

Full length Research Paper

An empirical investigation of selected strategy variables on firms performance: A study of supply chain management in large private manufacturing firms in Kenya

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Accepted 17 May, 2011

This paper focuses on the joint effect of selected strategy variables on performance of large private manufacturing firms of the supply chains in Kenya. To guide the study, two specific objectives have been used namely: 1) to determine the independent effects of core competencies, strategy, strategy implementation and core capabilities on firms performance, 2) to determine the joint effect of core competencies, strategy, strategy implementation and core capabilities on firms performance. Hypotheses are tested through the analysis of both the independent and joint effects of the variables on firms' performance. There is empirical evidence that the independent effect of core competencies, core capabilities, strategy, strategy implementation on firms performance is weaker compared to the joint effect of the same variables. A sample of about 52 large private manufacturing firms of the supply chains which are members of Kenya Association of Manufacturers is used.

Key words: Supply chain management, manufacturing, firms' performance, strategy, Kenya.

INTRODUCTION

In this paper the effect of selected strategy variables on corporate performance in supply chain management has been examined which includes competencies, strategy, strategy implementation, capabilities amongst many other study variables. In formulating supply chain management (SCM) strategy, recognition of a strategy of acquiring supplies to offset uncertainties in product supply or product distribution for an organization has been made. It involves making decisions that set and guide resource allocations for the total enterprise within the value chain. There is a growing recognition that SCM strategies embedded in large firms are strategic sourcing, partnering, lean manufacturing, communication, postponement, responsiveness and outsourcing. These can be effective tools to satisfy demanding customers and other stakeholders. There is also increasing evidence that most of the large firms in the supply chains have a long way to go before they can realize their full potential for a truly linked SCM system (Kilpatrick et al., 2000; Harps, 2000). In this paper strategic management has been considered from the economist and management perspective, as the

ability to perform better than competitors when core capabilities, core competencies, strategy and implementation are matched with performance in a supply chain (SC) environment. The main concern is whether a firm is capable of performing well in uncertain environment where performance indicators are not known and cannot be predicted with accuracy. The process of creating a match between competencies, capabilities, strategy and performance is the most challenging in such a scenario. Having joint SCM systems probably is an effective approach to achieving synergy. Hamel and Prahalad (1994) provided a handbook on how to think strategically, focusing on leadership, strategy, and the changing market environment. They state that strategy is both a process of understanding and shaping competitive forces, and a process of open-ended discovery and purposeful incrementalism. Firms need to exercise leadership and create their future to enact them by being better and especially different, change the rules of the game, reduce boundaries, blur the lines, create new industries lead and influence, control the firm's destiny by

