Impact of Sales Forecasting Practices on Dividends of Large Manufacturing Companies in Kenya

Independent Study Paper Submitted in the Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Business Administration, School of Business, University of Nairobi.

By

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DECLARATION

I hereby declare that the proposed work contained in this Independent Study Paper is my original work, and has not been previously, in its entirety or in part, been presented at any other University for a Degree.

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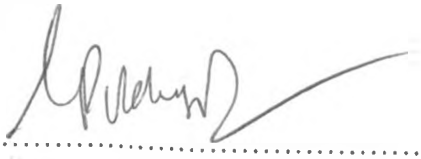

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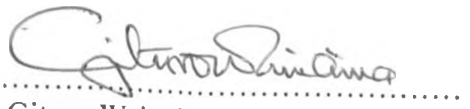

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ABSTRACT

The debate as to whether the accuracy of Sales Forecasting (SF) in large manufacturing companies improves when different forecasting methods are combined has continued to attract attention from scholars. Research in quantitative combination forecasting has been done extensively using seasonal and non-seasonal microeconomic, macroeconomic and demographic series, mainly in the United States of America. However, since organizations tend to also rely on qualitative or judgmental methods for their SF, it is unclear whether and how results from different forecasting approaches are actually combined by management in firms to improve forecasting accuracy and how any differences in combination strategies are reflected in forecast performance.

Despite the increased focus on forecasting, empirical research on forecasting still deals with methodological issues such as the development of more accurate forecasting methods. Whereas there, undoubtedly, have been some improvements in available methodologies, it is management's knowledge and use of existing methods, in their specific organizational context, that holds the greatest promise (Makridakis et al. 1983, p. 13). Schultz's (1992, p. 410) study paper underscores the fact that application issues are rather under-explored. The greatest gains in SF research are currently perceived to be in the areas of implementation and practice in firms. Little research exists in developing economies, like Kenya, in the area of combined SF strategies. This Independent Study Paper therefore, seeks to contribute to the knowledge in SF practices by developing a more accurate forecasting model through the assessment of how results from different forecasting approaches are actually combined, in order to improve accuracy, and how any differences in combination strategies are reflected in forecast performance, while taking cognizance of the probable role of decision making processes, organizational structures and the external environment. Performance can be measured using financial and growth indicators, more specifically, revenue, profit, return on assets, return on sales, market share and earnings per share/dividend yield, where dividend yield is a specific output that shareholders are interested in.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This Independent Study Paper is concerned with the analysis of Sales Forecasting (SF) practices in large scale manufacturing companies in Kenya in order to develop more suitable SF methods for the different sectors of these firms.

1.2 Background

SF has become a challenging concept in the study of public and private enterprises. No one seems to be exactly sure what method of SF to use to predict precisely future performance (dividend) for shareholders. The liberalization of the world economy has led to a reduction in trade barriers among countries leading to greater competition than hitherto. Businesses have to collaborate with new global players (Stoner et al., 2001). Organizations which focused on local markets have extended their frontiers in terms of markets and production facilities to a more national, multi-national, international and even global reach. The challenge of managing crises in a rapidly changing world has inspired a forward looking debate that looks at the lessons from the past and points to actions for the future.

The context in which the management of SF is carried out is now also changing rapidly. An increasing number of American management thinkers have talked about companies living in a turbulent environment (Wadell and Shoal, 1994). Globalization has had significant impact on all economies of the world with major effects on efficiency, productivity and competitiveness (Intriligator, 2001). For developing countries, the turbulent effects are even more severe due to the unpredictable and inseparable political-economic environment, forced trade liberation, and implementation of structural adjustment programs, while in developed countries, the economies are relatively stable and political trends do not significantly affect businesses. With rapid and often unpredictable changes in economic and market conditions, managers are making some decisions without knowing what will exactly happen in future. Inventory is ordered without certainty as to what sales will be, new equipment is purchased despite uncertainty about demand for products/services and investments are made without knowing what the profit will be, Chan

(2000). Accordingly, Reyes (2001) suggests that globalization underlines two main increasing trends: worldwide active communication systems and fluent economic conditions.

In general, forecasting is the process of making statements about events whose actual outcomes (typically) have not yet been observed. It is essential for decision making, unless insurance or hedging is selected to deal with the future (Armstrong, 1988). Both public and private enterprises operate under conditions of uncertainty and management wishes to limit this uncertainty by predicting changes in sales volume, price, cost and interest rates. Accurate forecasting can help develop strategies to promote profitable trends and to avoid unprofitable ones.

Risk and uncertainty are central to forecasting and prediction. Prediction is a similar, but more general term compared to forecasting. Both might refer to formal statistical methods employing time series, cross-sectional or longitudinal data, or alternatively to less formal judgmental methods. An important, albeit often ignored aspect of forecasting, is the relationship it holds with planning. Forecasting can be described as predicting what the future will look like, whereas planning predicts what the future should look like. Good SFs are an essential part of most successful production systems. They are a major input in all aspects of manufacturing operations decisions (Heizer and Render, 1991). Muir (1982) showed how forecasts can drive the master production schedule (MPS) which in turn drives both material requirements planning and order point system in a typical production and inventory control environment. Without accurate SFs, operations can only respond retroactively, leading to lost orders, inadequate service and poorly utilized resources (Fildes and Hastings, 1994). An early survey by Thomas and Dacosta (1979) of corporate operations research/management science confirmed that SF was the number one area of applications in major US corporations. A 1987 survey by Carter seems to support the same finding.

Managers would like to know about the future before it happens. While good SFs will reduce the uncertainty that all managers feel, they will not entirely eliminate this uncertainty. Management in organizations have therefore, not fully embraced any particular SF method that results in accurate forecasts of their future performance.

Several surveys pertinent to SF practices were conducted in the last four decades (Richard, 1966; Dalrymple, 1975; Wheelwright and Clark, 1976; Pan, Nicholas and Joy, 1977; Rao and Cox, 1978; Mentzer and Cox, 1984; Sparkes and McHugh, 1984; Dalrymple, 1987; Kwong and Li, 1989; Sanders and Manrodt, 1994; Wacker and Sprague, 1998). Most of these studies have focused on the use of forecasting techniques in the corporate planning process. Mentzer and Cox (1984) expanded the scope of their survey by investigating the familiarity, application, performance, and satisfaction of forecasting managers, in 160 US companies, with current SF techniques. Similarly, Sparkes and McHugh (1984) covered numerous aspects of the use of forecasting techniques in British industry. They studied the state of awareness of particular techniques and the extent they were used in various functional applications. Sanders and Manrodt (1994) surveyed the same aspects of forecasting practices at 96 US corporations. They explored the use of various forecasting techniques for different time horizons and corporate level forecasts in both small and large firms. Reasons for using judgmental forecasting methods and judgmentally adjusting quantitative forecasts prior to use were also reported in their study.

Lambert and Stock (1993) positioned forecasting as "the driving force behind all forward planning activities within the firm" (p. 559). When forecasts are accurate, they help companies and supply chains to prepare for short and long term changes in market conditions and help in improving operating performance (Fildes and Beard 1992; Gardner 1990; Wacker and Lummus 2002). When forecasts accuracy degrades, decisions based on the forecasts may lead to operational missteps. For example, in 2001 Cisco systems was forced to write off US$2.2 billion in inventories, lay off 8,500 employees and experienced a stock decline of over 80 percent (US$ 82 to $ 13.20 per share). The results were due in part because forecasts used for planning and management decisions did not predict the dramatic fall in demand for Cisco product as the dot.com bust took hold (Berinato 2001). Similar relationships have been confirmed in logistics and operations research where modeling studies have helped to assess the impact of forecast accuracy on replenishment (Aviv 2003; Bowersox et al. 1979; Gardner 1990), vendor managed inventory management (Nachiappan et al. 2005), collaborative planning forecasting and replenishment (Aviv 2001), and service parts management (Ghodrati and Kumar 2005). Such studies have also helped to quantify the impact of forecast performance by translating the statistical measures commonly used to evaluate forecasts into, "terms meaningful to managers"

(Gardner 1990, p.498), including inventory investment and service achievement. Little research has been reported on combining SF practices practically in different countries other than the US and Britain. SF in China, Europe, Japan, Korea and the US, by Kwong and Li (1989), is the first inter-country study reported in the literature. A more comprehensive study, by Wacker and Sprague (1998), examined the effect of forecast practices on forecast error for Germany, Japan, Mexico, New Zealand, Spain, Sweden and the USA.

Forecasting is used in the practice of Customer Demand Planning (CDP) in every-day business SF for manufacturing companies. The discipline of CDP embraces both statistical forecasting and a consensus process. Brownlees and Gallo (2007) assessed the performance of volatility forecasting using focused selection and combination strategies to include relevant explanatory variables in the forecasting model for realized volatility. In the recent past, studies on SF have focused on developing methodologies with little understanding on how forecasting methods are combined, practically, in organizations.

The growing importance of the SF function within companies is reflected in the increased level of commitment in terms of money, hiring of operational researchers and statisticians, and purchasing computer software (Wheelright and Clarke, 1976; Pan et al. 1977; Fildes and Hastings, 1994). Makridakis et al. (1983) also note several factors which have caused the importance of SF in organizations to increase in recent years as the increasing complexity of organizations and their environments have made it more difficult for decision makers to take all the factors relating to the future development of the organization into account; organizations have moved towards more systematic decision making that involves explicit justifications for individual actions, and formalized forecasting is one way in which actions can be supported; and the further development of accurate forecasting methods and their practical application can enable not only forecasting experts but also decision makers to understand and use these techniques. With particular reference to the last point, while it is evident that knowledge of forecasting is only useful if applied to an organization's decision making and planning processes, the forecasting methods require considerable modifications before they can be used. "Strong bridges are required to connect theory and practice, and many problems must be solved before forecasting methods can be used efficiently and effectively in management situations",

(Makridakis and Wheelright, 1979, p.3). While there is no single right forecasting method to use, the importance of applying forecasting techniques in practice has long been recognized and researchers have been repeatedly urged to investigate such issues (Armstrong, 1988; DeRoeck, 1991; Mahmoud et al., 1992).

