DETERMINATION OF THE SALES FORECASTING METHODS USED BY SUGAR MANUFACTURING FIRMS IN KENYA

BY

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A MANAGEMENT RESEARCH PROJECT SUMBITTED IN PARTIAL FULFILMENT
FOR THE REQUIREMENT FOR THE AWARD OF MASTERS IN BUSINESS
ADMINISTRATION, OF THE SCHOOL OF BUSINESS UNIVERSITY OF NAIROBI
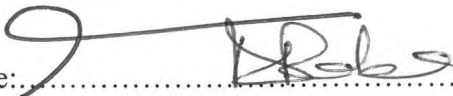
NOVEMBER 2008

DELARATION

I declare that this is my original work and that it has not been submitted in any other institution of higher learning.

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This project has been submitted for examination with my authority as the university supervisor.

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DEDICATION

This work is dedicated to my children Biko, Andy and Africia and to my parents Adams and Mary Nyabera

ACKNOWLEGEMENT

ABSTRACT

This survey study was carried out amongst the seven sugar manufacturing companies in Kenya operating at the time of the study and licensed by the Kenya Sugar Board. The objectives of the study were: - to determine Sales forecasting methods used by sugar manufacturing firms in Kenya, to identify factors that influence the choice of the methods, and to determine challenges encountered in the generation and implementation of the sales forecast by sugar manufacturing firms.

The study established that the sugar firms use sales forecasting to set their targets and for performance evaluation. The firms use qualitative models of market research to forecast their sales locking out the use time series analysis and casual methods. The use of the qualitative models (market research) within the sugar industry is attributed to the model's reliability, ease of interpretation of results and flexibility in use.

Finally, it was established that sales forecasting models face several challenges the main ones being lack of reliable/relevant data, lack of organizational support, and absence of consultancy services in the area of sales forecasting.

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CHAPTER ONE
INTRODUCTION

1.1   Background to the Study

The modern business establishment faces four major challenges namely fast changing technological world, customer demands, liberalization and globalization. Manufacturing firms face, amongst other host of challenges is the development and implementation of a reliable sales forecasting process in the advert of constantly changing consumer demands and other external environmental issues (2005).

Forecasting tools have been in use for a very long time for a variety of reasons. Commitment and interest in forecasting in organizations has also grown steadily in the recent past. Wadell and Sohal (1994) attributes the growth to the fact that organizations and their environment are becoming more and more complex, and therefore decision-makers find it more difficult to weight all the factors in a given situation without some explicit, systematic aids. They also cite the that organizations have grown large, the magnitude and importance of individual decisions have grown. Many decisions warrant special forecasting studies and more thorough analysis. That is the circumstances of most organizations have been changing at an accelerating rate. With key relationships, no longer stable, forecasting has proved to be one of the best tools for quickly identifying and understanding new relationships.

Many organizations have moved towards more systematic decision-making, requiring explicit justification of individual actions. Formal forecasting methods are one way to support and evaluate such actions (Wandell and Sohal, 1994).According to Little (1979) a good forecasting technique should exhibit six characteristics namely understandability, control, response, communication, completeness, and robustness. Forecasting techniques range from simple native procedures to sophisticated quantitative methods and from simple judgmental methods to complex qualitative ones. The commonly used techniques can be broadly divided into qualitative (Informal/Subjective/Judgmental) methods and quantitative (formal/objective) methods.

Different firms have employed the use of the different forecasting techniques based on prevailing environments. The popularity of different forecasting techniques and the factors determining the type of technique employed in a domestic or export setting differ. Moreover,

the link between use of different forecasting techniques and export forecast accuracy is based on a variety of factors.

The preference for judgmental techniques over a variety of forecasting levels; however, the choice and the number of techniques utilized do not seem to impact on forecast accuracy. This implies that, in order to improve forecast accuracy, attention needs to be focused beyond the question of technique selection. Issues such as the quality of the data utilized and the organizational practices associated with the export sales forecasting process are thus identified as key directions for future research (Diamantopoulos and Winklhofer, 2003).

1.1.2 The sugar Industry in Kenya

Agriculture is a dominant sector in the Kenyan economy accounting for 24% of the country's Gross Domestic Product (EPZ,2005). Through export earnings from tea, coffee and horticulture, the sector is the largest contributor of foreign exchange. The Agriculture sector provides livelihood to an estimated 75% of the population either directly or indirectly (EPZ, 2005).

The establishment of the first sugar factories dates back to 1922. The development of the sugar industry in Kenya started with private investments at Miwani in 1922. This was followed by Ramisi Sugar Company in 1927. After independence, eight additional companies were established namely; Muhoroni (1966), Chemelil (1968), Mumias (1973), Nzoia (1978), South Nyanza (1979) and West Kenya- Sugar (1981). The industry directly and indirectly supports 5 million Kenyans representing about 16% of the entire Kenyan population. In addition sugarcane growing is a major source of income to over 150,000 shareholders. Sugarcane in Kenya is grown in the Western Nyanza and Coast Provinces. And of the total cane supply 85% is from small-scale growers whilst the remaining is from the nucleus estates of the sugar factories. Being an important sector, any changes in the sugar industry due to its dominance will translate to changes in the whole economy. Thus further investment in the sector remains a priority.

In the 1990s before liberalization of the sugar industry, all sugar manufactured in the country was sold to Kenya National Trading Corporation (KNTC). KNTC was responsible for distribution of the sugar throughout the country. However with the advent of liberalization, factories are now free to sell their sugar through appointed distributors and wholesalers

agents, retailers and individuals. More than 5,000 private wholesalers buy sugar directly from the factories. For individual traders, they can buy directly from the factories.

