price concerns both before and after purchase has therefore become of interest for marketing managers. In addition to using low price strategies, cement companies also give rebates to loyal customer. This is usually given to those customers who have

serviced large and continual orders of cement as a way to keep them purchasing their products. An example is where rebates are given to those customers who meet set out purchase monthly targets.

2.3 Effectiveness of Cement Product Development

product development is decisive for the prosperity and success of any company (Woodside and Biemans, 2005). Through development and the introduction of new products new possibilities markets can be reached or created. Innovative input from customers and markets are often pointed out as significant external contributions which provide a solid foundation for successful product development (Wilkinson, 2006). Information obtained from customers or customer involvement in the development process may strengthen the company's ability to stay abreast with trends and developments in target markets as well as stay competitive in an increasingly globalised world.

product development are among the most powerful but difficult activities in business (Clark and Wheelwright, 1995). Business managers and marketing academics alike agree that an essential element of an organization's long-term survival is success in product development and design (Henry et al., 1989). The development of outstanding products not only opens new markets and attracts new customers, but also leverages existing assets and enlarges an organization's capabilities.

product development has a very important impact on final product quality. Product design and development translates the functional needs and expectations of a customer into specific engineering and quality characteristics. For traditional and simple products, the developmental process is not complicated and can be achieved by experienced engineers without using any special techniques. For modern products, it is impossible to reach the development target without using suitable techniques (Juran and Gryna, 1993).

In the Kenyan cement market, new products such as high strength 52.5 cement are yet to be introduced into the market. Other products such as rapid setting cement have not been fully assimilated into the market.

2.4 Challenges in Product Development

Some of the challenges include (WBCSD, 2002) source of raw materials. The main material used in production is clinker, which is very expensive to produce. The main

challenge here is whether to manufacture the clinker or to import it. The advantage of manufacturing clinker is that one has full control over stock levels and quality of stock. Importing clinker is cheaper than manufacturing and that is the major advantage it has over manufacturing.

The cost of energy inputs and other overheads also pose a challenge. The largest cost in cement production is the cost of electricity and overheads including employee salaries. Rising costs directly lead to increased product prices, which can be used as competitive advantage by others.

The environmental protection and employee health and safety is also of concern. Cement production is a process that produces a lot of fine dust. This dust easily spreads to the environs, and is harmful to plants, humans and other animals. By nature of this description, it becomes a key challenge in the development process. Major challenges are also met with concerns on how to ensure sustainability of the natural systems and the environment, so that these needs can be met not only in the present, but also for generations to come. The continual capacity and reliability of all equipment remains a challenge, and periodic preventive and predictive maintenance schedules have to be integrated into management systems.

2.5 Factors of Product Development

The industry is important as it plays a forward and backward linkage with other economic sectors hence playing a critical role as an indicator to the general economic conditions. It is a key contributor of revenue to the government and supports other key sectors like energy (Central Bank of Kenya, CBK, 2007). It also supports the community in term of income, community programs and skills.

The competitive environment has been and continues to be driven by technological innovations, globalization, and competition, extreme emphasis on price, quality and customer satisfaction (Thompson, 1967). As a result, organizations must continuously create and innovate in order to stay relevant and be successful. According to Miller (1998), organizations exist in a complex commercial, economic, political, technological, cultural and social environment. These environmental changes are more complex to some organizations than for others. For survival, an organization must maintain a strategic fit with the environment. The environment is important and an organization has to respond to its dynamism, heterogeneity, instability and uncertainty (Miller, 1998).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter outlines the overall methodology that was used in the study. This includes the research design, population of the study, sample size, sample frame, data collection methods, research procedures and data analysis and presentation.

3.2 Research Design

The research used descriptive survey method to assist the researcher answer the general and specific objectives of the study. This was meant to establish the responses by SCL manufacturing to changes in their environment. Both Day (1990) and Churchill (1991) agree that this is an appropriate form of study, especially when the objective of the research is to gain insights into ideas, which was applicable in this case. The descriptive survey method helped the researcher to get the data about existing phenomena by asking individuals about their perceptions, attitudes and behaviour or values.

3.3 Population of the Study

The population of interest in this study was the management staff in SCL manufacturing firm in Kenya. All those who have management experience of at least two years within the cement industry were selected. It was deemed that two years is a long enough time to have gained the relevant experience required to give qualitative responses to the questions contained in the questionnaires. A census study was taken to be the most appropriate because the population was small.

3.4 Data Collection Method

The study used primary data, which was collected using a questionnaire containing both structured and unstructured questions. Responses were sought from managers who had been in the industry for at least 2 years and these included senior managers or heads of departments. The two minimum years of experience was important as it ensured that the respondents were well versed with their organization and the changes in the industry.

3.5 Data Reliability and Validity

A pilot study to pre-test the validity and reliability of data collected using the questionnaire was done. Validity is the degree by which the sample of test items represents the content the test is designed to measure. Content validity was employed in this study as a measure of the degree to which data collected using a particular instrument represented a specific domain or content of a particular concept. Mugenda and Mugenda (1999) contend that the usual procedure in assessing the content validity of a measure is to use a professional or expert in a particular field. The content validity of the research instrument was evaluated through the actual administration of the pilot group.

According to Shanghverzy (2003), reliability refers to the consistency of measurement and is frequently assessed using the test–retest reliability method. Reliability is increased by including many similar items on a measure, by testing a diverse sample of individuals and by using uniform testing procedures.