Lawrence, Edmundson and O'Connor (1986) allude to the fact that Judgmental based forecasting is widely used in practice either alone or in conjunction with computer prepared forecasts. While modeling research has provided a means to assess the relationship between forecasting and operating performance in isolation, in practice forecasts are not always so integrated with the systems and decisions they support. Individuals are frequently involved in forecast implementation and can influence how forecasts are employed (Berinato 2001; Fildes and Hastings 1994). They may, for example, choose to implement forecasts as received; choose to adjust forecasts prior to implementation; or choose to ignore those forecasts and apply their own projections. The influence that management factors and individual behaviors may play in forecast creation and application has been of interest to researchers (Fildes 2006; Lawrence 2000; Schultz 1992).

While theoretical grounding has emerged to help explain the role of management in forecast development (Davis and Mentzer 2007; Fildes 2006; Mentzer et al. 1999; Winklehofer and Diamantopoulos 2003), few studies have considered how forecast users may influence the application of forecasts in planning and management activities (Foslund and Jonsson 2007). While Smith and Mentzer (2010) have addressed the issue of how user perceptions and actions may influence forecast utilization to guide logistics decisions, the lack of empirical evidence of how results from different forecasting approaches are actually combined by management and how any differences in combination strategies are reflected in forecast performance in manufacturing companies represents a gap in our understanding of the forecasting-operating performance connection.

1.3 Concept of Forecasting Performance

Mentzer and Bienstock (1998 p.3) defined forecasting as "a projection into the future of expected demand given a stated set of environmental conditions." Depending on the circumstances,

forecasts may be created by autonomous systems, individuals, cross-functional teams or some combination of approaches. The resulting forecasts frequently express future demand estimates at different levels of the product or service hierarchy depending on the intended use and application. For example, while Stock Keeping Unit (SKU) and Stock Keeping Unit by Location (SKUL) forecasts are typically of greatest interest to logistics managers, marketing managers are more interested in product category or market level forecasts, and financial managers are interested in divisional or corporate level forecasts.

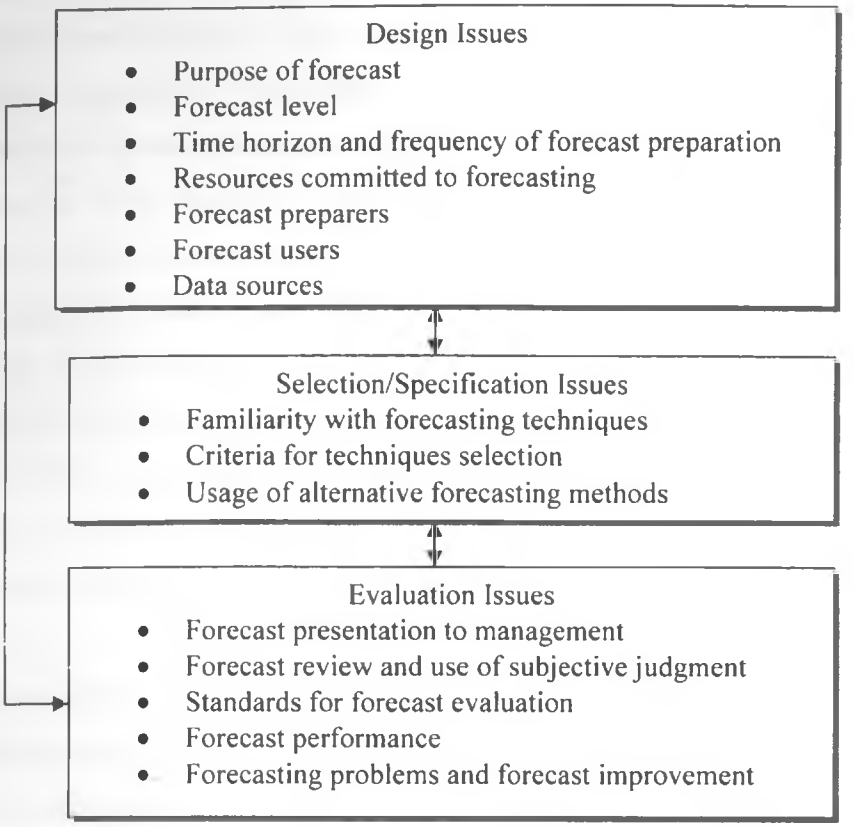
Forecasts also frequently provide demand predictions that extend over different time horizons. The forecasted unit of analysis reflects product or service characteristics. To assess performance, forecasts are typically evaluated using statistical measures that reflect how accurate previous SFs have matched actual demand. Common metrics include percent error and mean absolute percent error. Performance evaluation may be based on accuracy achieved at different levels of the hierarchy, across different time horizons and based on different units of measure. Forecasting research has traditionally relied on statistical measures of performance to evaluate forecasting techniques using a competition format (Makridakis et al. 1982; Makridakis and Hibon 2000), and within surveys as a means to assess the reported level of performance achieved in practice (Dalrymple 1975, 1987; Hughes 2001; McCarthy et al. 2006; Mentzer and Cox 1984; Mentzer and Kahn 1995). Results of these research streams offer a mixed picture of the extent that forecasting performance has improved over time. The competition studies have helped to identify techniques that can improve accuracy under different demand scenarios. It has been found that practice studies, however, have not found evidence that industry is achieving the same level of improvement and those responsible for forecasting appear to be less familiar with the range of techniques that can help with such efforts.

Although considerable empirical research has focused on the forecasting of firms, not all issues have received equal attention. For example, while questions concerning the utilization of forecasting methods have attracted a lot of study, issues such as the role and practical level of forecasting in manufacturing firms have been relatively unexplored (Winklhofer et al., 1996). Further, while variables such as company size and industry type have been systematically linked to some aspects of forecasting practice (for example resources available and forecast accuracy),

such linkages have been left relatively unexplored for other aspects (such as data sources utilized). A related point concerns the types of variables that have been linked to the individual elements of forecasting practice. Thus while company size and industry membership have been widely employed to explain differences in practices, other potentially relevant variables (such as environmental turbulence and degree of formalization/centralization within the firm) have received minimal attention, including but not limited to ease of use and interpretation of forecasts, timeliness and cost of forecasting, availability of software for quantitative forecasting and frequency of forecasting.

Winklhofer et al. (1996) posit that while the inter-relationships among certain aspects of forecasting practice have been examined (for example between forecast horizon and use of forecast), potential linkages between other aspects (for example, between the resources committed to forecasting and forecast performance) have not been fully studied. They observe that taken together, further studies are needed: first, to relate organizational and environmental variables known to affect forecasting to a wider range of issues; to explore the impact of additional firm-specific and environmental-specific variables on forecasting; and to examine neglected inter-linkages between different aspects of organizational forecasting. On the basis of these observations, some specific three key headings emerge on organizational forecasting practice using the following framework to depict the process of forecasting practice in organizations.

Figure 1: Framework for Organizational Forecasting Practice



Source: Winkler et al. International Journal of Forecasting 12 (1996) 193–221.

The above framework was developed by integrating the (largely complementary) perspectives of Levenbach and Cleary (1981, 1982, 1984) and Armstrong et al. (1987). The framework distinguishes between three different sets of issues relating to design, selection/specification and evaluation. The three sets of issues are interlinked in that each can have implications for the others; for example, the adoption of a particular forecasting technique (a specification issue) will have implications for forecast accuracy (an evaluation issue) which, in turn, may lead to adjustments in, say, the data inputs used to develop the forecast (a design issue). The above framework provides a logical and orderly representation of organizational forecasting practice and establishes a clear overview of the latter.

Winklhofer et al. (1996) state, for example, that under selection and specification issues, it is not known "how results from different forecasting approaches are actually combined by management in firms and how any differences in combination strategies are reflected in forecast

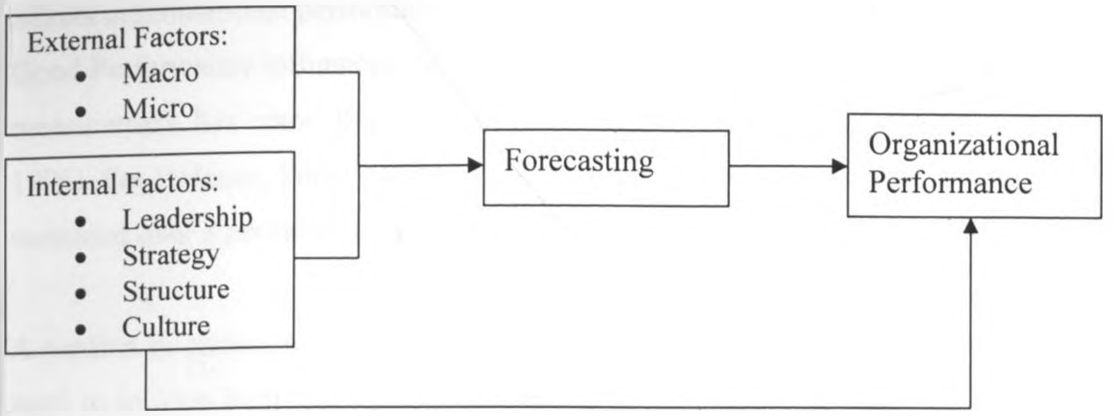
performance". Bates and Granger (1969), Newbold and Granger (1974), Bunn (1979) and Makridakis and Winkler (1983) examined the principles behind the combination of SFs from a theoretical standpoint. Makridakis and Winkler (1983) found that accuracy increases and variability in accuracy decreases as forecasts are combined. This tendency was also found to continue as more methods were included in the combination. These benefits were most pronounced for methods or combination of methods that had high errors associated with them. In their paper, Makridakis and Winkler (1983) restrict their consideration to the combination forecasts by quantitative techniques. However, they note that, since subjective forecasts are currently used by many companies (Mentzer and Cox 1984, Lawrence (1983) and Mbeche and Yego (1996), combination of judgmental and quantitative forecasts is a promising area for further research. Moriarty and Adams (1984) support combining judge-mental forecasts despite their results which they described as "atypical".