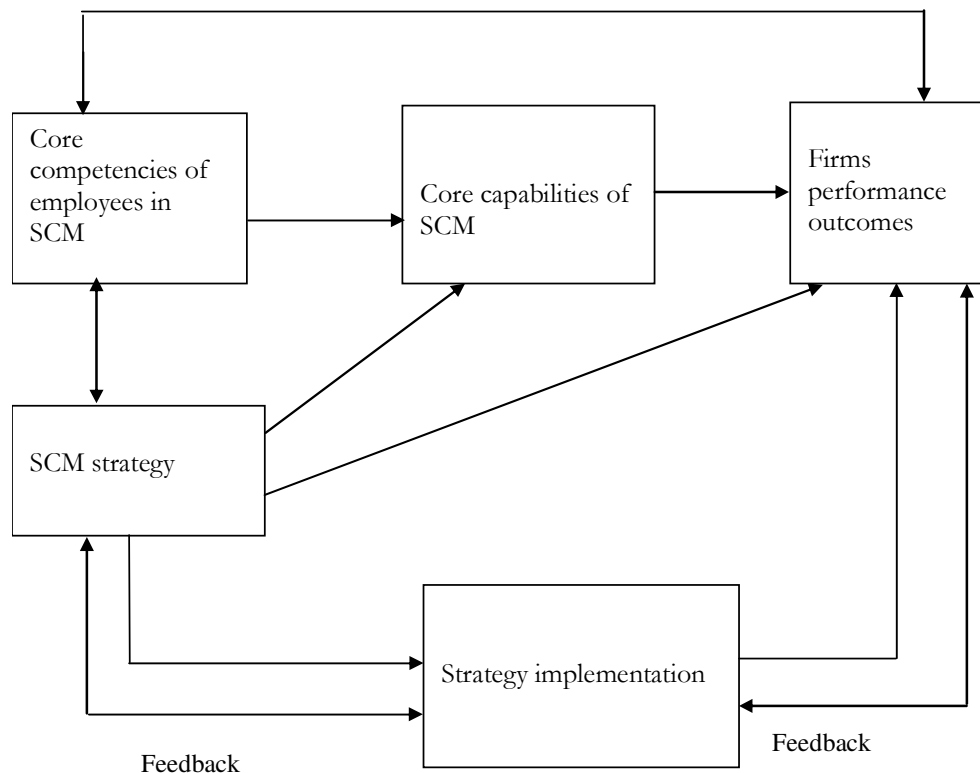


Figure 1. Supply chain management framework.

influencing change in the industry.

The view of scholars' strategy is to unclean the past, have foresight, and leverage core competencies. Stable value chains do not exist. Companies need to build new profit engines, forge alliances, experiment and learn. Strategy is now more about competing for position in tomorrow's industry than competing within today's Industry. An important implication for SCM is that business strategies are evolving and changing, making it important to constantly monitor and adjust SCM strategies, plans and measurements to ensure alignment to evolving corporate strategies. Segmentation and differentiation often require companies to support multiple strategies, which can be confusing and confounding to SC managers. SC managers pay increased attention to being effective, not just efficient. Planning follows the articulation of strategy. Planning has been defined as a deliberate process to produce systematically a preconceived outcome based on inter-linked system of decisions (Mintzberg, 1994). Planning the design of the SCM system historically focused on inventory policy, facility location and transport selection/routing (Ballou, 1993). Today, SC planners are also concerned with sourcing, outsourcing and interlinked information systems that extend beyond the direct or unilateral control of the firm. These planning activities include tasks and relationships. Segmentation and mass customization strategies have added complexity. Cycle time compression and customer-mandated quality in

execution have created a need for urgency and precision in planning.

Several major initiatives confront planners: asset productivity, horizontal management, information substitution, linkage planning and system flexibility (Perry, 1991).

Conceptual development

One major stream of research dominates the SCM strategy literature: the effect of competencies, capabilities, strategy formulation and implementation on firms' performance. Literatures have been reviewed in line with the schematic framework (Figure 1). Emphases have been put on how variables interact in the SCs of large manufacturing firms. The test of the variables have been done in two phases. Phase one provides a roadmap where independent variables of core competencies, core capabilities, strategy, strategy implementation, independently interact with firms performance. These variables have been tested and their relationship determined using advanced statistical techniques. In phase two, the joint effect of core competencies, core capabilities, strategy, strategy implementation, on firms performance have been tested.

A feedback loop is provided to evaluate the performance measurement. In essence, the study sought to

establish the additive effect of the study variables jointly if any on firms' performance across the SC as opposed to their independent effect. The two phases were necessary to compare the correlation of variables in accordance with the objectives of the study. The current research developed a mathematical model of SCM based on the study hypothesis. In this paper null hypotheses have been explored to support the study:

Variables with independent effect

H₀₁: Core competencies have no independent effect on firms performance.

H₀₂: Core capabilities do not have independent effect on firms performance.

H₀₃: Strategy does not have independent effect on firms performance.

H₀₄: Strategy implementation does not have independent effect on firms performance.

Variables with joint effect

H₀₅: The joint effect of core competencies, core capabilities, strategy and strategy implementation on firms performance is not greater than the sum total of the independent effects of the same variables on firms performance. The mathematical model was used to analyze the performance of large private manufacturing firms from antecedent of linkages between SC core competencies, SC strategy, the strategy implementation process, SCM core capabilities and firms performance, using linear regression analysis. The regression model assumes the following equations:

H₁: Firms performance = f (constant term + core competencies + error term).

$$P = \alpha + \beta_1 X_1 + \epsilon.$$

H₂: Firms performance = f (constant term + core capabilities + error term).

$$P = \alpha + \beta_2 X_2 + \epsilon.$$

H₃: Firms performance = f (constant term + strategy + error term).