A pilot group of 10 individuals from the target population was selected to test the reliability of the research instrument. The aim was to correct inconsistencies arising from the instruments, which ensure that they measure what is intended. The survey instruments were subjected to overall reliability analysis. A coefficient of 0.70 or more implies that there is a high degree of data reliability.

3.6 Data Analysis

In this study, a number of statistical techniques were used to analyse the data since the research purpose focus was on description of current strategies employed by SCL. The techniques used included both descriptive and inferential statistics. Descriptive statistics included graphs, charts and measures of location (mean, mode, and median). Inferential statistics included correlation analysis and ANOVA. These were used to establish association between production variables and determine linear relationships.

The secondary data from this study was processed through excel application and Statistical Package for Social Sciences (SPSS). The presentation of the information will be in tables, charts and graphs in form of frequencies and percentages. Table 2 below shows the summary of the methodology used. For objective one, that is to determine the current strategies used by SCL, both descriptive and statistical analyses were used. The secondary production data obtained from January 2013 to September

2013 was analysed in the form of graphs and charts and relationships obtained to determine product development strategies

For the second objective which was to determine the effectiveness of the cement product development at SCL, the SPSS package contained in Microsoft Excel was used. Charts and trends were also used to determine growth and improvement areas as measures of effectiveness of the current product development process.

For the third objective which was to establish the factors of product development at SCL descriptive analysis was used and a questionnaire (See appendix I) was used. The questions in section 3 and 4 of the questionnaire were used to primarily determine the drivers of product development at SCL.

Table 2: Summary of Methodology Used

Objectives	Data and/or Information to be Collected	Questionnaires	Analyses Done
To establish current development strategies at SCLLimited, SCL	Secondary data from one year production and quality records	Not applicable	Graphs and trends
To determine the effectiveness of the cement product development at SCL	Primary data; interviews and questionnaires given to select quality and production staff	Both structured and unstructured	Descriptive analysis and also use of Statistical Package for Social Sciences, SPSS
Establish the factors of product development at SCL	Primary data; interviews and questionnaires given to select quality and production staff	Both structured and unstructured	Descriptive analysis

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter deals with data analysis and discussion of the results. First, the chapter describes the data and also discusses the current method used for product development and management at SCL. All production data were used to derive correlations that was used in determining current development strategies.

4.2 Description of the Production Data

The production data for the year to date (January 2013 to September 2013) has been shown in Table 3 below. The production column represents all monthly cement production figures. The sales column represents the monthly sales volumes whereas the fourth column indicates the Cement to Clinker (C/K) ratio average for the month. The higher the ratio the lower the production costs. Finally, the cement fineness column indicates how fine the cement was ground. The lower the better, indicating stronger cement.

As seen from Table 3 below, the production and sales figures have grown steadily from January to date.

Table 4 shows additional production data for the year 2013. The kWh/ton column represents the average power used by the entire production process to produce a single ton of cement. Though it has not been steady, the fluctuation has not been very high. This figure gives a good indication of the average power usage and is a more meaningful indicator as compared to the total monthly power consumption indicated in the next column. The Total Monthly Power Consumption (TMPC) has steadily risen from month to month and is a direct indication of increased production activity within the plant. The Production Tonnage Per Hour (PTPH) is indicated in the next column.

Table 3: Production Data for the Year 2013

Month	Production (Million Metric Tons)	Sales (Million Metric Tons)	C/K Ratio	Average Production Tons per Hour	Cement Fineness (Percent)
January	15,843.40	13,092.55	1.5	96.40	10.70
February	17,678.50	15,993.85	1.6	92.30	8.60
March	19,048.90	18,075.85	1.5	89.20	8.80
April	21,768.70	25,125.30	1.5	82.90	8.50
May	18,937.30	19,390.90	1.5	81.30	8.30
June	28,622.00	23,091.20	1.5	96.90	8.80
July	31,659.90	28,980.40	1.5	85.90	8.50
August	33,524.90	29,301.89	1.5	92.69	8.53
September	31,432.40	34,637.97	1.5	84.20	8.04
October					
November					
December					
Total	218,516.00	207,689.91	13.57	801.79	78.77

Source: Secondary production data at Savannah Cement Limited

Table 4: Additional Production Data

Month	Production	kWh/ton	TMPC	TPH	Fineness
January	15,843.40	42.80	722,119.08	96.40	10.70
February	17,678.50	42.50	800,981.50	92.30	8.60
March	19,048.90	43.40	879,220.18	89.20	8.80
April	21,768.70	44.10	1,027,675.81	82.90	8.50
May	18,937.30	46.60	946,757.55	81.30	8.30
June	28,622.00	40.40	1,194,889.65	96.90	8.80
July	31,659.90	44.00	1,461,011.72	85.90	8.50
August	33,524.90	40.37	1,364,218.83	92.69	8.53
September	31,432.40	42.30	1,461,708.39	84.20	8.04
October					
November					
December					
Total	218,516.00	386.47	9,858,582.71	801.79	78.77

Source: Secondary production data at Savannah Cement Limited

Also as seen in Table 4, with the exception of January, the cement fineness has narrowly fluctuated between 8.04 and 8.80. This is a clear indication that the cement quality has not been compromised during year to date. As earlier indicated, fineness is a measure of cement strength. The finer the cement, the higher its strength. The cement fineness is diagrammatically indicated in Figure 6. Table 5 below shows the regression analysis on production volumes and TMPC. As expected, there is a very strong relationship, with R-Square equal to 0.996.