Apart from the increasing demand for sugar in the country, Kenya has the opportunity to benefit from annual export quota to the European Union after being granted the status of an exporting member of the International Sugar Organization. There also exists a potential market in the Common Market for East and Southern Africa (COMESA) and Inter Governmental Authority on Development (IGAD) regions. The future of the sugar industry is thus potentially good given the unmet demand. Kenya can become self sufficient in the production of sugar and even produce surplus for export. There exist potential markets in the neighboring countries of East African Community, COMESA and IGAD regions as well as the European Union under preferential market access arrangements.

A key player in the Kenya sugar sector is the Sugar Development Fund (SDF).The SDF was established in 1992 to extend loans to the industry for factory rehabilitation and cane development. It also provides grants for operations of Kenya Sugar Board (KSB), Kenya Sugar Research Foundation (KESREF) and development of roads infrastructure in the cane growing areas. The fund is financed through a levy which is charged at 7% of value of both locally manufactured and imported sugar. Prior to 1992, the government strictly controlled the marketing and distribution of sugar in the country through the Kenyan National Trading Corporation (KNTC). The government controlled the producer and consumer prices and distribution margins up to the retail level and undertook import and export of sugar.

The controlled pricing regime was abandoned in 1992 when the government adopted the liberalized policies under the Structural Adjustment Program (SAP). Initially this found the sugar companies unprepared to deal with the marketing and distribution of the commodity in the country. However, under the current structure, the factories established their own distribution networks.

Kenya's membership in regional trading bodies such as COMESA, African Union and the East African Community indicates that there is a large potential market for the product. As a member of the COMESA Free Trade Area (FTA), Kenya is allowed duty free exports of sugar to other COMESA FTA countries. Kenya also has an export quota for sugar to the European Union, thus offering potential investors with a ready and accessible market for

white sugar. Considerable efforts have been made to promote growth in the sugar sector through systematic process of tariff reduction, remains of price controls and thus freeing the market of most of the constraints and imposition of duties on sugar importation.

Government bodies such as the Kenya Sugar Board (KSB) are involved in the policy formulation and implementation. The KSB acts as a technical unit to advise the Ministry in promoting all aspects of producing, processing and marketing of sugarcane, sugar and molasses. KSB also advises in pricing and necessary legislation for the industry.

Kenya is a member of the East African Community Customs Union, COMESA, Cotonou Partnership Agreement (ACP-EU) arrangement and WTO Agreements. The East African Customs Union provides for Common External Tariffs (CET) while the COMESA FTA allows duty and quota-free access of commodities, sugar included. The WTOA Agreement however advocates for non-discriminatory trade practices by member states. These agreements influence the policy options open to government with regard to trade.

1.2   Statement of the Problem

The sugar industry has attracted a lot of debate in the recent past as an essential commodity and due to the fact that key political players have used it as an avenue for making quick money. The academic field has also not been left behind in terms of studies carried out. Studies have been carried out in the sugar sector and on issues relating to regionalization.

For instance Luseno (2007) carried out a study on factors influencing communication among stakeholders in the integration process of the EAC; Obado (2005) on competitive strategies employed by the sugar manufacturing firms in Kenya; Odera (2005) on the perceived effect of East Africa Community customs union on the food and beverage manufacturing in Kenya; and Owiye (1999) on why the Kenyan Sugar firms are failing to compete within the liberalized trading environment in Kenya: A case of government owned sugar firms

Sugar manufacturing firms face challenges in the development and implementation of reliable sales forecasting models. This is because the sugar firms not only depend on the weather which most of the time is unpredictable but also the sugar importers who dump imported sugar without paying the duty thereby affecting the sales of local sugar which is viewed as being expensive. Further, the sugar sector in a number of occasions reported two

extreme swings in terms of stock that cannot be sold and at times out of stock problems that have resulted into spiral price increases or fall in prices. This study will therefore seek to answer the questions: Does the sugar sector use sales forecasting models and to what challenges do the firms encounter in using sales forecast. It would therefore be of an academic interest to establish the use of sales forecasting models by the sugar manufacturers in Kenya as other studies have focused in other areas.

1.3   Objectives of the Study

The objectives of the study were;

   (i) To determine Sales forecasting methods used by sugar manufacturing firms in Kenya
   (ii) To identify factors that influence the choice of the methods
   (iii)To determine Challenges encountered in the generation and implementation of the sales forecast by sugar manufacturing firms

1.4   Importance of the Study

Academics. The outcome of this project is to fill the academic gap as no study has been undertaken on sales forecasting techniques used in the sugar sector. It will also be used as a basis for further research.

Government. The government will use this project as a basis of designing policies on issues in the sugar sector.

Sales and Marketing managers will appreciate from this study the common sales forecasting models and the challenges encountered in the implementation of the models.

CHAPTER TWO
LITERATURE REVIEW

2.1   Introduction

The chapter explores the concept of sales forecasting and the importance of sales forecasting to profit making entities. The chapter also explores the methods and techniques of sales forecasting basing the two distinctive classifications of qualitative and quantitative techniques. The chapter also addressed the need for monitoring of sales forecasting techniques in order to identify its predictive power. The last part of the chapter highlights the reasons for the failure of sales forecasting system.

2.2   The Concept of sales forecast

Sales forecast is defined as an estimate of the value or unit sales for a specified future period under a proposed marketing plan or program. This may be for a specified item or for an entire line. It may also be for a market as a whole or for any portion of it (Still et. al. 1999). It is one of the most important pieces of data used by management and lies at the heart of most companies' planning efforts. Sales forecasting is the process undergone for developing a sales forecast. In projecting future sales of a product, a number of factors must be taken into consideration. The basic one is to understand the key demand drives. Different manufacturing firms will have different assumptions in which their sales forecast will be based on.

Kotler (1998) defines a company's sales forecast as the expected level of company sales based on a chosen marketing plan and an assumed marketing environment. Chambers et al (1974) observes that generating a forecast is a process which involves the formulation of the forecasting problem, the important factors in the system and their relationships. The way in which the forecast will aid in the decision making will then follow with the timing and value of decision. The process ends with the evaluating the way the system changes, the most reasonable assumptions that can be made and the relevance of historical information that is available.