$$P = \alpha + \beta_3 X_3 + \epsilon.$$

H₄: Firms performance = f (constant term + strategy implementation + error term).

$$P = \alpha + \beta_4 X_4 + \epsilon.$$

H₅: Firms performance = f (constant term + core competencies + core capabilities + strategy + strategy implementation + error term).

$$P = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon.$$

Where P is denoted as dependent variable of firms performance and independent variables are:

X₁: Core competencies of SC,

X₂: Core capabilities of SC,

X₃: Strategies used in SC,

X₄: Implementation of SC strategy,

X₅: Core competency, core capabilities, strategy, strategy implementation.

α : Constants term,

β : beta coefficients,

ϵ : Error term.

The model presents a simplified approach of the linkage between competencies, strategy, implementation of strategy, capabilities and firms performance. This model explains the effect of the selected strategy study variables on performance in the work environment of the manufacturing sector in a developing economy like Kenya.

Effect of selected strategy variables on firms performance

The independent effect of core competencies, strategies and strategy implementation process and core capabilities on firm's performance may also create competitive advantage for a firm, but nevertheless, over time may be imitated by competitors. They may be more robust and difficult to imitate if they relate to the firm's value chain and supply, and distribution chains (Johnson and Scholes, 1999). It is the management of these linkages which provide leverage and levels of performance that is difficult to match. The major variables of SCM that affects firms' performance independently are core competencies, strategy, strategy implementation and core capabilities. Stalk et al. (1992) underscore the importance of this linkage. They observe that competencies and capabilities represent two different but complementary dimensions of an emerging paradigm for firms' strategy (Figure 2). Competencies relate to skills, knowledge and technological know-how that give a special advantage at specific points of the value chain, which in combination with strategy, form core capability of a firm. This in turn enhances firms performance, creates synergy and competitive advantage. Indeed, increased outsourcing to fewer suppliers managed using collaborative techniques can be characterized as a means of achieving the adventures of SCM without owning the means of production and the inherent risks of advances in technology or changes in law (Rich and Hines, 1997). The pressure from customers and financial markets has increased managerial recognition that companies cannot be effective by trying to be all things to all customers and should focus on limited set of core competencies (Fine,