While principles have been developed to guide forecasters in selecting a forecasting method (Armstrong 2001b), decision makers may be unwilling to generalize from prior research, believing that their situation is different. Alternatively, prior research may have revealed a number of relevant methods and one would like to narrow the field. The proposed study intends to focus on the large manufacturing firms in Kenya that have the resources and capability to carry out SFs more accurately.

The research problem for this study is to develop a more suitable forecasting model for each manufacturing sector through the assessment of how results from different forecasting approaches are actually combined, in order to improve accuracy, and how any differences in combination strategies are reflected in forecast performance.

1.4 Factors affecting Sales Forecasts

Figure 2: External and Internal Environments



Business performance can be seen from several standpoints, including market share, customer satisfaction, corporate image, profitability and growth, to mention a few. However, there are several factors that affect business performance in any organization. Performance can be impacted by both the external environment (politics, macro, micro and demographic factors) and internal organizational environment (leadership, strategy, structure and culture). Forecasting tends to be an internal factor embedded in the leadership style of an organization's management. Businesses are deemed to thrive in stable political environments with sound macro and micro plans. Many more new investments come on stream as a result. Demographic characteristics in terms of age, size, educational levels, structure, diversity and background too have an effect on business performance.

Business operating environment comprises internal factors, task environment (customers, new entrants, competitors, suppliers and substitutes), remote environment (political, economic, socio-cultural, technological, geo-ethnical factors) and ultra remote environments (earthquakes, natural calamities, wars). Kibera (1996) proposes that business context consists of various dimensions, among them physical, historical, economic, political-legal, socio-cultural and technological. The environment can further be classified as stable, changing or turbulent depending on the apparent complexity of and degree of uncertainty.

While some scholars argue that the operating environment can either sustain or destroy organizations (Burn and Stalker, 1961; Perrow, 1970; Pfeffer and Salancik, 1978), others note that organizations have a choice and can manipulate the operating environmental forces to their

advantage (Crozier and Fredberg, 1980; Friedberg, 1980; Pettigrew, 1985; Astley, 1985). Notwithstanding the various arguments, it is hypothesized that organizational operating context affects organizational performance. Performance is an essential concept in management research. Good Performance influences the continuation of the firm. Much of the research on Performance measurement has come from organizational theory and strategic management (Murphy et al., 1996). For instance, Porter (1980) defines good Performance as the above-average rate of return sustained over a period of years.

A number of studies have highlighted the 'multidimensionality' of business performance and the need to include both traditional financial accounting measures together with non-financial data (Venkatraman and Ramanujam, 1986; Cool and Schendel, 1987; Dess and Davies, 1984). Financial indicators are important, but provide only a limited view of a company's total value. Non-financial measures such as the quality of management, customer retention, Research and Development and innovation, are also indicators of internal operating performance and achievement. Organizational performance is enhanced when there is a good 'fit' between management style and various contextual factors (Khandwalla, 1977).

Tsai, MacMillan, and Low (1991) and Miller, Wilson, and Adams (1988) suggested the use of multiple measures to compensate for weaknesses in each of the performance measures individually. Thus the multiple measures are: average annual growth of full time employees since the firm was founded, growth in sales revenue during the last financial year, growth in profits over the last fiscal year; and profitability relative to competitors. While financial performance is at the core of the organizational effectiveness domain, it is considered not sufficient to define overall effectiveness (Murphy et al., 1996). Accounting-based standards which tap current profitability, such as Return on Assets (ROA), Return on Sales (ROS) and Return on Equity (ROE) measure financial success (Parker, 2000). On the other hand, Business performance measures market-related items such as market share, growth, diversification, and product development (Gray, 1997). There are two dimensions to consider: a) those indicators related to growth/share in existing business (such as sales growth and market share) and b) those indicators related to the future positioning of the firm (for example new product development and diversification). In addition to the foregoing, there are propositions that organization

decision-making processes are subject to organizational context and characteristics. The different aspects of the environment and organizational characteristics affect organizational management (moderating role) and results in widespread implications for an organization's performance (Mintzberg, 1989; Ashmore, 1992; Daft, 2001; Hunter, 2002).

Case research has highlighted the development and implementation of forecast algorithms (Fader and Hardie 2001; Ghodrati and Kumar 2005, Nachiappan et al. 2005), systems (Liu and Ridgway 1995; Mentzer and Kent 1999; Mentzer and Schroeter 1994; Snyder 1993), and processes (Chung and Leung 2005; Tanwari and Betts 1999). These studies have predominantly relied on accuracy as a means to assess pre- and post-implementation performance. Beyond accuracy, some research has relied on management perceptions (Mentzer and Kent 1999) or separate modeling analyses (Ghodrati and Kumar 2005; Nachiappan et al. 2005), as proxies to report expected performance benefits.

Case research has also investigated forecasting processes within organizations, and based on a case analysis of a multi-national organization, Fildes and Hastings (1994) diagramed what they considered to be an "idealized" forecasting system. They used the model to analyze forecasting practices and identified three factors they believed influence forecasting effectiveness: the forecaster/decision-maker relationship, information flows and forecast technical characteristics. The forecaster/decision-maker relationship in particular has been posited to influence user assessment of forecast credibility and the impact of forecasts on operations (Mahmoud et al. 1992; Makridakis et al. 1983). Anecdotes have described circumstances where users have adjusted forecasts because they believed they had better information than the forecaster(s) or because of political pressure (Fildes and Hastings 1994; Wheelwright and Clarke 1976). Mentzer et al. (1999) used the term "islands of analysis" to describe situations where forecast users chose to ignore forecasts derived from sanctioned processes in favor of forecasts they created using unauthorized systems and practices.

In Smith's and Mentzer's study, insights about how management and behavioral factors influence the relationship between forecast accuracy, the perceptions and actions of those who use forecasts are drawn from studies concerned with the utilization of market research

information. Marketing studies have confirmed a relationship between antecedents associated with organization structure (Deshpande and Zaltman 1982, 1984, 1987; John and Martin 1984; Mooreman, Deshpande, and Zaltman 1993), information attributes (Deshpande and Zaltman 1982, 1984, 1987), management (Deshpande and Zaltman 1982, 1984, 1987; Maltz and Kohli 1996; Mooreman, Deshpande, and Zaltman 1993) and market environment (Maltz and Kohli 1996), and dependent variables including user perceptions of information quality, credibility and the extent of market research utilization. Positioning forecasts as a type of market research information, these studies provide grounding to consider an alternative path that links forecast accuracy to the performance of operations.

Maltz and Kohli (1996) conceptualized "perceived intelligence quality (PIQ)," as a composite consisting of four sub-dimensions including accuracy, clarity, timeliness and relevance. John and Martin (1984) conceptualized the credibility of marketing plan output to include six sub-dimensions: plan realism, accuracy, specificity, consistency, completeness and validity. Perceived "Accuracy" is defined as the user's perception of the extent that forecasts reflect actual demand. Perceived credibility is defined as the users' perception that the forecasts they receive are based on good data, processes and systems. In their forecasting management benchmark study, Mentzer et al. (1999) asserted that actions taken to foster communications during forecast development and presentation are indicative of more sophisticated forecasting practices and are expected to impact forecast performance. The implication is consistent with marketing research results that confirmed that communications and intelligence dissemination were positively associated with user assessment of information credibility and the extent that they used the information (Maltz and Kohli 1996; Menon and Varadarajan 1992).

Another criterion resulting from the benchmark study promoted the use of formal processes to guide forecast development and application (Mentzer et al 1999). Deshpande and Zaltman (1982) confirmed a negative relationship between the formalization of research processes and the use of market research information, while John and Martin (1984) confirmed a positive relationship between process formalization and marketing plan credibility and use. John and Martin (1984) defined formalization as, "the emphasis placed on following specific rules and procedures in carrying out plan formulation, including documentation of planning activities and

adherence to job descriptions" (p. 172). This aligns with the Mentzer et al. (1999) criterion that specifies documentation of the forecasting process as reflective of more sophisticated practices.

Commenting on results of a forecasting survey, Wheelwright and Clarke (1976) noted that gaps in the perception of forecasting abilities between forecast preparers and forecast users appeared to contribute to poor forecasting performance in organizations. Their findings indicated that forecast users had a lower assessment of preparer abilities to forecast in a timely manner, deal with new situations, identify the best techniques and understand management issues related to forecasting, than the preparers themselves. Users also had a higher assessment than forecast preparers of their own abilities to understand forecasting techniques, evaluate techniques and understand sophisticated techniques. This led the authors to suggest that the disparities in perception hindered communications and affected the level of confidence in forecasts.

1.5 Problem description

This section is divided into two parts: the first part deals with the background to the problem, and the second part deals with statement of the problem.