Table 5: Regression on Production Volumes and Total Monthly Power Consumption

Source: Secondary production data at Savannah Cement Limited

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.99805
R Square	0.996105
Adjusted R Square	0.871105
Standard Error	1664.854
Observations	9

ANOVA

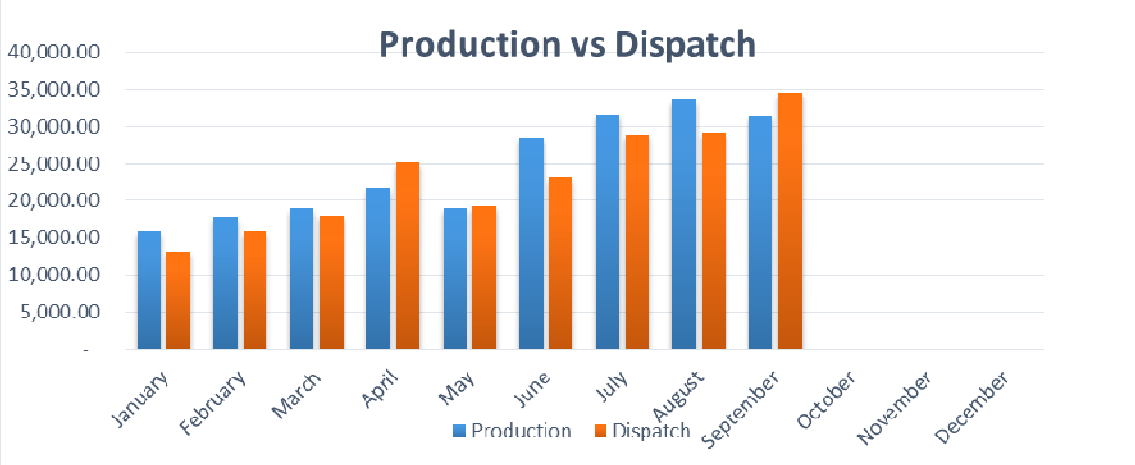
	df	SS	MS	F	Significance F
Regression	1	5.67E+09	5.67E+09	2045.723	6.75E-10
Residual	8	22173909	2771739		
Total	9	5.69E+09			

	Coefficients	Standard Error	t Stat	P-value	Lower 95percent	Upper 95percent	Lower 95.0percent	Upper 95.0percent
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Substatition	0.022255	0.000492	45.22967	6.31E-11	0.02112	0.02339	0.02112	0.02339

4.3 Factors that Influence Production Volumes

Production is largely driven by the sales (dispatch) volumes. It is clear that if the production is much higher than the dispatch, then the company would have large amounts of non-moving cement stocks. It is undesirable to store cement in the silos for periods longer than a week. It is thus clearly evident that production and dispatch volumes have very little variation. Figure 5 below shows the month to month variations in the productions and dispatch volumes where dispatch is the amount of cement sold. It is visibly clear that the sales volumes drive the production volumes.

Figure 5: Production Versus Dispatch Chart



Statistical analysis for the relationship between production and dispatch gave the results shown in Table 6. As indicated earlier, the relationship is very strong with R-square giving a value of 0.99.

Table 6: Statistical Analysis of Production and Dispatch

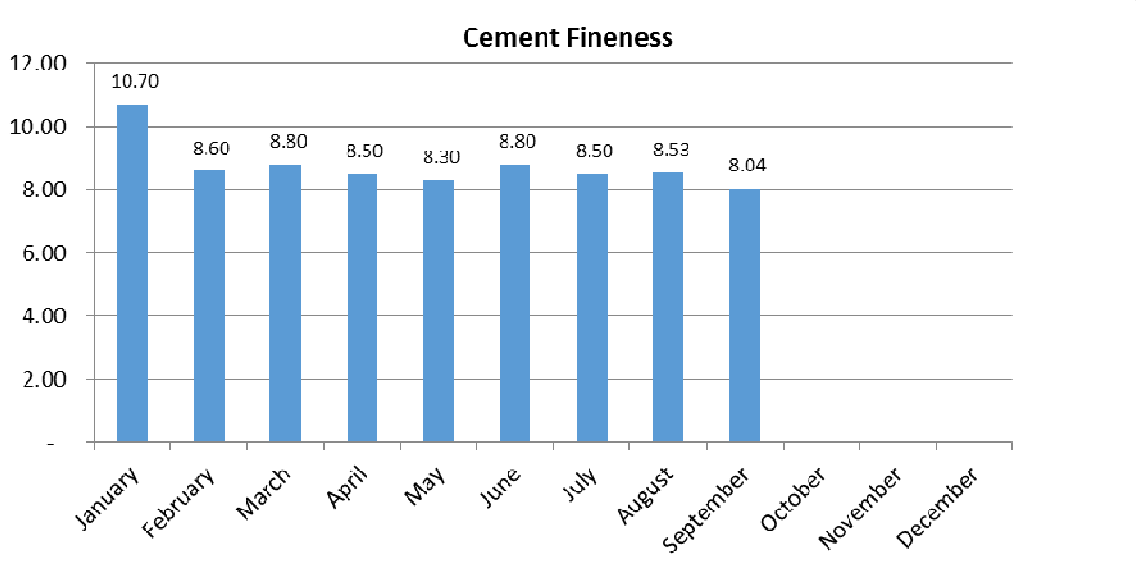
Source: Secondary production data at Savannah Cement Limited