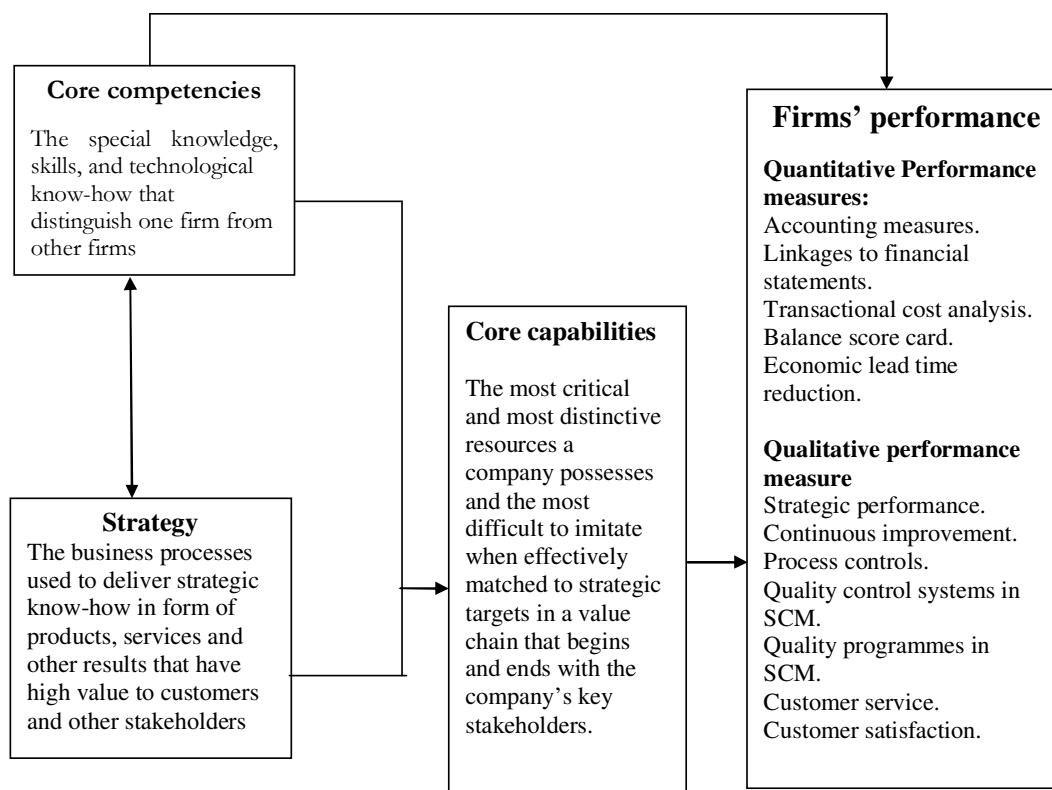


Figure 2. Competencies, strategy, capabilities and Performance framework. Source: George et al. (1992). Harvard business review, March to April issue.

1999; Cox, 1999).

The more a company concentrates on core competencies, the more it believes that other firms are better placed to manage some parts of the company thereby raising the profile of the SCM (Das and Narasimhan, 1999; Cox, 1999). Fine (1999) considers effective SC to be the ultimate core competence and is critical to company successful performance (Quinn, 2000). Core capabilities, therefore, are the most distinctive resources a company possesses and the most difficult to imitate when effectively matched to strategic targets in the value chain that begins and ends with the company's key stakeholders. In addition to the management of the aforementioned linkages, competitive advantage may also be gained by the ability to complement or co-ordinate the firm's own activities with those of suppliers, channels or customers through SCM best practices (Porter, 1985). This attempts to improve performance through ownership of more parts of the value system, making more linkages external to the organization. The linkages in the SCM therefore form an integral part of this paper. The linkage between core competencies and performance is widespread and is not specific to any industry. The force of core competencies is felt as decisively in service as in manufacturing industry. Prahalad and Hamel (1990) posit that competencies are the roots of competitiveness. They observe that in the short run, a company's

competitiveness derives from the price/performance attributes of current products. In the long run, competitiveness derives from an ability to build, at lower cost and more speedily than competitors, the core competencies that spawn unanticipated products. The real sources of competitive advantages are to be found in management's ability to consolidate corporate-wide technologies and production skills into competencies that empower individual businesses to adapt quickly to changing opportunities thus enhancing corporate performance.

Johnson and Scholes (1999) observe that the ability of an organization to co-ordinate the activities of specialist teams or departments may create competitive advantage and improve performance by improving value of money in the product or service industry. Specialization of roles and responsibilities in most organizations is one way in which high levels of competence in separate activities and divisions is guaranteed. The management of strategy independently in the value chain could enhance performance in a number of ways. For instance, there may be important linkages between a primary activity and a support activity and between different support activities.

Porter (1985) describes how selected strategy variables in the value chain link together to enhance corporate performance by creating value and customers satisfaction (Figure 3). Porter (1980) presents an approach to strategy, combined with a tool-kit for practitioners. He