A sales forecast has also been defined as an estimate of sales in dollars or physical units, in future period under a particular marketing program and an assumed set of economic and other factors outside the unit for which the forecast is made, Still et al (1999). It may be fore a

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single product, entire product line, manufacturing entire marketing area or a subdivision of it.According to Mwangi (1983), sales forecasting differ slightly with prediction. Sales forecasting is the projection of the past into the future while prediction is the anticipation of changes and new factors affecting demand. It is primarily based on how one perceives the future events. The events here may be within our control such as sales promotions, or may be without our control such as strikes or competitor activities.

2.3   The Importance of Sales Forecasting

Sales forecasting exercise is usually carried out in order to provide an aid to decision-making and in planning the future. Typically all such exercises work on the premise that if we can predict what the future will be like we can modify our behaviour now. This means that we will be in a better position, that we otherwise would have been, when the future arrives. In the manufacturing firms, sales forecasts touch nearly every aspect of operations. The range of operations spans from warehouse logistics, merchandise purchasing, allocation and replenishment and store staffing to expansion planning and expense control. At each different level of management, a sales forecast is important in its own way. At the top, the management will use a sales forecast to allocate resources among the various functions. Finance will use it to project cash flows, to decide capital appropriations as well as to establish operating budgets. The production manager needs it to decide how to cope with future manufacturing requirements, determine future capacity requirements, control inventory and develop a response to market trends. For the human resources, it is used for personnel planning while in procurement, it is used to plan the firms overall material requirements. Marketing and sales programs are planned within the sales forecast as well, besides being of fundamental importance in planning and evaluating the personal selling effort (Still et al 1999).

Leoutief (1964) observes that no matter how well a company schedules its internal operations, its plans collapse if its sales forecasts are seriously in error. One of the key aspects of decision making is being able to predict the circumstances surrounding individual decisions and situations. Forecasts that can be used as the basis for decision making are the most crucial because the general management function is central to successful operation of the firm. Most forecasting required for decision making is handled judgmentally in an intuitive fashion, often without explicitly separating the task of forecasting from that of

decision making (Chepkoit 1992). This is true even in large manufacturing firms despite its value both in small and large firms where it is straight forward and unequivocal.

2.4 Methods and Techniques of Sales Forecasting

The demand for a product is generated by a complex interaction of many factors. If it were possible to understand the effect of these factors and how they interrelate, the job of sales forecasting would be relatively straight forward. All that would be done is to develop a mathematical model that could give a very accurate estimate of the future demand. Since it is not possible, and that factors that influence sales are constantly changing, the sales executive must consider some kind of sales forecast in every decision made.

Prediction is very difficult, especially if it is about the future. Ideally, organizations which can afford to do so will usually assign crucial forecast responsibilities to those departments and/or individuals that are best qualified and have the necessary resources at hand to make such forecast estimations under complicated demand patterns. Clearly, a firm with a large ongoing operation and a technical staff comprised of statisticians, for example, management scientists and computer analysts is in a much better position to select and make proper use of sophisticated forecast techniques than is a company with limited resources. Notably, the bigger firm through its larger resources, has a competitive edge over an unwary smaller firm and can be expected to be very diligent and detailed in estimating forecast (although between the two, it is usually the smaller firm which can least afford miscalculations in new forecast levels).

After the forecasting problem has been properly formulated, the forecaster will be in a position to choose the technique or a combination of them that will best fit the needs. To deal with varying sales forecasting problems, there are many techniques that have evolved in the current business environment. Each technique has its most suitable use in business firms. The discussion that follows is an outline of some effective forecasting approaches especially for short to intermediate term analysis and forecasting. No attempt is made here to give an exhaustive list of the techniques. For simplicity, the sales forecasting techniques have been grouped into three basic categories (Chambers et al 1974), namely qualitative techniques, time series analysis and projection and finally causal methods.

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2.4.1 Qualitative Techniques

These are used primarily when data are scarce, either because there is no relevant history (for example a new product) or good information is virtually nonexistence (Chamber et al 1974). It is common where there is no formal mathematical model, often because the data available is not thought to be representative of the future (long term forecasting). As the name implies, these techniques rely primarily on qualitative or judgmental information. Kotler (1998) classifies qualitative methods as what people say, which means surveying the options of the parties involved in driving sales performance. However, qualitative information provides a poor basis for comparison and can be interpreted differently. Therefore, it is obviously better if the qualitative information can be translated in some way to a quantitative base. The objective of the techniques is to bring together in a logical, unbiased and systematic way all information and judgments that relate to the factors being evaluated (Mwangi 1983). It uses qualitative data such as expert's opinions (group discussions, sales force predicaments) and information about special events.

Qualitative techniques are frequently used both in new technology areas and, to a large extent, in technological forecasting where development of a product idea may require several "inventions," so that research and development efforts and likelihood of success are difficult to estimate. It is also used where market acceptance and penetration rates are highly uncertain.

2.4.2 Time Series Analysis and Projection

Based on the premise that past patterns will continue, this technique focuses on the changes in patterns and thus relies entirely on historical data. It is based on what people have done, and thus involves analyzing records of past buying behaviour and using them to project into the future (Kotler 1998). These are statistical techniques that can be used when several years' data for a product or product line are available and when relationships and trends are both clear and relatively stable.

One of the basic principles of statistical sales forecasting is that the forecaster should use the data on past performance to get a gauge of the current sales rate, and of how fast this rate is increasing or decreasing. The current rate and changes in the rate - "acceleration" or "deceleration" – constitute the basis of forecasting. Once these are known, various mathematical techniques can be used to develop projections from them (Chambers at al

2000). However, the sophistication of these analyses can vary widely. On one hand, the forecaster might simply forecast next year's sales aas a replica of the current year's sales. This may be true for a nature business with little growth, but for a growing business, the same percentage growth could be applied. On the other hand, the sales forecaster might attempt to break the historical sales into basic components that influence them. This is by isolating portions due to trend, cyclical, seasonal and irregular influences. Each could be forecasted separately and then combined to produce an aggregate forecast (Churchil et al 2000).