SUMMARY OUTPUT								
Multiple R		0.99304						
R Square		0.98614						
Adjusted R Square		0.84328						
Standard Error		3282.34						
Observations		8						
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	5.37E+09	5.37E+09	498.0575	5.29E-07			
Residual	7	75416345	10773764					
Total	8	5.44E+09						
		Standard			Lower	Upper	Lower	Upper
	Coefficients	Error	t Stat	P-value	95percent	95percent	95.0percent	95.0percent
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
13092.55	1.033751	0.046321	22.3172	9.17E-08	0.92422	1.143283	0.92422	1.143283

4.4 Relevance of Cement Fineness

As previously indicated in section 2.2, cement fineness and cement quality are inseparable. The fineness indicated in the production records is measured as a percentage of the residue that remained in the sieve. The lower the value the better quality the cement. As seen from the production data, the cement fineness has been maintained at the 8 percent level with the exception of January 2013. This is a clear indication that cement fineness is a key strategy being used by SCL. Figure 6 below shows the cement fineness chart with the fineness figures shown on the Y-axis.

Figure 6: Cement Fineness Chart



4.5 Power Consumption at the Plant

The data reveals a gradual increase in power consumption. This however can be attributed to increased plant utilization and increased production and not necessarily wastage. Figure 7 below shows the trend, with the peak power consumption recorded during the month of September 2013.

The production rates are also shown in Figure 8 below. This is an indication of the hourly utilization of the mill. However, the lower the production rate the finer the cement can be ground. So a good balance has been gradually been obtained through continuous learning.

Figure 7 below shows the power consumption trend for the year 2013. The y-axis represent the power consumed in kilowatt-hours. The values have been steadily rising. This can be attributed to the general increase in production at the cement plant.

Figure 7: Power Consumption Chart

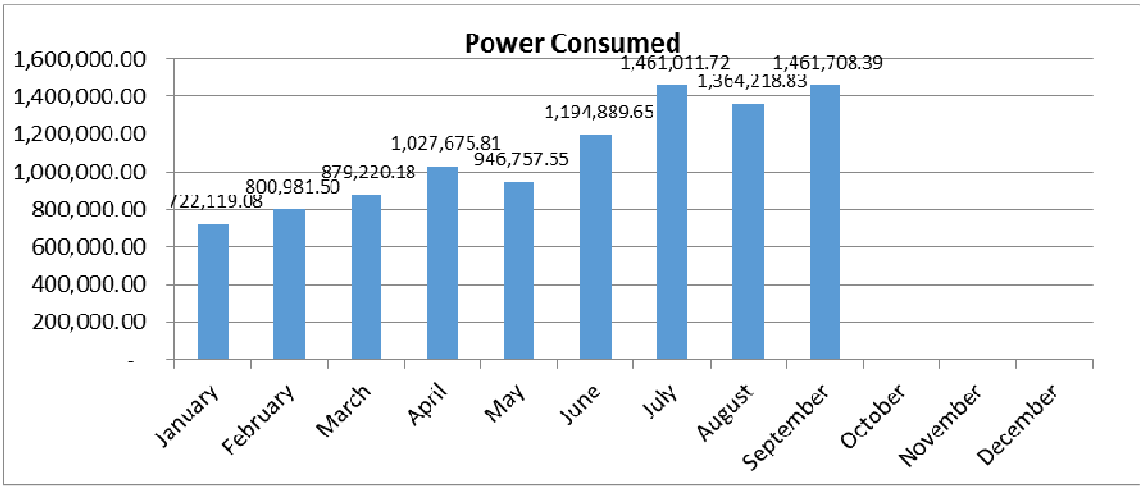
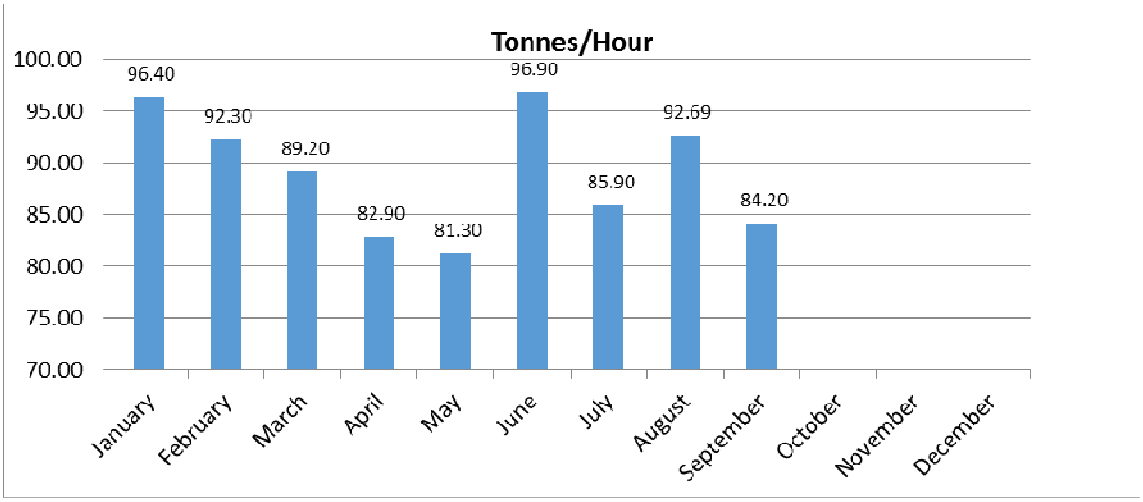


Figure 8 on the proceeding page shows the production tons per hour chat for the year 2013. The y-axis represents the hourly production cement tonnage rate

Figure 8: Tons per Hour Chart



4.6 Comparison with Competitors

Table 7 on the proceeding page shows the data obtained showing the Sales volumes for SCL compared with other top competition. All the figures indicated show the monthly sales volumes in metric tonnes.