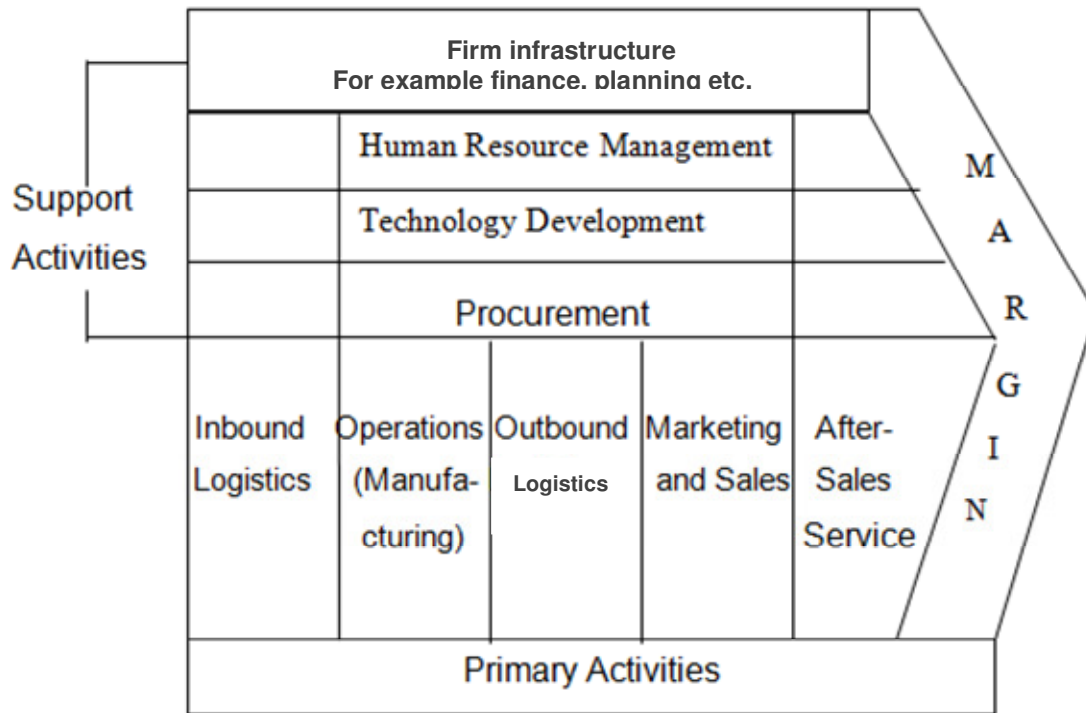


Figure 3. The value chain model. Source: Porter and Michael (1985). *Competitive advantage: creating and sustaining superior performance*. New York: Free press.

describes five forces that drive industry competition: potential entrants, suppliers, buyers, industry competitors, and substitutes. He reports entry barriers to be scale, differentiation, capacity requirements, switching costs, distribution channel access, raw material access, government policy, and retaliations. He describes exit barriers as being economic, strategic and emotional. All these factors should be considered in evaluating strategic choices. He imparts three generic strategies for competition: low-cost, differentiation, and focus. He warns firms against getting "stuck in the middle" with a half-hearted mix of options, not emphasizing one of the three strategies. He states that the strategic choices cannot be pursued simultaneously, but they can be pursued sequentially, as opportunities dictate.

Porter (1980) describes four diagnostic components to developing strategy: future goals that drive it, current strategy (or what the firm is doing and can do), assumptions about itself and the industry and capabilities. Porter (1980) recommends a strategy to seek the most favourable buyer; build up buyer switching costs; and reduce costs to switch from suppliers. Other studies which have been examined in this paper have also discussed the effect of selected strategy variables on performance, and a number of conclusions drawn. Caeldries and van Dierdonck (1988) did a study on effect of strategy and performance of 82 Belgian firms. They established the relationship between strategy and performance. They concluded that strategy enables the firm to strengthen its

competitive position externally; they further observed that for the internal functioning of the organization, strategy facilitates the linkage and co-ordination of members' behaviour. According to Prahalad and Hamel (1990) and Barney (1991) they define core capabilities as complex bundles of skills and collective learning, exercised through organizational processes that ensure co-ordination of functional activities. In their study they concluded that strategic importance of core capabilities lies in their demonstrated contribution to sustainable competitive advantage and superior profitability. Varadarajan et al. (1995) in another study of large firms in UK found that the linkage of key variables within SCM, can lead to competitive advantage by enabling the partner to perform various value chain activities better and at lower cost and/or in a way that leads to differentiation. Stanley and Magnan (2001) in an examination of strategy in the large private manufacturing companies in US realized that SCM is different from most commercial studies in that it is inherently cross-functional and inter-organizational. Most SCM strategies are not owned by the purchasing organization but other organizations within the SC that also provide the required linkages towards the overall organizational performance. Another study by David (1997) indicates that sound SCM policies, proper resource allocation, good corporate culture, proper management of conflict and resistance to change are key considerations in strategy implementation process and may act as an impediment to successful

implementation if not checked.

Measure of firms performance in SCM

Measurement of performance of large firms is based on both quantitative and qualitative performance indicators. The SC efficiency and effectiveness are two major concerns for SCM scholars. This will be discussed subsequently in the study.