1.5.1 Background of the problem

Competitive activity in manufacturing firms has intensified worldwide leading to the necessity for accurate SF in setting future goals to ensure survival and pay dividends to shareholders. This independent study paper focuses on large[1] manufacturing firms, in Kenya, that have the resources and capability to carry out SFs accurately. Ansoff (1987) pointed out that the environment is constantly changing and so it makes it imperative for organizations to continually adapt their activities in order to succeed.

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[1] In Kenya, any firm employing ≥ 50 people is considered as large, Parker and Torres (1994). Aosa (1992), describes a large business in Kenya as one that employs 50 or more people , has a sales turnover of at least Kshs. 3 million and sales per employee of at least Kshs 60,000.
The Central Bureau of Statistics (1996) defines a large firm as those organisations that employ 50 people and above. Another definition provided by the Kenya Industrial Research Development Institute (1987) defines large businesses as those firms employing a minimum of 50 employees and constitute that compartment of the economy concerned with the production or making of finished goods out of raw materials by means of an elaborate and organized system of labour with the aid of machinery. Kibe (2000) and Nyamwange (2001) in a study of large business enterprises in Kenya posit that when using the number of employees to determine a firm's size, a firm with at least 50 employees is considered large.
This study will confine itself to manufacturing firms that employ ≥ 101 people.

A literature review covering 1970 to 2010 has resulted in the identification of over 35 surveys and several case studies pertaining to forecasting practices. Of these studies, the majority (64 percent) were conducted in the USA, while 15 percent of the investigations focused solely on UK companies and 11 percent examined Canadian firms. The remaining 10 percent of surveys either used cross-national samples (for example USA and Canada) or concentrated on other countries (such as Brazil and Australia). 49 percent of all studies identified focused specially on SF, while the majority of the latter examined SF practices in the light of specific variables such as time horizon (Dalrymple, 1975, 1987; Mentzer and Cox, 1984a, b); some looked at the practice of SF in broad terms (Cerullo and Avila, 1975; Rothe, 1978) and forecasting market shares from models for sales, Fok and Franses (2001).

Overall, there is a predominance of North American studies (which account for 76 percent of all investigations), a bias towards large firms and industrial goods sectors and substantial variability both in sample sizes and response rates. Of particular concern is the fact that some empirical studies (Greenlley, 1983; Wilson and Daubek, 1989) do not explicitly specify the kind of forecasting problem(s) under study. This, inevitably, has raised questions as to the applicability of the reported results (and any accompanying recommendations) to specific forecasting situations. Gurbaxani and Mendelson (1990) compared their forecasting model using 28 time-series observations against an alternative model that used only two observations. In addition, they used recent data to calibrate their preferred model and older data to calibrate the competing model.

Reviews on forecasting practice by Turner (1974) cover very old studies (Thompson, 1947; MacGowan, 1952; Strong, 1956; Sord and Welsch, 1958; British Institute of Management, 1964; Richard, 1966; Jones and Morrell, 1966); thus, it is debatable whether their findings are still of relevance today with the further development of forecasting models using more advanced computer software. Most of the studies have only compared the performance of alternative approaches to time series forecasting. Few studies have examined the updating of forecast for a fixed time period in the future as the lead time reduces.

In setting accuracy targets for short-term judgmental SF, Bunn and Taylor (2001) state that traditionally, the quality of a forecasting model is judged by how much it compares, in terms of

accuracy, to alternative models. They assert that when judgmental methods are used alongside simple forecasting models, the scope for improvements is considerable and difficult to benchmark. All the above researchers used only secondary data to perform their studies.

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 more human forecasters were more biased and their results were more influenced by noise in the data. More accurate results were found when an exponential smoothing model with trend and seasonal decomposition was used. The weakness of the study is that the researchers did not attempt to combine the different SF strategies. In Lawrence (1983) survey on a convenience sample of firms in Australia it indicated that computer-based forecasting systems are not widely used, and a number of established systems had been discarded due to inaccuracy.

Hyndman and Koehler (2005) discuss and compare measures of accuracy of univariate time series forecasts in commonly occurring situations and propose that the mean absolute scaled error become the standard measure for comparing SF accuracy across multiple time series without considering the environmental uncertainty manufacturing firms face.

In SF practices of Egyptian public enterprises, survey evidence by Mady (2000) revealed that few qualified forecasting personnel are available and computers are not used in SF by most companies. He found out that Egyptian companies tend to prepare individual-products forecasts in both monetary and physical units and that forecasting is mainly used for the domestic market, and firms are reluctant to produce long-term forecasts. He concludes that Egyptian practitioners are less familiar with the objective than the subjective techniques of forecasting. The lack of top management support and the turbulent changes in the companies' markets were among the top SF implementation problems in Egypt.

Mbeche and Yego (1996) researched on 29 large manufacturing firms in Nairobi and posit that subjective methods are still predominant in the field of SF. However, the sample size in this study (29 firms) was very small and confined to Nairobi only.

Nyanamba (2003) developed a methodology for forecasting sales demand of tooth paste at Colgate Palmolive (EA) Limited. The survey results indicated that the model for indirect channel of distribution (small size) was the time series decomposition, which brought out the seasonal variations in sales. The Autoregressive Moving Average (ARMA) model was considered to be suitable for the bigger size of Colgate. It was concluded that the time series and the ARIMA models could be combined with subjective input to forecast the sales for demand of Colgate Palmolive better. The gaps identified in this study were the nature of data used and the lack of scrutiny, which may have compromised accuracy. Other variables (sales promotion, plant failures and raw materials stock-outs) that could not be easily isolated from the data, may have impacted actual sales.

From the literature review, a few researchers have studied the relationship between combining different SF strategies from a theoretical standpoint. In his review, Winklhofer (1996) suggests a practical research, with operating firms, as a knowledge gap.
Armstrong (2001), on the other hand, provides a list of suggestions for which there is a strong need for research, among them combining different SF strategies.

1.5.2 Statement of the Problem

Consequent upon the above, research studies that have been done so far have left a lot to be desired in terms of methodology, sampling, analysis and interpretation to establish a suitable SF method for large scale manufacturing firms. There is, therefore, a need to conduct a study to address this kind of a problem. This independent study paper proposes the development of a more suitable SF method for each manufacturing sector through examining how different forecasting approaches are combined and how any differences in combination strategies are reflected in forecast performance to ensure accuracy. The evaluation process will be used to test the various alternative methods.

1.6 Concept of dividend policy in large scale manufacturers in Kenya

Organizational survival, for the long-run, is closely related to how well management is able to anticipate the future. The challenges of competition, international trade and global market require organizations to react appropriately to the changing conditions to avoid either failure or

underperformance. Forecasts are required for planning purposes and many manufacturing companies tend to plan their businesses' performance using, mainly, sales and production forecasts prepared separately or by consensus, and these are usually judgmental forecasts (Mbeche and Yego, 1996) with no significance level attached to them, which results in wide variances between forecast and actual performance. The forecasts are prepared on an annual basis when budgets are being prepared and these are reported to shareholders with indications of likely dividends to be paid at the end of the financial year. However, at the end of the accounting period, the variances between actual and forecast performance are such that budgeted dividends cannot be paid. These manufacturers tend to use figures from previous years to produce targets for succeeding periods taking into consideration existing competition and overall market, but periodically adjust the targets as the year progresses. Results from this process of SF show that there is a high deviation of the forecast figures against actual performance (see Table 1 and Figure 1 below of aggregated results of the foam mattresses manufacturing sector for the last five years).

Table 1 Sales Forecast Against Actual Sales for the Foam Mattresses Manufacturing Sector in Kenya: 2006 - 2010

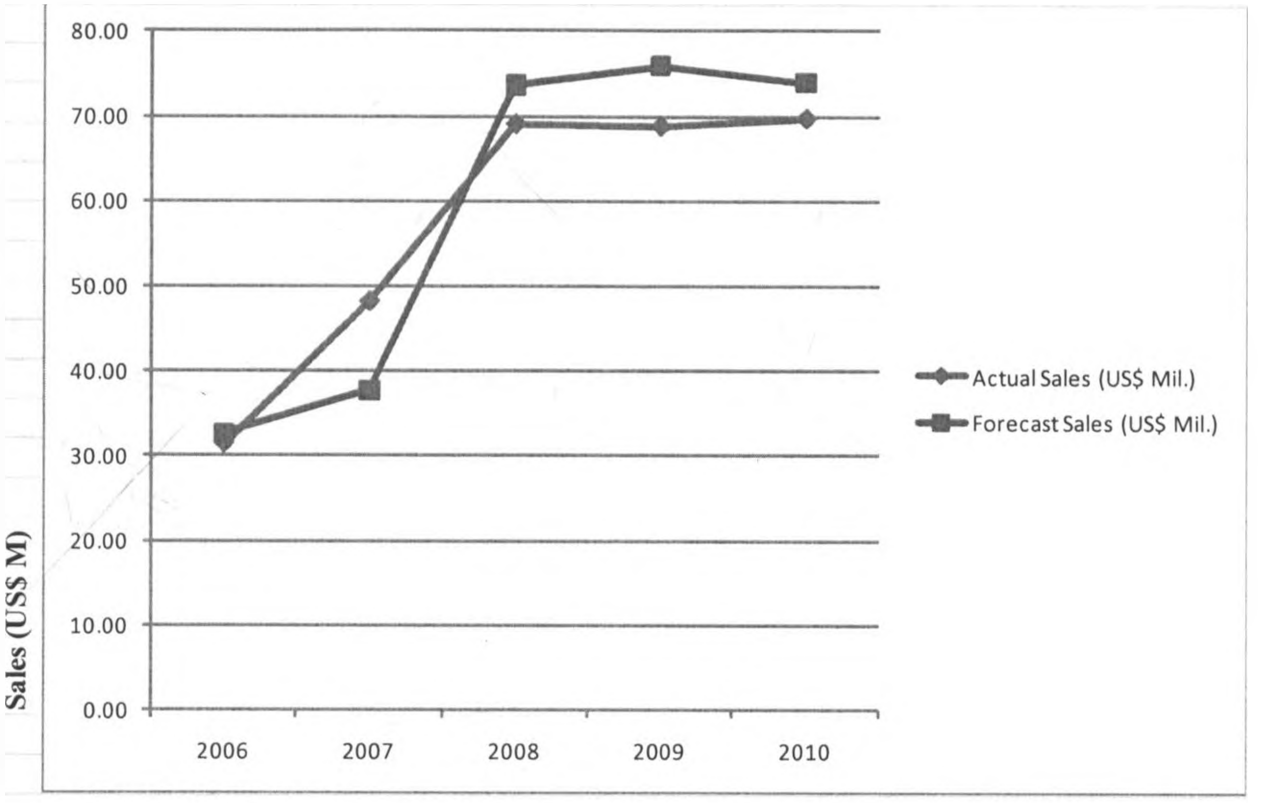
Year	Sales (Million US$)		Variance (Million US$)	Variance (Percent)
	Actual	Forecast		
2006	31.49	32.65	(1.16)	-4
2007	48.16	37.78	10.38	27
2008	69.04	73.69	(4.65)	-6
2009	68.79	75.94	(7.16)	-9
2010	69.70	73.95	(4.24)	-6