From Figure 9 it is clear that there has been a steady rise in the volumes. This can be a pointer to the success of the product development process in use at SCL. For the same period, the descriptive statistics are given in Table 8.

Table 7: Sales Volumes in Metric Tons Comparison with Competition

Month	Savannah	Bamburi, NBI	Mombasa Cement	EAPCC
January	15,843.40	45,121.00	33,654.00	29,645.00
February	17,678.50	47,895.00	35,652.00	33,564.00
March	19,048.90	41,232.00	38,791.00	44,578.00
April	21,768.70	40,894.00	35,644.00	36,541.00
May	18,937.30	44,368.00	39,875.00	36,999.00
June	28,622.00	38,941.00	33,548.00	40,112.00
July	31,659.90	37,899.00	38,123.00	39,654.00
August	33,524.90	40,125.00	36,138.00	34,333.00
September	31,432.40	41,777.00	33,121.00	31,212.00
October				

Source: Secondary production data at Savannah Cement Limited

The figures shown in Table 7 show the steady rise in the sales of Savannah Cement product from the month of January 2013 to September 2013. The sales of other companies have stagnated and in instances like for EAPCC dropped from a high of 44,578 metric tonnes in the month of March 2013.

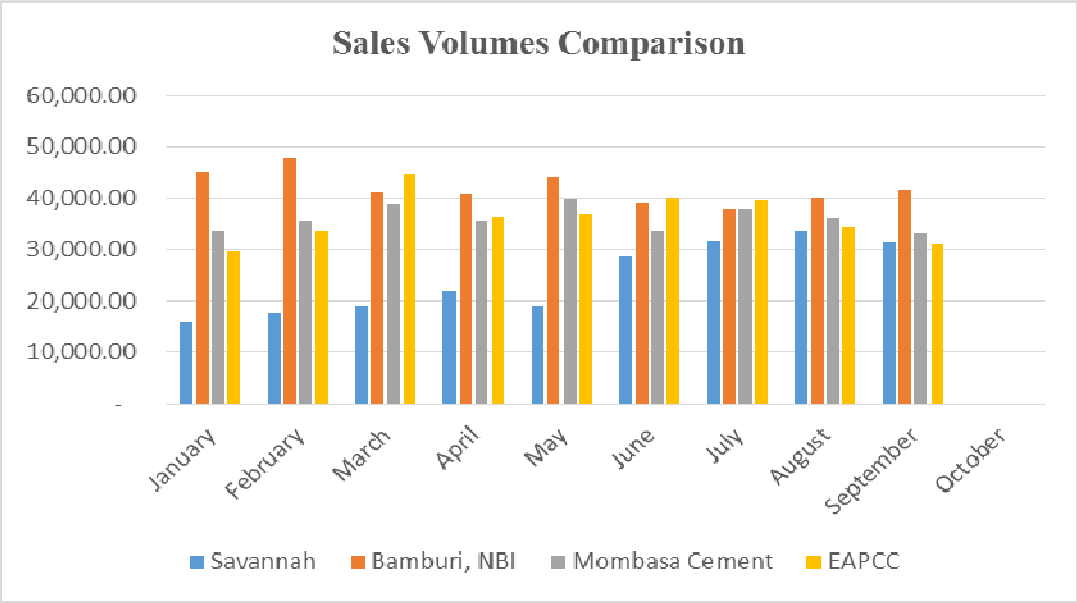
Table 8: Descriptive Statistics for Sales Volumes

	Savannah	Bamburi	Mombasa	EAPCC
Mean	24,279.56	42,028.00	36,060.67	36,293.11
Median	21,768.70	41,232.00	35,652.00	36,541.00
Standard Deviation	6,954.43	3,194.65	2,432.87	4,695.53
Range	17,681.50	9,996.00	6,754.00	14,933.00
Minimum	15,843.40	37,899.00	33,121.00	29,645.00
Maximum	33,524.90	47,895.00	39,875.00	44,578.00
Sum	218,516.00	378,252.00	324,546.00	326,638.00
Count	9.00	9.00	9.00	9.00
Confidence Level(95.0percent)	5,345.65	2,455.62	1,870.07	3,609.30

From Table 8 it is seen that within a year, the strategies used by SCL have made them have a monthly average sales volume of 24,279 metric tonnes of cement. This is phenomenal growth given that EAPCC and Mombasa Cement have a monthly averages of about 36,000 metric tonnes. It is clear that the strategies are bearing fruit.

Figure 9 below shows a chart comparing the sales volume of SCL as compared to competitors. From here, the growth of SCL sales as compared to competitors can be clearly seen

Figure 9: Sales Values as Compared to Competitors



4.7 Questionnaire Response

The questionnaire was administered to 10 SCL employees who were under management with at least two years prior experience in the cement industry. The response rate was 100 percent with all respondents returning filled out questionnaires.

4.7.1. Project Functional Area

The questionnaire asked the respondents their functional areas of employment within SCL. The response was as shown in Table 9 where majority of the respondents were technical department of production. The other respondents were distributed between finance, projects, human resource and sales departments.