It is usually difficult to make projections from raw data. This is because the rates and trends are not immediately obvious; they may be mixed up with seasonal variations, for example, distorted by such factors as the effects of an ambitious sales promotion campaign or some random event. Thus, the projection of raw data and their use in an unadjusted form to establish current rates and trends is perhaps the major source of error in forecasting.

2.4.3 Causal Methods

The causal methods use highly refined and specific information about relationships between system elements. It takes the past as the starting point and then incorporates variables. Whenever historical data is available, and explicit analysis can be done to expose the relationship that exists between the factors changes in demand, the forecaster will often construct causal models. It is the most sophisticated type of forecasting tool, which uses mathematical models to express relevant causal relationships between demand variables. It also incorporates predictions of related events such as competitive activities and promotions.

If certain kinds of data are lacking, it may be necessary to make assumptions about some of the relationships and then track the results to assess the validity of the assumptions. Some forecasters will go ahead and attempt to quantify the assumptions used in order to support the sales forecast developed thereof. The causal model used in such a case will continually be revised as more knowledge about the system becomes available.

The model is ideal for evaluating the implications of various tactics and strategies as implemented by the sales force. In essence, the ultimate objective of a sales forecasting system under a causal model is to develop a comprehensive model of the system, which explains all of the system parameters and includes their interactions.

2.5   Choosing a Sales Forecasting Method

There are different ways that business firms use to develop a process of sales forecasting. The idea behind the process chosen is mainly influenced by the various factors behind the demand of a product. Managers applying forecasting in decision making must know the importance of selecting the appropriate forecasting techniques for the specific situation. Different authors have highlighted how businesses classify their forecasts and factors behind choosing a certain method of sales forecasting.

Mwangi (1983) points out that the factors that influence demand may be grouped into two broad categories. The first one, is a set of factors that influence demand in the past and continue to do so in the future. In such a case, where such factors are dominant in determining future sales of a product, the process of forecasting is chosen from routine methods. The second category consists of factors what were non-existent in the past but are envisaged to influence demand in the future. In such cases, the selection of the method of forecasting becomes complicated and new methods have to be developed.

Others have classified them according to the planning horizons. According to Hayes et al (1998) a sales forecast may be long term or short term. A long term sales forecast is used in the strategic plan, for planning the broad focus of a company. Long term planning is hazardous as the forecast is often based on tenous data and the decisions are often crucial. On the other hand, short term sales forecast is of period of three to six months. It is of interest to the short term planning such as production people who must plan for the manufacturing system. Depending on what period the forecast covers, a method is then chosen.

Classifying forecasting problem is a combination of the timescale involved in the forecast that is, how far forward into the future we are trying to forecast and associated business decisions to be made. Short, medium and long-term are the usual categories but the actual meaning of each will vary according to the situation that is being studied, for example in forecasting energy demand in order to construct power stations 5 – 10 years would be short-term and 50 years would be long-term, whilst in forecasting consumer demand in many business situations upto 6 months would be short-term and over a couple of years long-term. The table below shows the timescale associated with different business decisions.

Different forecasting methods apply in each situation, for example, a forecasting method that is appropriate for forecasting sales next month (a short-term forecast) would probably be an inappropriate method for forecasting sales in five years time (a long-term forecast). In particular the use of numbers (data) to which quantitative techniques are applied typically varies from very high for short-term forecasting to very low long-term forecasting when dealing with business situations.

Sales depend on three main factors, which must be recognized before attempts to develop a sales forecast (Laughlin 1999). In this case, the factors are decisions the company makes, competitor activities and environmental factors. Once we identify the extent of influence of these factors, a method of forecasting is then chosen. The best method suggested here is running a regression with sales as the dependent variable and these factors as the independent variables. The regression allows us to forecast sales with the assumption that we know what the values of these independent variables will be in the future. However, due to the uncertainty of the independent variable, it is advisable to conduct sensitivity analysis and estimate a range of sales forecast under different scenarios. Thus, have three sets of forecast namely optimistic, best estimate (realistic) and pessimistic.

Chambers et al (1974) states that choosing the method to use for sales forecast will depend on the stage of the product in the product life cycle. Normally, there are five stages in the life cycle of a successful product. These stages are product development testing and introduction, rapid growth, steady state and phasing out. The relevant factors and their interactions will usually be evolutionary over the product life cycle. In addition, the information and the level of accuracy required for obtaining the forecasts will change throughout the various stages. So the techniques used for deriving the desired outputs will also differ analogously. Further to this, different products may require different kinds of forecasting techniques for the same state of the product of life cycle.

Chepkoit (1992) notes that even though each situation is different and each technique has different strengths and weaknesses, it is very important to identify the general characteristics of forecasting situations and to contrast these with general characteristics of available forecasting methods. These two sets of characteristics can be used as a basic framework for matching specific needs with specific approaches.

2.6   Monitoring the Sales Forecasting Methods

The sales forecasting process should not end once the output is obtained. It is a continuous process and it is important that the forecaster always know whether the methods used are performing adequately (Yego 1995). Controls should be identified that should suit the process in use and constantly checked to evaluate their response to change in data patterns. Some commonly used methods for this purpose include mean absolute deviation, mean square error, tracking signal and control charts (Yego 1995). These methods have upper and lower limits which define the range of acceptability of errors. Any sales forecast values falling beyond these limits are outliers and indicate existence of errors. This then calls for an evaluation of the forecasting process and corrective measures taken. When early corrective measures are taken, the stability and accuracy of the forecast is upheld, aiding in minimal errors while making decisions.