Quantitative performance measures

Armitage (1987) presents a management accounting technique for measuring and improving efficiency and effectiveness in distribution operations. Rhea and Shrock (1987a, b) defined physical distribution effectiveness and presented a framework for the development of SCM performance measures for distribution of customer service programs. They made an important distinction between effectiveness determinants (that is, customer satisfaction) and effectiveness dimensions, such as timeliness and accuracy. Harrington et al. (1991) provided a formal vendor performance measurements model that used defined criteria and weighted scores to assess the performance of suppliers. The model was tested and successfully implemented. Chow et al. (1994) provide a summary of SCM performance measurement literature published in five leading SCM journals between 1982 and 1992 focusing on accounting techniques. Generally, the literature found that firms tend to focus on their own internal performance, and are especially concerned with efficiency measures. Discussions of SC performance measures were noticeably absent.

Additional other aspects quantitative measures of SCM with accounting measures (Kaplan, 1984; Eccles and Pyburn, 1992; Speh and Novack, 1995), cost and effect (Kaplan and Cooper, 1997), balanced scorecards (Kaplan and Norton, 1992), economic value added and shareholder value (Glassman et al. 1997), the total cost/value model (Cavinato, 1992), linkages to financial statement (Cavinato, 1989), the stakeholder approach (Atkinson et al., 1997), transaction cost analysis (Rindfleisch and Heide, 1997) and the economics of lead-time reduction (Wouters, 1991).

Qualitative performance measures

Qualitative measures in SCM are the second major area covered by the literature. Topics include strategic performance (Chakravarthy, 1986), continuous improvement performance measures (Fortuin, 1988), process controls (Novack, 1989), design (Stevens, 1989; Perry, 1991) and flow analysis (Scott and Westbrook, 1991; Farris, 1996), quality control systems (Hillman et al., 1990) and quality programmes in SCM (Read and Miller 1991), outsourcing (Aertsen, 1993; Foster, 1998; Fawcett

and Clinton, 1996). Customer service has become a crucial measure of competitiveness in markets throughout the world. As competition gets more intense, service quality is seen as a primary determinant of overall customer satisfaction. The need to achieve service excellence in markets characterized by shrinking margins and tight budgets has created a powerful challenge for SCM. The challenge is to balance these operational realities with the need for quality customer service. Service quality can be managed effectively, even when market conditions are difficult and resources are limited, if the organization can focus on a limited number of high-priority SCM service features (La Londe and Cooper, 1988). One study presents a customer's perspective on product and information flows (Rhea and Shrock, 1987b). Another study presents a technique for the evaluation and management of customer service quality (Harding, 1998). Customer satisfaction has been shown to depend directly on performance measurement of effective order fulfillment (Davis, 1998).

Benchmarking topics abound, especially in the trade press. Most SC managers want to have a guide to what to measure, and to compare their own operational performance to that of their competitors, or to a "best-in-class" model. Various benchmarking articles are concerned with the values of performance measures and not the numerators and denominators of them, leaving the comparability and validity of the values at question. One notable exception to the emphasis on content rather than process benchmarking is found in the efforts of the SC Council (Pittiglio et al., 1994).

METHODOLOGY

In this study positivist philosophical orientation or paradigm in the philosophy of science has been applied. The positivists tend to assume that a single, objective reality exists independent of what individuals perceive; they share the fundamental belief that the material world of tangible objects does not exist unperceived. They place a high priority on identifying causal linkages between and amongst variables. The positivists views involves: a) the observation of real world facts or phenomena, b) the formulation of explanations for such facts or phenomena using inductive processes, c) the generation of predictions about real world phenomena using the previously formulated explanations and deductive processes, d) the attempted verification of these predictions through systematic, controlled experimentation or observation. In view of this approach, the survey method was used to obtain the empirical data to determine the linkages between variables.

Population

The target population was basically all large private manufacturing entities in Kenya, who are members of Kenya association of manufacturers (KAM). The main reason for this choice was that these firms were likely to exhibit elaborate SCM philosophy and make use of best practices in SCM. Furthermore, the focus of the study was within the manufacturing sector, other sectors were considered to be outside the scope of this paper and could not reveal substantial data for statistical analysis.

Sample frame

In total, there are 2,000 companies in the Kenya Association of Manufacturers Directory (2004/2005), from which all public sector firms (where the government holds majority shares) and small companies were eliminated. This left 500 firms, which constituted the sample frame of the target population.