Table 9: Project Functional Area

Functional Area	Number of Respondents
Finance	2
Production	4
Human Resource	1
Sales	1
Project	2
Total	10

4.7.2. About the Respondent

Majority (50 percent) of the respondents were middle level managers. 3 respondents representing 30 percent of total were from top management, whereas the remaining 20 percent were from first level supervisors. This is shown in Table 10 below.

Table 10: Employment Level of Respondents

Position in the Company	Number of Respondents
Top Management	3
Middle Management	5
First Level Supervisor	2
Non Managerial Position	0
Total	10

4.8 Factors Influencing Product Development Strategy

The questionnaire (see Appendix I) was used to collect data on the factors that influence the product development strategy. The questionnaire was administered to all the management staff who had experience of two years or more in the cement industry. The main aim of the questionnaire was to determine the product development driving factors as well as the strategies used in gaining competitive edge. The external factors that were considered as strongly affecting product development were government policies, customer feedback and actions of competitors.

Internal factors that were considered as strongly affecting product development were the pricing strategy, plant planning, production policy and the technology in use. The

questionnaire also covered the production strategy; while it was observed that there is indeed a formalized and centralized production strategy that strategy heavily relied on subjective (judgemental) methods. In this case, the jury of executive opinion was the most used technique in the product development strategy. When quantitative (computer based) methods were used for production strategy, majority of the respondents felt that the most common technique was the use of trend line analysis.

4.7.3. External Factors

As per the questionnaire, the external factors affecting production strategy and product development at SCL were tabulated as shown in Table 11 below. As seen, the external factors influencing product development at SCL were customer feedback and actions of competitors.

Table 11: External Factors Determining Production Strategy

	Strong effect	Moderate effect	Weak effect	No effect	Total
Government Policy	5	4	1	0	10
Customer Feedback	7	3	0	0	10
Fiscal Policies(taxation)	2	4	2	2	10
Raw Materials Prices	6	3	1	0	10
Competitors	8	2	0	0	10

4.7.4. Internal Factors

As per the questionnaire, the factors determining production strategy at SCL were tabulated as shown in Table 12 below. Production policy and planning were seen to be having strong effects on production strategy whereas the technology in use at SCL and pricing strategy were seen to be having largely moderate to weak effects on the production strategy.

Table 12: Internal Factors Determining Production Strategy

	Strong effect	Moderate effect	Weak effect	No effect	Total
Pricing Strategy	2	3	5	0	10
Planning	8	1	1	0	10
Production Policy	8	2	0	0	10
Technology	4	5	1	0	10

4.7.5. Production Strategy Currently Employed at Savannah Cement

The questionnaire also asked respondents on what the current production strategy being used as SCL was and the importance of each of the strategies. The response was as shown in Table 13

Table 13: Response to Current Production Strategy Used

	5	4	3	2	1	Total
	Extremely important	Important	Somewhat important	Little importance	Not Important	
Computer based methods	8	2	0	0	0	10
Judgmental methods	7	2	1	0	0	10
Combinations of the above two	3	3	4	0	0	10
Other (please specify)	0	0	0	0	0	10

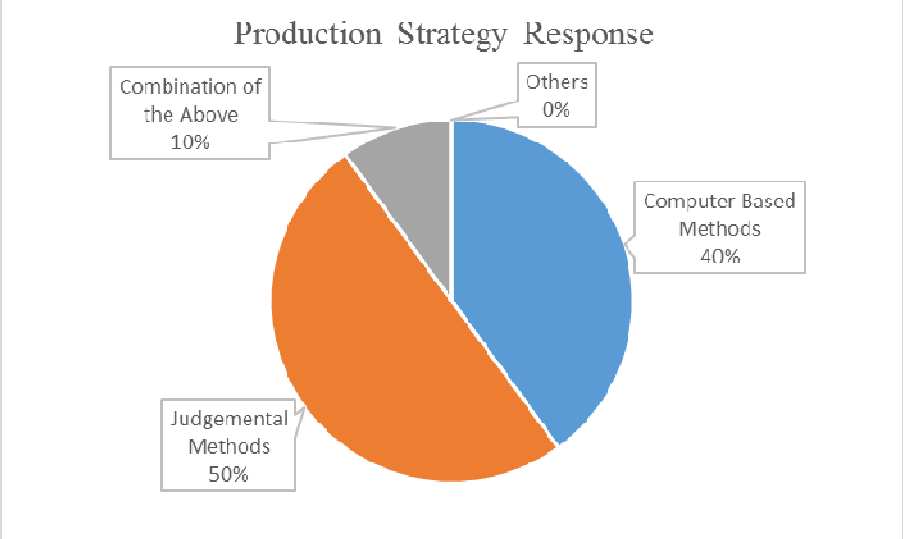
Table 13 was also summarised in chart form as shown in Figure 10 below which shows the response percentages to the questionnaire used in this research.

It is clear that majority (50 percent) of the respondents felt that the production strategy was largely based on judgmental methods. In this case, executive management opinion was considered the strongest technique used in product development and in

forecasting production. The questionnaire was given to managers with at least two years of experience in the cement industry.

Computer based methods were found to be the second most used product development strategy.In instances were computer based methods were used, trend line analysis was the most used computer based method used. Trend line analysis was largely used in projecting production levels and volumes. Trend line analysis was also used to speculate preceeding months sales volumes, thus aiding in planning of production to be able to meet projected demands.

Figure 10: Response to Strategy Questionnaire



4.9 Discussions

The main objective of this study was to establish the strategies adopted by SCL in cement production management and to determine the effectiveness of cement product development at SCL. The final objective was to establish the factors of product development at Savannah Cement.