Source: Vitafoam Products Ltd. 2010

Besides imports of special mattresses (mainly inner sprung and orthopaedic mattresses), there are about 11 mattress producers in Kenya who all consolidate their sales for reporting purposes to KAM to help in lobbying government to stop imports in order to enhance local production. Figure 1 shows sales having remained flat since 2008. In 2007, the forecasted sales were much lower than the achieved performance which led to the companies being a little more aggressive

in subsequent periods by forecasting higher than the actual performance. In general, the trend in forecasting by companies tends to be higher than actual performance, for various reasons, but the main one being lack of suitable forecasting methods. One of the objectives of the proposed research study is to develop a suitable SF method for each sector of the large scale manufacturers to ensure that shareholders' dividends are also forecasted accurately.

Figure 1: Forecasted Sales against Actual Sales for Foam Mattresses Manufacturing Sector in Kenya: 2006 – 2010



Source: Vitafoam Products Ltd. 2010

Table 2: Earnings per Share for Foam Mattresses Manufacturing Sector in Kenya: 2006 – 2010

Year	Earnings per Share(US$)		Variance (Million US$)	Variance (Percent)
	Actual	Forecast		
2006	0.003	0.015	-0.012	-80
2007	0.004	0.021	-0.017	-81
2008	0.01	0.080	-0.07	-88
2009	0.23	0.250	-0.02	-8
2010	0.34	0.500	-0.16	-32

Source: Vitafoam Products Ltd. 2010

While Earnings per Share (EPS) would be viewed from the perspective of public companies registered on the stock market, generally, this also applies to private companies where EPS can be benchmarked against public companies operating on the stock market. Further, since some companies in their growth phase may not pay out dividends, EPS acts as a good proxy for dividends that would have, otherwise, been paid out. The notion of dividends remains an important aspect for shareholders who may choose to receive these at the end of each financial year or opt to postpone consumption until a future date depending on how the company is performing and/or its phase in the growth cycle.

Figure 2: Earnings per Share for the Foam Mattresses Manufacturing Sector in Kenya: 2006 - 2010

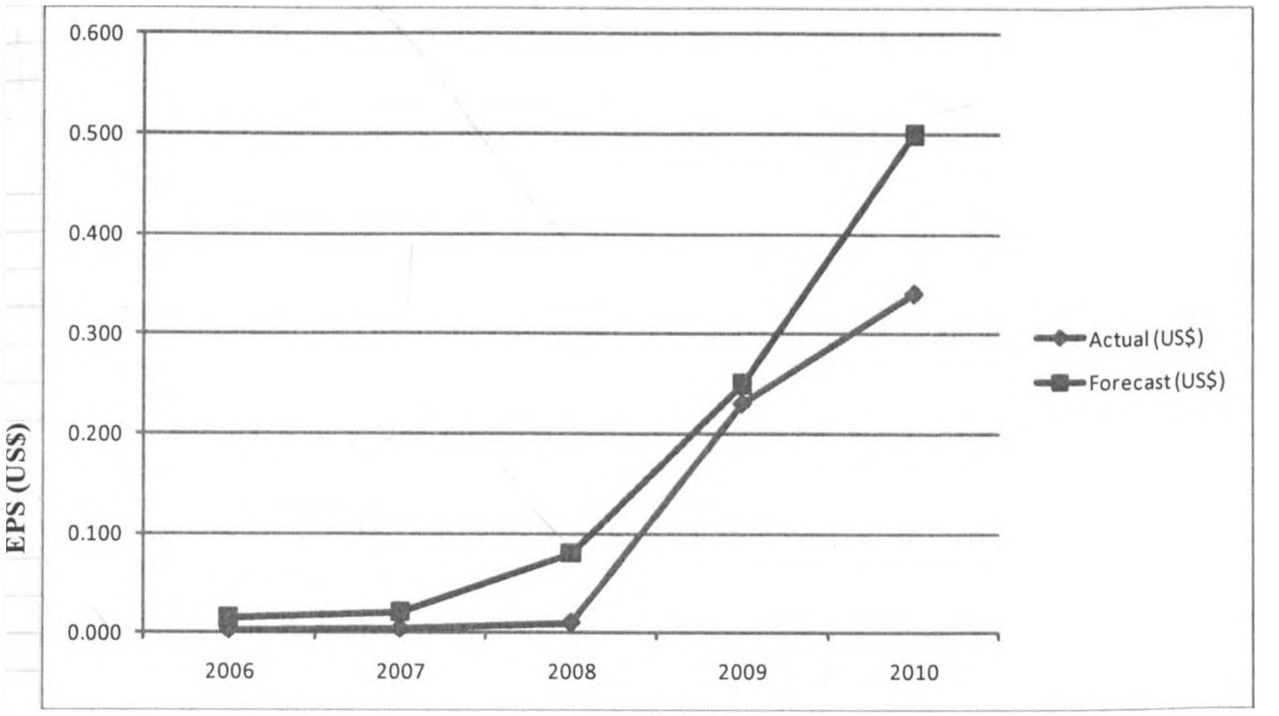


Figure 2 above illustrates the need to develop a more suitable SF model to improve the forecasting processes for large scale manufacturing companies in order to ensure shareholders receive dividends as forecasted. Figure 2 shows that there is a wide deviation in the forecasts from actual results, negatively impacting dividends paid out due to forecast errors. The use of judgmental methods alone as a forecasting approach no longer provides an accurate demand forecast and hence dividend payout. Consequently, to improve the accuracy level of forecasts, an alternative and more robust SF method requires to be developed.

1.7 Research Objective

The general objective in this independent study paper is to establish the impact of SF practices on dividend payments in large manufacturing firms in Kenya. In order to do this, this paper proposes the examination of the individual variables (frequency of preparation, availability of software, time horizon, resources committed to forecasting, cost of forecasting, data requirement and sources, timeliness, ease of interpretation and ease of use) on accuracy in SF and their effect

on the relationship between accuracy and performance when combination approaches in SF are used.

1.8 Significance of the Study

Pertinent literature indicates that the relationship between combined SF methods and firm performance is a contemporary issue in which more research is needed: Winklhofer et al. (1996 p. 193 - 221), Schultz (1992, p. 410), Makridakis et al. (1983, p. 13). Since the early 1980s, many African countries have been implementing market-driven economies, which have been accompanied by considerable interest in the implementation of business management practices of the developed countries. Scholars have also long argued about how to create and implement accurate and practical SF models in businesses, supporting the view that with adequate expertise, accuracy in forecasting should benefit all firms around the world.

The liberalization of the Kenyan economy since the mid-1980s opened up avenues for foreign direct investments resulting in competition with multinationals in management styles, goods and services. Consequently, relevant management practices in organizations have been adopted. It is also noted that most top and middle-level managers have been exposed to the education systems of the developed countries through formal education, conferences, seminars and training programs (El-kot and Leat 2005). However, technology and culture vary across regions, countries and economies, so does their effect on business management. On the basis of this knowledge, this study is deemed appropriate as it seeks to extend the frontiers of knowledge in the area of SF practices in large manufacturing firms.

Previous research studies have focused on forecasting methodologies and techniques with little attention being given to practical applications (Winklhofer et al. 1996; Mentzer and Cox 1984 and Lawrence 1983). This study will help in the understanding of how firms actually combine different forecasting approaches to achieve accuracy, maximize performance, and how differences in combination strategies are reflected in forecast performance. Manufacturers, managers and forecasters will benefit from this study through the application of more robust SF techniques. Shareholders will benefit through accuracy in forecasted dividends; and the government can be able to forecast its revenues from corporate taxation more precisely.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers the literature review in which empirical studies (surveys and case studies) reporting on forecasting practice in industry are identified. The extent to which the concept of combined forecasting approaches has been applied is analyzed to highlight knowledge gaps that exist for further research.

2.2 Background

While Sales Forecasting is an essential tool in business management, its accuracy and application have always posed challenges to decision makers. There is no one foolproof and accurate way of forecasting. Individuals are frequently involved in forecast implementation and can influence how forecasts are employed (Berinato 2001; Fildes and Hastings 1994). Levenbach and Cleary's (1981, 1982, 1984) outline of the forecasting process is considered together with Armstrong et al.'s (1987) list of practical questions relating to forecast application, and these are used to generate an overall framework for organizational forecasting practice (see Figure 1).