2.7   Reasons for Failure of sales Forecasting Systems

Majority of plants fail because of lack of implementation. This could be seen more evidently in the failure of impressive forecasts by organizations. For this reason, managers ought to take care in putting forecasts plans into action. According to Chepkoit (1992) the main reasons why these forecasts fail are (Chepkoit C.K, 1992) include failure to recognize that the forecasting model is an element of the forecasting system and not the system; non-involvement of the right persons in implementation of forecasting during the forecasting process and broad cross section of people in the forecasting system could see more information brought to use; tendency to take forecasts as perfect (estimates are bound to have derivation from the actual results) as this turns soar to the organization when such forecasts are not attained; the methodology of making the forecasts are in some cases inappropriate and this leads to wrong forecasts that are misleading; failure to forecasts the right things (for instance, forecasting raw materials usage rather than finished goods demand); and lack of follow-up to compare forecasts and the actual results (This would help in assessing the accuracy of the forecast model and thus an inappropriate model may continue to be used and never be modified).

Sales forecasting involves more than just the skills of utilizing the existing mathematical and statistical data to project the future. An understanding of the market dynamics and use of market research where necessary is vital to a credible sales forecast. The forecaster also needs to incorporate special information such as potential competitive activities, any

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anticipated changes in economic factors and effects of other events on timing and sales. Any sales forecaster must understand that despite the availability of many techniques, forecasting is still an art rather than a science. Therefore there is need to carefully determine what is required of the forecast and examine each of the techniques to determine which is most applicable for the particular forecast being prepared. This can only effectively be done through proper formulation of the forecasting problem, since each technique has strengths and weaknesses. The underlying assumptions must also be evaluated for each specific situation. The accuracy of the forecasts will ultimately depend on the skill of the forecaster in using all the resources available.

A number of researchers have been conducted in the area of forecasting and forecasting techniques but they mainly focus on the developed countries. They indicate that trends in forecasting methods have been towards the use of objective rather than subjective methods especially in weather forecasting (Armstrong, 1985). However, with historical data being collected systematically and as computers become available, the movement towards objective methods has become more apparent although still slow.

However, surveys continue to indicate that subjective methods are still dominant (Rothe 1978; 1983; Sparkes and McHughe, 1984; Menzer and Cox, 1984; Dalrymple, 1985). The same case was confirmed to apply in Kenya by Mbeche and Yego (1996) who conducted a study on 29 large manufacturing firms in Nairobi. The research indicated that overall the subjective methods of forecasting are more popular and more commonly used than quantitative ones. Reasons given were that they are easy to understand, quick to produce results and less costly.

Rice (1997) carried out a study on 43 large US Multinational firms to "explore managers" attitudes and perceptions about sales forecasting process in order to suggest how firms might improve forecasting." The response showed that managers had a positive attitude towards forecasting and a confidence in the ability to forecast even in volatile environments. They felt that better forecasts led to better decisions. It revealed that the forecasting process is formalized, rather than *adhoc* in the majority of the firms and that "the most popular and successfully used methods in all market locations are judgmental methods", although they believed that statistical methods were more accurate.

Chan (2000), conducted a study, developed and evaluated the use of a Bayesian time series model to forecast demand and manage inventory in a dynamically changing environment for a multinational company in Singapore. The company had an advanced technology batch production system with short lifecycle and non-seasonal products with relatively long lead-times. The study used a "BATS" software developed by Pole et al (1994), which is "based on the principle that routine forecasts can be updated by subjective intervention as external information becomes available". The results showed that Bayesian time series model was suitable for short, medium and long forecasting horizon. Chan indicated that "the model can handle long-term structural change in real time by including subjective opinion with the intervention analysis".

Adam and Ebert (1976) conducted a study to compare human and statistical forecasting to find out which technique produced better forecasts. The findings were that human forecasts were more biased and their results were more influenced by noise in the data. An exponential smoothing model with trend and seasonal decomposition was more accurate except where data pattern was characterized by trend and low seasonality. Brandt and Bessler did a comparison of seven methods of forecasting to find which one provided better results. The findings were that combination of methods was better. Use of expert forecasts alone was the worst.

Lawrence (1983) carried out a small survey on a convenience sample of firms in Australia, indicated that computer-based forecasting systems are not widely used and in fact, a number of established systems have been discarded because of inaccuracy. Chepkoit (1992) also carried out a study to model the demand for sugar in 34 depots of the Kenya national Trading Corporation (KNTC). The models constructed were found to predict demand for sugar fairly well with minimal variations.

Iraya (1993) carried out a study to model demand patterns for the University of Nairobi Health Clinics using time series forecasting models. The results indicated that the attendance process could be modeled using time series analysis with a large degree of accuracy.

2.8 Summary of the Chapter

The chapter explores the concept of sales forecasting and the importance of sales forecasting to profit making entities. The chapter also explores the methods and techniques of sales forecasting basing the two distinctive classifications of qualitative and quantitative techniques. The chapter also addressed the need for monitoring of sales forecasting techniques in order to identify its predictive power. The last part of the chapter highlights the reasons for the failure of sales forecasting system.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1   Introduction

The chapter discusses the research design and methodology. It addresses the issue of the population of the study, data collection and analysis

3.2   Research Design

The study design was survey which was chosen because of its exploratory nature and also its the ability to use the study outcome for generalization purposes and hence its representativeness. Other studies Ojode (1989) Iraya (1989) Obado (2004) Owiye (2005) have also successfully used the design.

3.3   Population of Study

This was a census and therefore there was no sampling. It was found appropriate to use a census and not a sample because of the few number of sugar manufacturing firms. This study used the seven sugar companies operating at the time of the study and licensed by the Kenya Sugar Board. These sugar companies are current seven as given in the list in appendix 2.

3.4   Data Collection

Primary and secondary data was used in the study. Primary data was collected using a self administered questionnaire. A drop and pick method was used. The questionnaires were responded to/filled by sales/marketing directors or senior sales manager designated by him/her. The questionnaire was divided into four parts.