Sample

A survey of 52 large private manufacturing entities was carried out using a stratified sampling technique. This was necessary to include SCs with all the variables of the study for equal chances of selection. At least 10% sample of the population was considered generally acceptable method of selecting samples in such a study (Stanley and Gregory, 2001). In the current study, the sample was stratified into agro-based industrial sector, engineering and construction industrial sector and chemical and mineral industrial sector based on the value added by each sector to the manufacturing industry. For example, agro-based industrial sector added 68%, engineering and construction and industrial sector 12%, and chemical and mineral sector 20% (KAM, 2004). The sample size is denoted by:

$$n = n_1 + n_2 + n_3$$

$$52 \text{ firms} = 36 + 6 + 10$$

or,

n = Sample size.

n_1 = Agro-based industrial sector.

n_2 = Engineering and construction industrial sector.

n_3 = Chemical and mineral industrial sector.

The respondents in the study were located mainly in Nairobi Industrial and Baba Dogo areas in Kenya respectively, which form the bulk of manufacturing sector in the country. This is where most of the supply chain firms are located.

Data collection method

The study used primary data obtained through questionnaires with selected teams of managers involved in the SCM within the 52 manufacturing entities.

The questionnaire was piloted on 10 firms prior to data collection this was necessary to help the researcher identify any ambiguous and unclear questions. The researcher was available to clarify any questions that were not clear to the respondents. The questionnaires were then submitted to the participating firms after the pilot test with a letter of introduction from the School of Business, University of Nairobi and a covering note requesting the respondents to participate in the research in order to get the data and information required for this study. This was done with the help of research assistants who administered the questionnaires in a cross-sectional survey; they dropped them to the SC practitioners, logisticians, production managers and SC managers with written instruction on how to fill them and the duration of time required. They made prior appointments before the actual study and also assured the participants high degree of confidentiality and anonymity of responses. They later picked the questionnaires after they were filled by the respondents.

RESULTS AND DISCUSSION

Analysis of the effect of "selected strategy" variables on "firms performance".

Table 1. Simple regression analysis of SCM variables with independent effect.

Model	R ²	DF	F	P-value
H ₁	0.174	47	9.714	0.003
H ₂	0.248	47	15.204	0.000
H ₃	0.343	37	18.789	0.000
H ₄	0.118	48	6.303	0.016

The model was tested at 95% confidence level.

This was done using regression analysis in respect of the two research objectives and hypotheses.

Objective one

To determine the independent effects of core competencies, core capabilities, strategy and strategy implementation on firms performance. It was addressed by testing hypotheses one, two, three and four using simple regression analysis (Table 1).

H₀₁: Core competencies have no independent effect on corporate performance. The results reveal that 17.4% of the variations in corporate performance is explained by core competencies, with accuracy of 99%, nearly 82.6% is explained by other factors, the effect of core competencies, though significant, have low explanatory power on corporate performance. This means that hypothesis one did not accurately predict the outcome of the study, leading to rejecting the null hypothesis.

H₀₂: Core capabilities do not have independent effect on corporate performance. The results indicate that 24.8% of the variations in corporate performance is explained by core capabilities with an accuracy of 99%, nearly 75.2% is explained by other factors. In view of this, the effect of core capabilities, though significant, have low explanatory power on corporate performance which implies that hypothesis two did not accurately predict the outcome of the study, leading to rejecting the null hypothesis.

H₀₃: Strategy does not have independent effect on corporate performance. According to the analysis, there is indication that 34.3% of the variations in corporate performance is explained by strategy, with an accuracy of 99%, nearly 65.7% is explained by other factors. The effect of strategy, though significant, has low explanatory power on corporate performance, which implies that the hypothesis did not accurately predict the outcome of the study, leading to rejecting the null hypothesis.

H₀₄: Strategy implementation does not have independent effect on corporate performance. The results indicate that 11.8% of the variations in corporate performance is explained by strategy implementation, with an accuracy level of 99%, nearly 88.2% is explained by other factors. The effect of strategy implementation, though significant, has low explanatory power on corporate performance.

Table 2. Multiple regression analysis of SCM variables with joint effect.