2.3 Importance of Sales/Demand Forecasting

Forecasting product demand is crucial to any supplier, manufacturer, or retailer. Forecasts of future demand will determine the quantities that should be purchased, produced, and shipped. Demand forecasts are necessary since the basic operations process, moving from the suppliers' raw materials to finished goods in the customers' hands, takes time. Most firms cannot simply wait for demand to emerge and then react to it. Instead, they must anticipate and plan for future demand so that they can react immediately to customer orders as they occur (Bails and Peppers, 1982). In other words, most manufacturers "make to stock" rather than "make to order" – they plan ahead and then deploy inventories of finished goods into field locations. Thus, once a customer order materializes, it can be fulfilled immediately – since most customers are not willing to wait the time it would take to actually process their order throughout the supply chain and make the product based on their order. An order cycle could take weeks or months to go back through parts suppliers and sub-assemblers, through manufacture of the product, and through to the eventual shipment of the order to the customer (Adebanjo and Dotun, 2000).

Firms that offer rapid delivery to their customers will tend to force all competitors in the market to keep finished goods inventories in order to provide fast order cycle times. As a result, virtually every organization involved needs to manufacture or at least order parts based on a forecast of future demand. The ability to accurately forecast demand also affords the firm an opportunity to control costs through levelling its production quantities, rationalizing its transportation, and generally planning for efficient logistics operations.

In general practice, accurate demand forecasts lead to efficient operations and high levels of customer service, while inaccurate forecasts will inevitably lead to inefficient, high cost operations and/or poor levels of customer service (Adam and Ebert, 2001). In many supply chains, the most important action taken to improve the efficiency and effectiveness of the logistics process is to improve the quality of the demand forecasts. Logistics professionals are typically interested in where and when customer demand will materialize. The analytic challenge is to come up with a better forecast than simple average. The logistics system must satisfy specific demand, that is, what is needed, where and when. Accurate forecasts must be generated at the Stock Keeping Unit (SKU) level, by stocking location, and by time period (Bedward, 1999). Thus, the logistics information system must often generate thousands of individual forecasts each week. This suggests that useful forecasting procedures must be fairly "automatic"; that is, the forecasting method should operate without constant manual intervention. Forecasting is a problem that arises in many economic and managerial contexts, and hundreds of forecasting procedures have been developed over the years, for many different purposes, both in and outside of business enterprises.

The marketing department, for example, will generate high-level long-term forecasts of market demand and market share of product families for planning purposes. Marketing will also often develop short-term forecasts to help set sales targets or quotas. The manufacturing organization may need a forecast of total product demand by week, and the marketing organization may need to know what the demand may be by region of the country and by quarter. The logistics organization needs to store specific SKU level in specific warehouses and to ship them on particular days to specific stores (Leontif, 1964). An important issue for all forecasts is the time "horizon", that is, how far into the future must the forecast project? As a general rule, the further

into the future we look, the more clouded our vision becomes - long range forecasts will be less accurate than short range forecasts. The answer depends on what the forecast is used for. For planning new manufacturing facilities, for example, we may need to forecast demand many years into the future since the facility will serve the firm for many years (Bails and Peppers 1982). It is also important to note that the demand forecasts developed within the logistics system must be generally consistent with planning numbers generated by the production and marketing organizations. If the production department is planning to manufacture ten million units, while the marketing department expects to sell twelve million units, and the logistics forecasts project a total demand of six million units, senior management must reconcile these different visions of the future (Little, 1970).

2.4 Nature of Customer Demand

Customers are assumed to be able to order what, where, and when they desire. The firm may be able to influence the amount and timing of customer demand by altering the traditional "marketing mix" variables of product design, pricing, promotion, and distribution. On the other hand, customers remain free agents who react to a complex, competitive market place by ordering in ways that are often difficult to understand or predict. The firm's lack of prior knowledge about how the customers will order is the heart of the forecasting problem – it makes the actual demand random.

However, in many other situations where inbound flows of raw materials and component parts must be predicted and controlled, these flows are not rooted in the individual decisions of many customers, but rather are based on a production schedule (Rice and Gillian 1997). Given each part supplier's lead-time requirements, the total parts requirement can be determined through a structured analysis of the product's design and manufacturing process. The Material Requirements Planning (MRP) technique is often used to handle this kind of demand. This demand is described as dependent demand (because it is dependent on the production requirement), as contrasted with independent demand, which would arise directly from customer orders or purchases. The MRP technique creates a deterministic demand schedule for component parts, which the materials manager or the inbound logistics manager must meet. Typically a detailed MRP process is conducted only for the major components and/or materials.

2.5 Review of Previous Studies

A lot of research has been carried out in the area of forecasting, both in developed and developing countries where both quantitative and qualitative methods have been used, including combining both objective and subjective forecasting strategies. However, there is no study done in Kenya on how results from different forecasting approaches are actually combined by management in firms and how any differences in combination strategies are reflected in forecast performance. In Kenya, the use of objective methods is increasing rapidly in weather forecasting (Armstrong, 1984), malarial outbreaks and manufacturing firms as a result of availability of historical data and more use of computers.

In examining previous empirical research on forecasting practices, out of about six literature reviews of forecasting practices published in the past 30 years (Turner, 1974; Rao and Cox, 1978; Makridakis et al., 1983; Wheelright and Makridakis, 1985; Makridakis and Wheelright, 1989), Heidi Winklhofer et al. (1996), the four most recent reviews cover only six empirical studies between them (namely those by the Conference Booard, 1970; Dalrymple, 1975; Wheelright and Clarke, 1976; Pan et al., 1977; Mentzer and Cox, 1984a; Dalrymple, 1987). However, many more investigations of forecasting practices have been conducted, both within the periods covered by these reviews, and since the publication of the latest reviews by Heidi Winklhofer (1996). Moreover, in contrast to previous efforts, the present review also includes case studies; the latter not only provide detailed insights into the forecasting process, but also address issues additional to those covered in survey-type investigations (for example applying subjective judgment). Davis and Mentzer (2007): organizational factors in sales forecasting management propose a theory-based framework of organizational factors in SF management that integrates research on organizational climate, organizational capabilities, organizational learning and sales forecasting to bridge the gap between theory and practice for SF research.

A wide variety of issues relating to SF practice have been subject to investigation in the studies identified in literature search. Generally, organizational capabilities (Prahalad and Hamel, 1990; on dynamic capabilities (Teece et al., 1997) can be connected to a resource-based view of the firm (RBV), which is originated in the strategy literature (Rumelt, 1984; Wernerfelt, 1984; Srivastava et al., 2001). The RBV of the firm rests on the premise that the organizations' desired

outcome is to achieve a sustainable competitive advantage that allows them to earn economic rent or above-average returns (Fahy and Smithee, 1999), and implicitly result in growth. The key to earning this reward is the possession of critical resources that are firm-specific, valuable to customers, non-substitutable, and difficult to imitate, and that lead (if deployed effectively) to a sustainable competitive advantage (Barney, 1991; Foley and Fahy, 2004; Fahy and Smithee, 1999). This perspective emphasizes firm-specific capabilities and assets and the existence of isolating mechanisms as the fundamental determinants of firm performance.

Capabilities generally have been defined as complex bundles of skills and collective learning, exercised through organizational processes that ensure superior coordination of functional activities (Day, 1994). One capability is stated to be critical in developing successful businesses: the market-sensing capability, which is essentially the ability of the organization to be aware of change in its market and to forecast accurately responses to its marketing actions (Day, 1994). According to current literature, market-sensing capabilities refer to a firm's ability to use market intelligence that can be obtained through formal and informal mechanisms from various personal and public sources (Maltz and Kohli, 1996; Menon and Varadarajan, 1992; Moorman et al., 1992). Generally, market-sensing capabilities are critical in developing market focus and thus, ultimately, company performance (Day, 1994). Day (1994) has stressed the need to conceptualize market-sensing as an organizational learning capability to advance strategic marketing by learning about customers, competitors, and channel members with a view to acting on events and trends in markets and provide accurate forecasts for performance. Huber (1991) has also described market-sensing as the capacity of a firm to acquire and disseminate knowledge, and to use market information for organizational change as required.

Forecasting refers to utilization of the gathered and interpreted information in decision-making. Through forecasting, the intangible information and knowledge is turned into visible marketing action. Day (2002) underlines that the processes for market-sensing are more systematic, thoughtful, and anticipatory in market-oriented firms than they are in other firms, in which these processes tend to be ad hoc, reactive, constrained, and diffuse. Following Day (2002), it can be assumed that organizations that have mastered the market-sensing activities gain competitive advantage and superior business performance. In other words, an organization's ability to learn

about its market environment and use this information appropriately to guide its actions is the key driver of business performance (Vorhies and Morgan, 2005).

In 1890, Chamberlin (reprinted in Chamberlin 1965) claimed that sciences that use multiple competing hypotheses progress more rapidly than those that do not. Empirical research since then (summarized by Armstrong, Brodie and Parsons 2001) supports this claim. Armstrong asserts that the value of a method should be judged by comparing it with other methods. Sherlock Holmes commented on this issue: "I don't mean to deny that the evidence is in some ways very strongly in favour of your theory. I only wish to point out that there are other theories possible," (Doyle, Adventure of the Norwood Builder, 1905).