Part one provided general demographic details while Part Two captured information on the methods on sales forecasting preferred and used. And Part Three on the challenges encountered in the implementation of sales forecast. Secondary data used included past financial reports and details related to past production and sales.

3.4 Data Analysis

Data was analyzed using descriptive statistics which included simple averages. The data was presented using graphs, charts and diagrams. Data was collected from five sugar firms.

CHAPTER FOUR
DATA ANALYSIS AND INTERPRETATION

4.1   Introduction

This chapter covers data analysis and interpretation. It discusses the key demographics upon which the key research questions are based. The research findings are presented using tables.

4.2   Sample Characteristics

4.2.1   Response Rate

The population of the study consisted of all the seven sugar firms operating at the time of the study and registered by the Kenya Sugar Board. Five sugar firms responded to the survey by the close of the study. This represented a response rate of 71% that can be used to reliably make valid conclusion about the status of the industry. The respondents were senior managers and board members of the sugar firms. The demographic profile of respondents was analyzed based on age of the firms, ownership products sold, annual turnover and number of employees.

4.2.2   Age of the Firms

From the research data it was found that 80% of the respondents have operated for more than 15 years and that only one firm was less than five years having been the latest entrant in the sugar manufacturing sector This shows that the respondents firms have been in the industry long enough to have developed reliable tools in particular sales forecasting models. The firms were found to be of different ages as shown in Table 4.1.

Table 4.1   Age of the Firms

Years of Operations	Number	Percent (%)
Less than Five Years	1	20%
Over 15 Years	4	80%
Total	**5**	**100%**

From Table 4.01 it can be observed that 80% of the firms have operated for over fifteen years. Only one firm (20%) has operated for less than five years. This indicates that the firms were old enough to have had enough experience in the use of sales forecasting tools.

4.2.3 Turnover of the Firms

The firms were asked to indicate the level of their turnover. The firms were to identify amongst the given rage where their turnover falls. The response was as shown in Table 4.2

Table 4.2 Turnover of firms

Range of Turnover (Ksh)	Number	Percent(%)
Up to 100Million	1	20%
101-500 Million	1	20%
1000-5,000 Million	2	40%
Over 10,000 million	1	20%
Total	**5**	**100%**

The firms general report high turnover that range between Ksh 100 million to over Ksh.10 billion. This may be taken as a reliability of the sale forecasting models that the firms use. A firm which is the youngest and the latest entrant reported an up to Ksh. 100 million followed by one firm with sales up to Ksh. 500 million turnover; two firms with up to ksh.5 billion sales and one firm with up to Ksh. 10 billion sales.

4.2.4 Number of Employees

The sugar firms normally employ a big number of workers on casual and permanent terms. It was not possible to establish the number on casual appointment due to the type of jobs which they do within and outside the factory. The detail of number of employees which was availed was for those on permanent employment and time contracts. The response is shown in Table 4.3.

Table 4.3   Years in Operation and Number of Employees

Years in operations	Number of Employees				
	600	1020	1350	1500	1600
Less than 5 years	1	0	0	0	0
Over 15 years	0	1	1	1	1
Total	**1**	**1**	**1**	**1**	**1**

4.3   Sales Forecasting Methods

All the firms that responded to the survey use sales forecasting methods

The analysis of the use of sales fore casting model was made in three key areas namely qualitative methods, Time Series Analysis and Causal Models. Qualitative Methods that were listed for response included Delphi Technique, Panel Technique, Market Research and Jury of Executive Opinion. The preference use of various qualitative methods of sales forecasting is shown in Table 4.4

Table 4.4   Use of Qualitative Methods by the Firms

Qualitative Methods	No use	1	2	3	4	5
Delphi Technique	5	0	0	0	0	0
Market Research	0	0	1	1	1	2
Panel Technique	5	0	0	0	0	0
Jury Of Executive opinion	5	0	0	0	0	0

From Table 4.04 it was found that the most popular method used amongst the qualitative methods is the marketing research with all the respondents acknowledging its use. The other methods in this class was not responded to and therefore not used amongst the firms that responded to the survey.

It was found that the firms do not use the time series methods which include Moving Average, Exponential Smoothing, Learning Experience Curve, and Trend Line projections. This may be attributed to that fact that these methods require skill and are more complicated. Based on the premise that past patterns will continue, time series technique focuses on the changes in patterns and thus relies entirely on historical data. It is based on what people have done, and thus involves analyzing records of past buying behavior and using them to project into the future (Kotler, 1998). These are statistical techniques that can be used when several years' data for a product or product line are available and when relationships and trends are both clear and relatively stable. The absence of reliable and relevant data within the sector therefore affects the application of these models

As has been observed, one of the basic principles of statistical sales forecasting is that the forecaster should use the data on past performance to get a gauge of the current sales rate, and of how fast this rate is increasing or decreasing. It is usually difficult to make projections from raw data. This is because the rates and trends are not immediately obvious; they may be

mixed up with seasonal variations, for example, distorted by such factors as the effects of an ambitious sales promotion campaign or some random event. Thus, the projection of raw data and their use in an unadjusted form to establish current rates and trends is perhaps the major source of error in forecasting.

The model is ideal for evaluating the implications of various tactics and strategies as implemented by the sales force. In essence, the ultimate objective of a sales forecasting system under a causal model is to develop a comprehensive model of the system, which explains all of the system parameters and includes their interactions.

An analysis was also made on the Casual Methods namely Regression Analysis, Intension to buy and anticipation survey, Econometric model, and Product life cycle analysis. As reported from the time series model the casual models are not used by the sugar manufacturers as models for forecasting sales. These casual models require established information data bank, skills of estimation and environment where indicators are recorded and reported.