On the first objective, we found that SCLs main strategy is to reduce the costs of production. This was achieved through use of lean production methods like using of a roller press and importation of clinker. Another strategy was found to be production of unique and quality cement. This was seen in the maintenance of cement fineness at constant levels throughout the year 2013. The third strategy used was also management focus and direct input in production. From the questionnaires, it was

observed that the single most used production strategy was the expert opinion and the jury of executive opinion.

The second objective was to determine the effectiveness of the strategies used and here the secondary data obtained from operation and production data for the year 2013 was analysed and used to determine the effectiveness. SCL's growth in 2013 was clearly evident, with it gaining advantage against its competitors. At the beginning of the year 2013, the sales volumes of SCL were about a third of Bamburi's sales. This has grown and was seen to be about three quarters of Bamburi's sales by the month of September 2013.

The final objective was to determine the drivers of product development at SCL. From the data obtained, it was observed that one of the factors was cement quality, represented by cement fineness. Another factor was power consumption. Power consumption had a direct impact on cost of the product, and thus measures were put in place to reduce consumption. For the case of SCL, this was achieved through use of a roller press and by optimising production levels. The final factor of product development was also the sales volumes which had a direct impact on production levels. The higher the sales volumes the higher the production levels.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter discusses the summary of the findings obtained in chapters 3 and 4 of this research. Thereafter the conclusions and recommendations were given.

5.2 Summary

The main objective of this study was to establish the cement product development management in Kenya using a case of SCL. Specific objectives were to establish the strategies adopted by SCL in cement production management; determine the effectiveness of cement product development at SCL and establish the factors influencing product development at SCL.

It was established that maintaining quality standards has been the strategic pillar. This was seen in that the cement fineness was maintained at near constant levels throughout the entire year. It was also established that minimizing power was also used as a strategy. This helped reduce direct production costs enabling the company maintain the price of the product. It should be noted that SCL has been in operation for just over a year, and thus only the production data for 2013 was used.

5.3 Conclusion

The study established that the quality of the cement has been used to gain competitive edge. The fineness and the strength of the cement were the indicating quality factors. These have been maintained constant throughout the year.

As a result, there has been a steady rise in the sales volumes from January 2013 to September 2013. This can be attributed to the cement consistency leading to countrywide consumer acceptance.

During the same period, the sales volumes of other competitors has dipped albeit by small margins. This can be attributed to the gain in market share of the SCL products, which has seen their sales volumes just about match those of big industry players like MCL and EAPCC.

External factors have also contributed to the development strategy used at the company. Government regulations through Kenya Bureau of Standards (KEBS), were

the main contributors. The KEBS dictates the minimum required quality standards with regards to material mixtures and cement fineness.

Other external factors are customer requirements and actions of competitors, both of which impact the product development process.

5.4 Limitations of the Study

The study was limited to SCL only thus making the sample of the survey small. This meant that much information could not have been collected.

Another limitation was that the study did not focus on how to reduce the power consumption. Power consumption is the largest production cost outside the cost of raw materials.

5.5 Areas for Further Research

Since the study was focused on the specific case of Savannah Cement, there is need for further research on the product development process of other major industry players like Bamburi Cement, EAPCC and Mombasa Cement. This would give an industry wide understanding of the product development process.

The power consumption data can also be studied in the form of an energy survey or energy audit. This will give greater understanding of specific areas of energy improvement through conservation and better management

5.6 Recommendation

In view of the findings, the following recommendations were made. The company should maintain management focus to ensure that strict adherence to quality standards and this has been used to gain competitive advantage and the strategy is bearing fruit.

While there exists a formalized production strategy, it is recommended that this strategy be based on computer methods. The company should incorporate methods such as simple regression, moving averages and simple averages in production strategizing. At the moment, it was observed that there was heavy reliance on trend line analysis only as a production planning method.

The company should also survey the possibility of further reducing power consumption during its production process. This has the possibility to further reduce

production costs; electric power is the single largest production cost outside the cost of raw materials. The company should also survey the possibility of using product pricing as a competitive strategy. It has been noted that the price remained constant during the entire year.

REFERENCES

Adams, B. (2002). Low Price Guarantee Creates Confidence. Hotel and Motel Management, 1 and 74.

Blair, D. and. (2012). Kenya Cement Industry Brief Overview. Nairobi.

Brockhoff, K. (1994). Management Organisation Forschung and Entwicklung. Hamburg.

Brown, S. L., and Eisenhardt, K. M. (1995). Product Development: Past Research, Present Findings, and Future Direction. Stanford: Stanford University.

Clark , K. B., and Wheelwright, S. C. (1995). The Product Development Challenge: Competing Through Speed, Quality and Creativity. Havard: Harvard Business Review Book.

Henry, W., Menasco, M., and Takada, H. (1989). New Product Development and Testing. Lexington, MA: Lexington Books.

Hines, P. (1994). Creating World Class Suppliers. London: Financial Times/Pitman Publishing.

Juran, J. M., and Gryna F. M. (1993). Quality Planning and Analysis (3rd ed.). Ney York: McGraw-Hill.

Keith G, R. M. (2005). Innovation Management: Strategy and Implementation Using the Pentathlon Framework. PALGRAVE USA.

Krishnan , V., and Ulrich, K. T. (2001). Product Development Decisions: A Review of Literature.

Lamming, R. C. (1993). Beyond Patnership: Strategies for Innovation and Lean Supply. London: Prentice-Hall.