Competing methods should be reasonable, but how can one judge this without working with practitioners? It is acknowledged that selecting reasonable alternative methods requires knowledge of the forecasting literature. Textbooks provide descriptions of forecasting methods and experts can provide advice about them. Sometimes alternative methods are used but they may not be reasonable. According to evidence summarized in Armstrong (1984), simple extrapolation models (such as the naive model that "things will not change") are often accurate. Winklher et al. (1996) note that researchers often fail to use reasonable alternative methods in their tests. Armstrong (1979), in an examination of empirical papers published in Management Science from 1955 through 1976, found that only 22 percent used multiple competing hypotheses. Armstrong, Brodie and Parsons (2001), in a study of five leading marketing journals from 1984 through 1999, found that less than 15 percent of the empirical studies examined reasonable alternative hypotheses.

Relative to other areas of management science, forecasting appears to have a decent record with respect to comparing alternative approaches, but all this in laboratory situations. Armstrong coded a sample of 105 empirical papers published by the Journal of Forecasting and the International Journal of Forecasting and found that 58 percent of these examined reasonable competing hypotheses (Armstrong 1988). He concluded that one can evaluate a forecasting method by examining its inputs or its outputs. While this might seem obvious, it has long been the subject of debate. Friedman (1953) claimed that testing outputs is the only useful approach to evaluating methods. Nagel (1963) criticized Friedman's position. Machlup (1955) claimed that

testing inputs is the only worthwhile way to test methods. Researchers have concluded that it seems reasonable to test both inputs and outputs. The primary reasons for testing inputs are to learn how to improve a given model and, in the case of causal models, to better assess the effects of policy changes. The major reasons for testing outputs are to select the best models and to assess uncertainty. However, tests of inputs may show that one model is inferior to another, and tests of outputs may provide ideas about how to improve the model. In the proposed study, both inputs and outputs will be tested.

In a new and practical heuristic for Master Production Scheduling (MPS) creation Vieira and Favaretto (2006) provide some research insights into MPS following earlier studies by Higgins and Browne (1992), Raffish (1981) and Moran (1986) which stated that very little research has been published on MPS development in either a make-to-stock or make-to-order environment. This continues to be the case and can be seen in the difficulty in finding new studies in this area. In the use of focus forecasting, Brownlees and Gallo (2008) wrote a paper concerning issues of modeling and projecting the dynamics of volatility when a group of potentially useful predetermined variables is available using, financial econometrics literature. Vieira and Ribas (2008) used simulated annealing (an artificial intelligence optimization meta-heuristic) to generate good solutions in reasonable computer time for MPS problem. Fok and Franses (2001) proposed a simulation-based forecasting method which results in unbiased forecasts of market shares as an alternative to dividing of brand sales by a forecast of category sales, when they are generated from brand specific sales-response models, which renders biased forecasts of the brands' market shares.

In their study, Fildes and Makridakis (1995) confine themselves to the performance of time series analyzing and forecasting. Also, in their study, Berg, Nelson and Rietz (2003) confine themselves to analyzing the standard error of prediction markets for forecasting purposes; and Flores, Olson and Pearce (1993) attempt to identify a suitable forecasting method for inventory control decisions encountered by electronics warehouses.

The term "focus forecasting" was coined by Smith (1978) to describe a heuristic methodology that appears to be widely used in practice. The basic idea is to specify a set of alternative

decision rules for forecasting one step ahead. All rules are tested each time period. The rule that yields the smallest error in the current period is selected to make the forecast for the next period. No recommendation is made to combine forecasting strategies. Gardener and Anderson (1997) compared the accuracy of damped-trend, seasonal exponential smoothing, for cookware demand, to a focus forecasting system drawn from Flores and Whybark (1986) to reaffirm two conclusions by Fildes et al (1998) that damped-trend, seasonal exponential smoothing were substantially more accurate than either the simple Flores-Whybark focus forecasting. Again, in this case, no combination of forecasting strategies was tested.

Yokum and Armstrong (1995) conducted two studies which highlighted that researchers rated higher accuracy than did practitioners, educators and decision-makers. Decision-makers rated implementation-related criteria, such as "ease" criteria, relatively higher than the other groups. In the second study, forecasting experts significantly varied their ratings on six of seven criteria. In prior studies by Collopy and Armstrong (1992) accuracy was rated as important relative to other criteria such as ease of interpretation, cost/time, and ease of use. Hughes (2001) in forecasting practice: organizational issues, conducted a survey expanding on earlier studies which suggested a re-location of the forecasting function within the organization focusing on the role of forecasting in changing organizational structures as organizations adapt to meet the business needs of their customers. Hughes does not address the issue of how forecasting approaches are combined by management in firms.

Lawrence et al (1986) empirically examined the improvement in accuracy which can be gained from combining judgmental forecasts, either with other judgmental or with quantitatively derived forecasts by experiment. The time series to be forecast were the 68 monthly series in the M-Competition (Makridakis et al. 1982). This database included seasonal and nonseasonal, microeconomic and macroeconomic and demographic series. The judgmental data were those developed in Lawrence et al. (1985). This study showed, like in Makridakis and Winkler (1983) that the accuracy of combinations of forecasts is generally always greater than that of their constituent forecasts, and the accuracy improves as the forecasts of more methods are combined. It was also noted that for accuracy to improve, judgmental forecasts should be combined mechanically rather than intuitively, which supports and extends the conclusions suggested by

Einhorn (1972) and the bootstrapping literature in general (Ashton 1982) as well as Carbone et al. (1983). However, it is still not clear how management in manufacturing firms actually choose to combine forecasts.

Moon M.A. et al (1998) emphasize the use of tools wisely, relying solely on qualitative or quantitative methods and understanding the cost/benefit of additional information. Fildes and Hastings (1994) developed an "idealized" forecasting system that can serve as a diagnostic tool for identifying potential distortions based on the fact that the organization and staff support given to market forecasting will determine how effective an organization is in dealing with the environmental uncertainty it faces. They state that a particular organizational design may collect or ignore particular data sources, encourage or inhibit certain intra-organizational information flows, reward or ignore an employee's forecasting performance.

Hughes (2001) studied the role of forecasting in changing organizational structures in the electronics industry. He expanded on earlier studies which suggested the need for a re-location of the forecasting function within the organization; while Gardner et al. tested further results on focus forecasting versus exponential smoothing against demand solutions, a more sophisticated version of focus forecasting using five time series of cookware demand from a production planning application and 91 time series from the M-Competition study of forecast accuracy and found that exponential smoothing is substantially more accurate than demand solutions. Frees Miller (2004) wrote a paper showing how to forecast using a class of linear mixed longitudinal, or panel, data models. Fork and Franses (2001): forecasting market shares from models for sales used an alternative simulated-based method which resulted in unbiased forecasts of market shares. An application of this forecasting technique to a five brand tuna fish market illustrated its practical relevance.

In Benchmarking Sales Forecasting Management by Mentzer, Bienstock and Kahn (1998) the researchers examined the four sales forecasting approaches: independent approach in which each functional department involved in the sales forecasting process develops its own forecasts for its own internal uses, independent of all other departments; concentrated approach, in which one department is assigned the responsibility for developing the sales forecasts and all other

departments must use the results; negotiated approach, in which each functional area makes its own independent forecast, but representatives from each area get together every period to reach negotiated final forecasts; and consensus approach, in which a common committee develops the forecasts, with representatives from various functional areas and one person in charge. Discussing the relative advantages and disadvantages of each of these, Mentzer and Kahn concluded that the state of sales forecasting management was generally improving. More companies, they found, were using the negotiated and consensus approaches rather than the independent approach. Mentzer and Kahn did not study how management actually combines different forecasting methods.

Moon, Mentzer and Smith (2003) described a method for conducting SF audit, the goal of which is to help a company understand the status of the SF process and identify ways to improve those processes.

In the study by Mbeche and Yego (1996) on 29 large manufacturing firms in Nairobi, they posit that subjective methods are still predominant in the field of SF. The research indicated that overall, the subjective methods of SF are more popular and are commonly used than quantitative ones.

In forecasting demand in health services, Iraya (1983), "The Case of University of Nairobi", the study indicated that the attendance pattern could be time dependent for all the clinics. The highest demand occurred mostly during June/July while the lowest demand occurred during December of each year. The time series model Y = bo + bt was developed and validated. It was found that the model had a predictive power ranging from 95.47 percent to 71.78 percent. The F test showed that 12 out of 13 models were time dependent and thus justified the use of time series analysis. The overall model had a predictive power of 91.17 percent. The number of patients attending the clinics on a monthly basis could be predicted accurately in the short term. The method of the data collection and the accuracy of the data used were questionable by the researcher, as the attendance records in some clinics were not well kept. In some cases, there were missing data; this affected the validation of some models. The closure of the university from October 1991 – March 1992, meant that some clinics were not operational. This could have affected the predictive power of the models.

In Chepkoit's (1992) study of the sugar industry it was found out that sugar demand patterns could be modeled using forecasting techniques - decomposition method - by developing forecasting models for the sugar depots in the country. The study came up with 34 models representing each depot. The models had a high predictive power and therefore could be used to forecast sugar demand at the depots. Comparison of the actual sugar sales and the predicted sales revealed that results of the individual models were very close to actual sales. The deviation between the actual and the predicted demand was minimal, thus confirming the strength of the models to predict accurately. However, gaps in this study were the technical expertise required to implement the models and the study relied entirely on secondary data. Further, the use of depots as the final consumption point for the sugar is questionable when in the real sense the final point of sugar distribution is the retailer.

The literature review undertaken provides knowledge gaps that are summarized below.