4.4   Reasons for using the methods

The respondents were given five options to score against in relation to reason for choice and sue of sales forecasting method used in the firm. All the respondents indicated in their response their use of marketing research and non use of the time series analysis and casual models. Their use of market research was based on the scored items as per tables 4.5.

Table 4.5   Reasons for use of Forecasting models

Reasons	Reason	Not a Reason
Cost	0	5
Accuracy/reliability	2	3
Ease of interpretation	4	1
Details	4	1
Flexibility in use	4	1

As shown in Table 4.5, the use of qualitative techniques and in particular market research has been scored on the basis of accuracy, ease of interpretation and flexibility of use. The respondents 100% did not consider cost as a basis for using market research for sales forecasting. It can be observed that any time an organization undertakes a market research it

gets the current feel of the consumers of its products. The firms may put in features that the consumers prefer and adjust itself to the demands of the market.

Whereas other quantitative and causal models are hailed for their scientific background, the expected projections may not hold true in particular to issues like consumer tastes which keep on changing. Products like sugar being fast consumer product; market demand is normally affected by many factors and the response very immediate. Firms must therefore develop models that may enable them to gauge the feel in the market. Qualitative techniques therefore score high in level of preference

Qualitative models are used primarily when data are scarce, either because there is no relevant history (for example a new product) or good information is virtually nonexistence (Chamber et al 1974). It is common where there is no formal mathematical model, often because the data available is not thought to be representative of the future (long term forecasting). The outcome of the study confirms these premise upon which the qualitative methods are used.

4.5   Challenges of Using Sales forecast

As observed by Yego (1995) sales forecasting process should not end once the output is obtained. It is a continuous process and it is important that the forecaster always know whether the methods used are performing adequately. It is therefore necessary to identify controls that should suit the process in use and constantly checked to evaluate their response to change in data patterns.

The respondent were asked to identify and score against a list of reasons that they perceive to be challenges in the in the development of the sales forecast. Three areas pose challenge to the respondents in their quest to develop sales forecasting models. These areas are lack of organizational support and relevant/reliable data, and the absence of consultancy in the area of sales forecasting. Sales forecasting requires committed organizational support for the resources required to set the system both human and financial cannot be attained and harmonized without the support of the organization. The result are presented in Table 4.6

Table 4.6. Key areas of challenges

Challenges	Yes		No		Total
Lack of reliable/relevant data	5	100%	0	0	5
Lack of organizational support	5	100%	0	0	5
Poor forecasting skills	1	20%	4	80%	5
Rapid and inconsistent environmental changes	1	20%	4	80%	5
No forecasting consultancy services	4	80%	1	20%	5
Poor communication between parties involved	1	20%	4	80%	5

Table 4.6 shows that the response rate 100% indicates the support of the organization as fundamental. The employment of the statistical techniques not only depends on the knowledge of the users and developers but on reliable and relevant data. Therefore the lack of reliable and relevant data in this area is a major challenge to the respondents and the industry in general. The lack of reliable data may be attributed to the fact that the industry faces challenges which range from external influence in terms of illegal inflow of sugar into the country to the fact that all the sugar firms are located in the remote areas of Kenya therefore not being able to attract interested researchers who based more in the cosmopolitan and urban centers.

This also confirms the 80% response on the issue of consultancy services in the area of sales forecasting. The consultants therefore charge exorbitantly to avail their services in the remote areas and only those firms which can afford are able to attract such service. Only one firm did not find the issue of consultants as a challenge. The analysis of this firm indicates it is the

leading industry player and is capable of accessing such services what the cost due to its financial muscle.

The last section of the questionnaire required the respondents to state their familiarity with the modern sales forecasting models in use. The response indicates that all the respondents are familiar with all the listed models. This therefore indicates that the preference of the marketing research model is not based on the lack of familiarity and use of the other models. It indicates the industry prefer the use of marketing research over other methods confirming the reasons identified earlier.

4.6   Summary
The chapter discussed the response rate and the demographics upon which the analysis of the response was based. It also presented the interpretation of the data and the outcome based on other studies.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5:1   Introduction

This chapter discusses the summary, conclusion and recommendations of the study. It covers the recommendations into two namely recommendations for further research and policy implications.

5.2   Summary

The respondents to the questionnaires who by position are senior marketing managers and by and large with wide experience are familiar with the other methods of sales forecasting. Their preference to particular methods may be therefore attributed to their long standing experience of the sector. The sector therefore require models that have the real and current feel within the sector as the sugar product is one of the few products which serves all the sectors and consumers- industrial, age, sex, color, the poor the rich etc.

It was established from the study that the sugar firms use sales forecasting to set their targets and for performance evaluation. The firms use qualitative model of market research to forecast their sales locking out the use time series analysis and casual methods. The use of the qualitative models (market research) within the sugar industry is attributed to the model's reliability, ease of interpretation of results and flexibility in use. Whereas the individual marketing manages who responded to the questionnaire are aware and know the operation of other models they have continued to use marketing research.

The firms while developing sales forecasting models face three major challenges. The challenges being lack of reliable/relevant data, lack of organizational support, and absence of consultancy services in the area of sales forecasting.

5.3   Conclusion

The study can therefore conclude that the sugar manufacturing firms in Kenya use sales forecasting tools to project their sales. It was also established from this study that these firms use qualitative models and in particular market research. While using the marketing research as a forecasting tool their major challenges they face are lack of relevant data, organizational support and absence of consultancy services.

5.3   Recommendation

5.3.1   Recommendation with Policy and Policy Implications

This study found that the current changes in the regional economic policies require proper data and information to be able to make reliable forecast. It is therefore recommended that the industry employ not only qualitative models but other statistical techniques of time series analysis and casual models to be able to develop dependable and reliable data bank that can be able to report any changes and challenges within the sector. There is need to create reliable data capturing models and bank for ease of access to industry players.