Miller, D. (1998). A Theory of Shopping. New York: Cornell University Press.

Monroe, K. B. (1971). Measuring Price Thresholds by Psychophysics and Latitudes of Acceptance. Journal of Marketing Research, 460-4.

Monroe, K. B. (1973). Buyers' Subjective Perceptions of Price. Journal of Marketing Research, 70-80.

Monroe, K. B. (2003). Pricing: Making Profitable Decisions. New York: McGraw-Hill Publishing.

Monroe, K. B., and Lee, A. Y. (1999). Remembering Versus Knowing: Issues In Buyers' Processing of Price Information. Journal of the Academy of Marketing Science, 27, 207-25.

Mugenda, O. M., and Mugenda, A. G. (1999). Research Methods: Quantitative and Qualitative Approaches. African Centre for Technology Studies.

Neville, A. M. (2012). Properties of Concrete. Prentice Hall.

Pang-Lo, L., and Chih-Hung, T. (2009). Research on the Influences of New Product Design and New Product Development Process Management on New Product Development Performance in Taiwan's Industries. Asian Journal on Quality, 89-106.

Sanjay, J., and Srivastava, J. (2000). An Experimental and Theoretical Analysis of Price-Matching Refund Policies. Journal of Marketing Research, 351-362.

Sivakumar, K., and Weigand, R. E. (1996). Price-Matching Guarantees: Rationale, Implementation, and Consumer Response. Pricing Strategy and Practice, 4-13.

Thompson, J. D. (1967). Organizations in Action. New York: McGraw-Hill.

World Business Council for Sustainable Development (2002). Business and Biodiversity: A Handbook for Corporate Action. WBCSD.

APPENDIXES

APPENDIX I: RESEARCH QUESTIONNAIRE

Section 1: Project Functional Area

Please tick the most appropriate functional area

1. Which functional area of the project do you work?

☐ Finance;

☐ Production

☐Human Resource

☐ Sales

☐ Project

Section 2: About Yourself

Please tick the most appropriate information about yourself

2. Your position in the project

☐ Top management

☐ Middle management

☐ First level supervisor

☐ Non managerial position

3. Your Gender

☐ Male

☐ Female

4. Your age in years

☐ Less than 25

☐ 25 – 35

☐ 36 – 47

☐ 48 – 54

☐ More than 54

5. Your highest level of education

☐ Diploma

☐ University/College degree

☐ Masters Degree

☐ PhD

☐ Other (please specify): _____

6. Number of years worked in organization or project

☐ Less than 6 months

☐ 6 – 12 months

☐ 12 – 18 months

☐ 18 – 24 months

☐ Over 2 years

Section 3: External and Internal Environment

7. To what extent do the following external and internal production factors affect the type and quality of cement product? (please tick appropriate box)

External environment

	Strong effect	Moderate effect	Weak effect	No effect
Government policy	☐	☐	☐	☐
Customer feedback	☐	☐	☐	☐
Fiscal policies(taxation)	☐	☐	☐	☐
Raw materials prices	☐	☐	☐	☐

Competitors	☐	☐	☐	☐

Internal environment

	Strong effect	Moderate effect	Weak effect	No effect
Pricing Strategy	☐	☐	☐	☐
Planning	☐	☐	☐	☐
Production Policy	☐	☐	☐	☐
Technology	☐	☐	☐	☐

Section 4: Production Strategy

8. Is there a formalized and centralized production strategy?

☐ Yes ☐ No

9. Which production planning methods and strategies would you consider important to you (rate each method as 1= not important to 5 extremely important

	+5 Extremely important	+4 Important	+3 Somewhat important	+2 Little importance	+1 Not Important	NA
Computer based methods	☐	☐	☐	☐	☐	☐
Judgmental methods	☐	☐	☐	☐	☐	☐
Combinations of the above two	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐

10. If subjective (judgmental) methods are used for production planning, please select the forecasting technique used in product development?

☐ Jury of executive opinion

☐ Cross functional teams

☐ Survey of customer needs

☐ Expert opinion

☐ Other (please specify): _____

11. If quantitative (computer based) methods are used for production planning, please select the forecasting technique used in product development?

☐ Simple averages

☐ Moving averages

☐ Exponential smoothing

☐ Trend line Analysis

☐ Simple Regression

☐ Box – Jenkins time series

12. Which of the following criteria would you use to determine the effectiveness of the production plan used? (Please rate each criteria as +1= not important to +5 extremely important)

	+5 Extremely important	+4 Important	+3 Somewhat important	+2 Little importance	+1 Not Important
Accuracy	☐	☐	☐	☐	☐
Credibility	☐	☐	☐	☐	☐
Customer satisfaction	☐	☐	☐	☐	☐
Ease of Use	☐	☐	☐	☐	☐
Inventory turnover	☐	☐	☐	☐	☐
Amount of data	☐	☐	☐	☐	☐

required					
Cost	☐	☐	☐	☐	☐
Overall savings to the SCL	☐	☐	☐	☐	☐

13. Which of the following product planning timing horizon is most important to you? (Please rate each time period as +1= not important to +5 extremely important)

	+5 Extremely important	+4 Important	+3 Somewhat important	+2 Little importance	+1 Not Important	NA
Monthly	☐	☐	☐	☐	☐	☐
Quarterly	☐	☐	☐	☐	☐	☐
Semi-annual	☐	☐	☐	☐	☐	☐
Annual	☐	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐	☐

14. Please provide any additional comments on product planning and development methods used by the Savannah plant

……
……