Table 3: Identified Knowledge Gaps from Empirical Review

Researcher	Knowledge Gaps	Action as per Proposed Study
Armstrong (2001)	Need for obtaining information from similar series of cases to address combination forecasting accuracy.	To be addressed in the proposed study.
Winklhofer et al (1996)	Practical study needed with operating firms on forecasting combination strategies.	To be addressed in the proposed study.
Mady (2000)	Few qualified forecasting personnel are available and computers are not used in sales forecasting by most companies.	To be addressed in the proposed study.
Makridakis and Winkler (1983)	For accuracy to improve, judgmental forecasts should be combined mechanically rather than intuitively.	To be tested by the proposed study.
Einhorn (1972), Ashton (1982) and Carbone et al. (1983)	To improve forecasting accuracy, forecasting methods should be combined in firms.	To be addressed in the proposed study.

Lawrence et al. (1986)	Check improvement in accuracy which can be gained from combining judgmental forecasts, either with other judgmental or with quantitatively derived forecasts.	Proposed study to address this.
Brownlees and Gallo (2007)	Assess the performance of volatility forecasting using focused selection and combination strategies to include relevant explanatory variables in the forecasting model for realized volatility.	Proposed study to lay foundation.
Silver (2002)	Heuristic solution methods: Use of combined mathematical models as an aid to decision making.	Not to be addressed by the proposed study.
Vieira and Favaretto (2006)	A practical heuristic for MPS creation in firms.	Not to be addressed by the proposed study.
Winklhofer et al. (1996)	To relate organizational and environmental variables known to affect forecasting to a wider range of issues.	Not to be addressed by the proposed study.
Winklhofer et al. (1996)	To explore the impact of additional firm-specific and environmental-specific variables on forecasting.	Not to be addressed by the proposed study.
Winklhofer et al. (1996)	To examine neglected inter-linkages between different aspects of organizational forecasting.	Not to be addressed by the proposed study.

2.6 Model Conceptualization

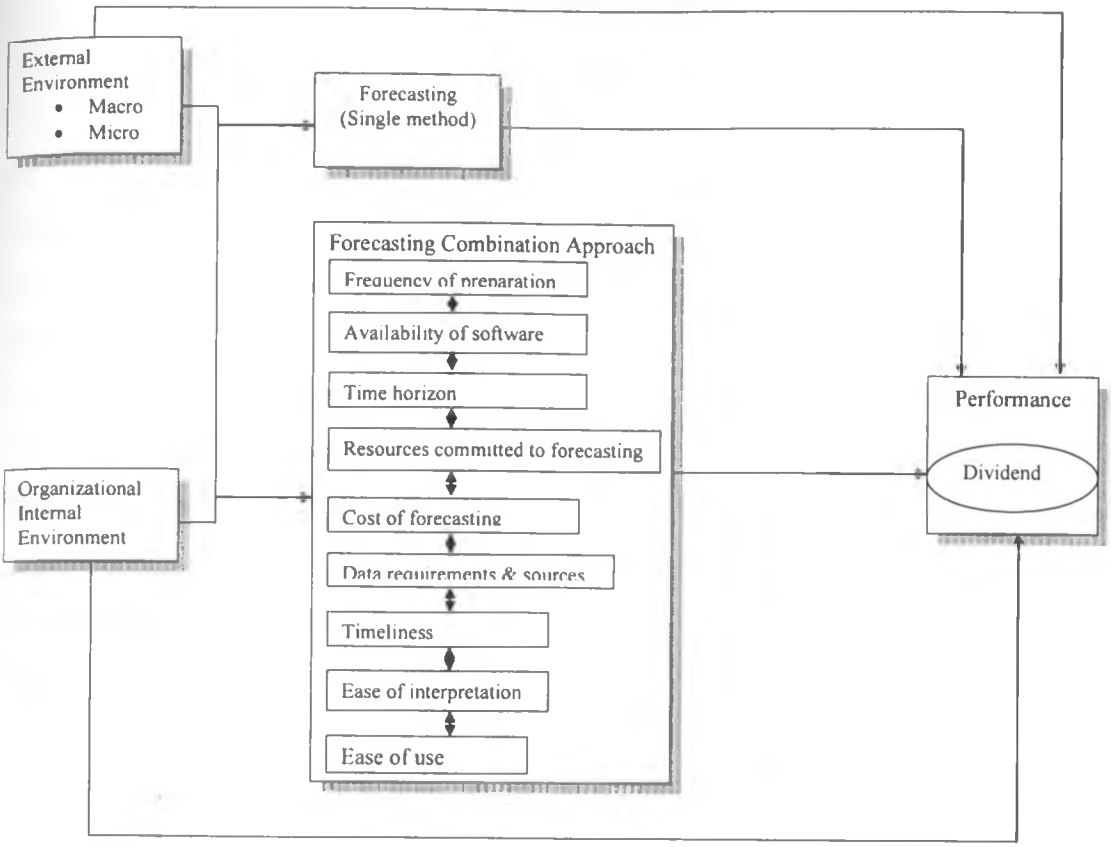
The SF model is conceptualized on a resource-based view of the firm which rests on the premise that the organizations' desired outcome is to achieve a sustainable competitive advantage that allows them to earn economic rent or above-average returns (Fahy and Smithee, 1999). The key to earning this reward is the possession of critical resources that are firm specific, valuable to customers, non-substitutable, and difficult to imitate, and that lead (if deployed effectively) to a sustainable competitive advantage (Barney, 1991; Foley and Fahy, 2004; Fahy and Smithee, 1999). This perspective emphasizes firm-specific capabilities and assets and the existence of

isolating mechanisms as the fundamental determinants of firm performance. Capabilities have been defined as complex bundles of skills and collective learning, exercised through organizational processes that ensure superior coordination of functional activities (Day, 1994). The variables of interest in forecasting are interlinked and previous examination has established their effect on the accuracy of SF and performance in organizations. Further, the effects of the external and internal environments have been shown to impact the type of SF strategy deployed in an organization. Research analyses have also shown that combining different forecasting methods results in more accurate SF than using only one method of SF. Figure 3 captures the various variables of the study - the variables of interest that will determine an appropriate SF combination approach are frequency of preparation, availability of software, time horizon, resources committed to forecasting, cost of forecasting, data requirements and sources, timeliness, ease of interpretation and ease of use. These variables are interlinked as they have an impact on each other and on the decision maker. The model suggests that the accuracy of combined SF approach is mainly determined by the nine variables as highlighted.

2.7 Conceptual Framework

Figure 3, below, captures the various variables of the study; the variables that will determine an appropriate combination approach are highlighted under Forecasting Combination Approach. These variables are interlinked as they have an impact on each other and on the decision maker. The dependent variable is the Performance of firms. In the past, researchers have carried out studies on these linkages by examining the effect of each individual variable on forecasting accuracy and hence firm performance (Granger 1974; Bunn 1979; Makridakis and Winkler 1983). Mentzer and Cox (1984) and Lawrence (1983) posited that combination of judgmental and quantitative forecasts is a promising area for further research. The testing of the individual variables has been extensively done and these will be tested again to confirm if the study will obtain the same results based on practical combinations of SFs by management in large manufacturing firms in Kenya.

Figure 3, Conceptual Framework: Forecasting combination strategies of the large manufacturers in Kenya



Elements under Organizational Internal Environment: Leadership, Strategy, Structure and Organizational culture.

SF using either a single method or combination approach is impacted by both the external and internal organizational environments. The accuracy of SFs will depend on the robustness of the SF approach used.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter will describe and outline the research methods to be used to test hypotheses. In particular, the section will describe the research design, population of study, sampling design, data collection instrument, measurements, data analysis and analytical models to be used. Various research findings have been reported in the context of SF and analytical models indicated. The results of this study will focus on enhancing the understanding of the linkage between SF and dividends accruing to shareholders in large manufacturing firms in Kenya.

3.2 Research Design

The research design will be guided by two major schools of thought which are positivism and relativism or phenomenology. Phenomenology is a philosophy of science that focuses on immediate experience, open and unstructured interviews, and introspective reports that are typical procedures. Positivism is a philosophy of science that seeks facts of social phenomena with little regard for the subjective status of individuals.

In this study, the research methodology will involve triangulation, which is a blend of positivism (quantitative research) and phenomenology (qualitative research). Both approaches are contingent upon the nature of the phenomenon under investigation (Morgan & Smircich 1980).

The positivism philosophy will guide the observer as he will be independent of what is being observed; the choice of what to study is determined by the objective criteria; science proceeds through a process of hypothesizing fundamental laws and then deducing from observations which demonstrate the truth or falsify of these hypotheses; concepts need to be operationalized in a way which enables facts to be measured quantitatively and select samples of sufficient size to enable generalization of results to the population. For the study, observations will be determined by objective criteria with the intent to determine, where possible, causality of the subject matter. This will facilitate empirical testing of hypotheses, which have been derived from either existing or postulated theory. This approach will seek to determine the relationships between SF and performance using a single SF method and that between SF and performance using combination

strategies. On the other hand, phenomenology will be used to develop real understanding of the phenomenon (meaning) through in-depth interviews. This approach will seek to understand the implementation aspects of SF approaches, that is, how forecasting methods are combined practically in order to achieve accuracy.

The benefits of both methodologies will be to enrich the study by applying their complimentary roles. Having used triangulation at the philosophical level of research, the practical level will involve both quantitative and qualitative research methods - Morgan and Smircich (1980) argue that the dichotomy between quantitative and qualitative methods is a rough and oversimplified one. The units of analysis will involve departments responsible for managing the forecasting and planning processes in firms. The respondents will include sales and marketing managers, production managers, finance managers and corporate planning managers (where applicable). The study will therefore, adopt a descriptive correlational survey and direct measurements in which variables will not be controlled or manipulated, but will be measured as they naturally occur in order to help the researcher to describe and establish relationships between the variables (Reeves, 1992), namely, SF practices, SF combination strategies and organizational performance, that is, dividend.

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