5.3.2   Suggestions for Further Research

This study focused in three areas namely the sales forecasting models, the factors that influence the use of the models and the challenges encountered in the generation and implementation of the models. Therefore there is need to carry out further research on the reliability of the sales forecasting models used by the sugar firms in Kenya. A comparative study need to be carried out between the sugar importers and sugar firms to establish the benchmarks they used in establishing their sales levels amongst the industrial sugar users.

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APPENDIX 1: QUESTIONNAIRE

This is an academic questionnaire and will be treated purely for academic purpose.
Kindly tick or state where applicable:-

Part A

1.   Name of the sugar manufacturing Firm _____

2.   Number of employees _____

3.   Position of the respondent in the organization_____

4.   Years of experience in this position_____

5.   For how long has your firm been operating as a sugar firm? (Tick one)

   (a)   5 years and below   [ ]   (b)   6 – 10 years   [ ]

   (c)   11 – 20 years   [| (d)   15 years and above   [   ]

6.   Please tick the option that best describes the ownership of your firm.

   (a)   Local   [   ]

   (b)   Foreign   [   ]

   (c)   Jointly owned (Foreign and Local)   [   ]

7.   Which other product/services do you sell apart from sugar

   (a)   ....   [   ]

   (b)   ....   [   ]

   (c)   ....   [   ]

   (d)   ....   [   ]

8.   Please tick one of the following statements that best describes your company's annual
turnover in Kshs.

   (a)   Up to 100 million   [   ]

   (b)   100 million to 500 million   [   ]

   (c)   500 million to 1 billion   [   ]

   (d)   1 billion to 5 billion   [   ]

   (e)   5 billion to 10 billion   [   ]

   (f)   Over 10 billion   [   ]

9. Do you do a sales forecast for your firm?

   (a)　Yes　[　]　　(b)　No　[　]

PART B

Where applicable in this section, a scale of 1 to 5 shall be used, where

[1]　To no extent[2]To a small extent[3]　To a moderate extent[4]To a great extent

[5]　To a very great extent

10. To what extent do you use the following sales forecasting methods and techniques?

	[1]	[2]	[3]	[4]	[5]
Dimensions (Variables)					
10 Qualitative Methods					
Delphi Technique	[　]	[　]	[　]	[　]	[　]
Panel Technique	[　]	[　]	[　]	[　]	[　]
Market Research	[　]	[　]	[　]	[　]	[　]
Jury of Executive Opinion	[　]	[　]	[　]	[　]	[　]
11. Time Series Analysis	[　]	[　]	[　]	[　]	[　]
a) Moving Average	[　]	[　]	[　]	[　]	[　]
b) Exponential Smoothing	[　]	[　]	[　]	[　]	[　]
c) Learning Experience Curve	[　]	[　]	[　]	[　]	[　]
d) Trend Line projections	[　]	[　]	[　]	[　]	[　]

12. Casual Methods

   a) Regression Analysis　[　] [　] [　] [　] [　]

   b) Intension to buy and anticipation survey [　] [　] [　] [　] [　]

   c) Econometric model　[　] [　] [　] [　] [　]

   d) Product life cycle analysis　[　] [　] [　] [　] [　]

13. Others (specify) _____ [　] [　] [　] [　] [　]

14. Others (Specify) _____ [　] [　] [　] [　] [　]

15. Please indicate the appropriate reason(s) for using the methods(s)

a)　Less costly to use　　　　　　　　　　　[　]

b)   Accurate/reliable   [   ]

c)   Easy interpretation of results   [   ]

d)   Detailed in analysis   .   [   ]

e)   Flexible to use   [   ]

f)   Others, (specify)_____   [   ]

g)   Others (specify)_____   [   ]

16.   What are some of the challenges you encounter when developing a sales forecast/

a)   Lack of reliable/relevant data   [   ]

b)   Lack of organizational support   [   ]

c)   Poor forecasting skills   [   ]

d)   Rapid and inconsistent environmental changes   [   ]

e)   No forecasting consultancy services   [   ]

f)   Poor communication between parties involved   [   ]

g)   Others, (Specify) _____   [   ]

h)   Others (Specify) _____   [   ]

17.   To what <u>extent</u> are you familiar with the following sales forecasting methods and techniques?

	[1]	[2]	[3]	[4]	[5]
18. Qualitative Methods	[ ]	[ ]	[ ]	[ ]	[ ]
Delphi Technique	[ ]	[ ]	[ ]	[ ]	[ ]
Panel Consensus	[ ]	[ ]	[ ]	[ ]	[ ]
Market Research	[ ]	[ ]	[ ]	[ ]	[ ]
Jury of Executive Opinion	[ ]	[ ]	[ ]	[ ]	[ ]
19. Time Series Analysis	[ ]	[ ]	[ ]	[ ]	[ ]
a) Moving Average	[ ]	[ ]	[ ]	[ ]	[ ]
b) Exponential Smoothing	[ ]	[ ]	[ ]	[ ]	[ ]
c) Learning Experience Curve	[ ]	[ ]	[ ]	[ ]	[ ]
d) Trend Line Projections	[ ]	[ ]	[ ]	[ ]	[ ]

20.   Casual Methods
   a) Regression Analysis   [   ] [   ] [   ] [   ] [   ]
   b) Intension to buy and anticipation survey [   ] [   ] [   ] [   ] [   ]
   c) Econometric model   [   ] [   ] [   ] [   ] [   ]
   d) Product life cycle analysis   [   ] [   ] [   ] [   ] [   ]

Please specify other not indicated above…………………

THANK YOU FOR YOUR CO-OPERATION

APPENDIX 2

LIST OF SUGAR FIRMS (Operating and licensed by the KSB (at 1/08/2008)

Chemelil Sugar company Ltd

Kibos Sugar company Ltd

Mumias Sugar company Ltd

Muhoroni Sugar company Ltd

Nzoia Sugar company Ltd

SONY Sugar company Ltd

West Kenya Sugar mill Ltd