Model	R ²	DF	F	P-Value
H ₅	0.522	36	8.734	0.000

The model was tested at 95% confidence level.

This suggests that the hypothesis did not accurately predict the outcome of the study, leading to rejecting the null hypothesis. These findings are similar to studies done by other scholars where emphasis was more on the independent effect of variables on corporate performance. Chandler (1962) looked at strategy and structure. Andrews (1971) did a similar study. Booker and Goodstein (1991) studied the relationship between environment and corporate performance. In all these studies, it was established that various variables have significant effect independently on performance.

Objective two

To determine the joint effect of core competencies, core capabilities, strategy and strategy implementation on corporate performance. This was addressed by testing hypothesis five using multiple regression analysis (Table 2).

H₀₅: The joint effect of core competencies, core capabilities, strategy and strategy implementation on corporate performance is not greater than the sum total of the independent effects of the same variables on corporate performance. The results show that jointly the variables explain 52.2% of the variation in corporate performance with accuracy of 99%, 47.8% is explained by other factors. There is evidence that the joint effect of the variables is greater compared to their independent effect. Furthermore, the joint effect is significant with a high explanatory power on firms' performance; the study therefore, rejects the null hypothesis.

SUMMARY AND CONCLUSIONS

Here the summary and conclusions on the findings are as follows: 1) there is evidence that the independent effects of core competencies, core capabilities, strategy, strategy implementation is relatively weaker compared to their joint effect. In contrast, previous studies did not address the effect of these variables jointly; they only considered the measurement of competencies, strategies, capabilities independently on performance (Caeldries and van Dierdonck, 1988; Johnson and Scholes, 1999; Day, 1994; Stanley and Magnan, 2001). This study has, however, provided an outcome where the effect of SCM variables can be measured jointly against firms performance in the large private manufacturing SC firms in Kenya. The study

has made attempts to establish the synergistic effect of the selected strategy variables. From the theoretical perspective, these variables can create competitive advantage in the value chain. Porter (1985) in addition to the management of the aforementioned linkage posits that competitive advantage may also be gained by the ability to complement or co-ordinate the organizations' own activities with those of suppliers, channels or customers through strategies used in SCM; 2) There is further evidence that SCM provides an environment where core competencies, strategy and strategy implementation process, core capabilities can be linked effectively within the value chain to enhance corporate performance, 3) the joint effect of core competencies, core capabilities, strategy and implementation has influenced firms performance by creating synergy in most of the large manufacturing organizations surveyed in the private sector in Kenya. As SCM variables, they support other findings in strategic management (Smit et al., 1993) where selected strategy variables has been used deliberately to achieve an enterprises mission and objectives by reconciling its resources with opportunities and threats in the business environment, 4) there is universal consensus that strategy formulation and implementation are fundamental in setting direction and objectives for the firm. This is critical to this paper which supports Ackhoff (1981) findings, who posits that environment is important to strategy formation and that strategy must be well-articulated. This is necessary to manage the dynamic changes within the environment, 5) this study's findings has been supported by other scholars. Varadarajan and Gunningham (1995) study of the large SC firms in the U.K. equally found selected strategy variables in SC can lead to competitive advantage, 6) the findings support the study of Stanley and Gregory (2001) that the implementation of strategy in large private manufacturing companies is inherently cross-functional and inter-organizational.

Most of SCM strategies are not owned by individual firms but also other organizations within the SC that also provide the required linkages towards the overall corporate performance of the manufacturing industry. They play a crucial role in the implementation of SCM strategies within the value chain process. To make the economy more vibrant and to improve productivity, proper corporate structure and governance need to be put in place where SCM competencies, strategy, capability, can be used to create synergy. In effect, no single variable can effectively influence firms' performance. An enabling environment is needed for the variables to operate jointly in order to improve socio-economic development for a country like Kenya and spur economic growth, the study concludes.

ACKNOWLEDGEMENTS

It please me to acknowledge the contribution of Prof.

Peter K' Obonyo, Dr. Gituro Wainaina, Dr. Martin Ogutu and Prof. Ganash Parasad Pokhariyal from the school of Business University of Nairobi for their valuable contribution to the previous drafts and ultimately in providing guidance and counseling to produce a paper of such magnitude.

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