

**SUPPLY CHAIN MANAGEMENT PRACTICES AND CHALLENGES
FOR THE SMALL SCALE TEA SECTOR IN KENYA**

KENNEDY O. MOENGA

SUPERVISOR: ONSERIO NYAMWANGE

**A Project Report Submitted in Partial Fulfillment of the Requirements for the award
of the Degree of Master of Business Administration (MBA) of the University Of Nairobi**

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DECLARATION

This management project is my original work and has not been presented for a degree in any other university.

Signed Date.....
Kennedy O. Moenga
D61/70925/2008

This management project report has been submitted for examination with my approval as a university supervisor.

Signed Date

Mr. Onserio Nyamwange
Lecturer, Department of Management Science.

DEDICATION

This project proposal is dedicated to my wife Doris Kwamboka and our children Brian Moenga, Nancy Gesare and Lovin Moraa for their patience, understanding and encouragement during the period I was away from home. Their combined support and constant prayers gave me the much needed energy and encouragement to continue working very hard up to the completion of the course.

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ABSTRACT

As the business environment becomes increasingly competitive, companies continuously look for ways to distinguish themselves from their competitors. Companies adapt different Supply Chain Management practices and philosophies to help them become competitive. However, they may face challenges that hinder attainment of the results sought. This study was carried out to establish the supply chain management practices and challenges for the small scale tea sector in Kenya. The study was conducted by taking a stratified random sample of all the categories of staff who work for the managing agent (KTDA Ltd) of the sector in Kenya. The categories of staff include Tea Extension Staff, Logistics staff, Factory staff and Head Office staff. Data was collected from the sample using a questionnaire and face to face interview for a few selected staff at the Head Office. The data collected was analyzed using mainly descriptive statistics for supply chain management practices and factor analysis for the supply chain challenges.

The study found out that, although the small scale tea sector appreciates good supply chain management practices, the same has not been put into practice. The sector has not established long term relationships with its suppliers who operate along its supply chains as was evidenced by the frequent seeking of suppliers through tenders. The supply chains in the sector were also found to be too long involving several stages which increase operating costs. The sector was found to face several challenges which threaten its long term growth and survival, the most worrying challenge being the continued rising labour and other operating costs. The sector and the tea industry in general, has always grown and contributed to the development of this country and therefore with some improvements in its supply chains and challenges, the sector can become very stable and competitive in the international markets.

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ABBREVIATIONS

EDI -	Electronic data inter change
GSCF-	Global Supply Chain Forum
ICT-	Information Communication Technology
JIT-	Just - In -Time
KTDA Ltd. -	Kenya Tea Development Agency Limited
KTGA-	Kenya Tea Growers Association
MRP-	Material Requirements Planning
MRP II-	Manufacturing Resource Planning
POS-	Point of sale
SC-	Supply Chain
SCDA-	Special Crops Development Authority
SCM-	Supply Chain Management
TQM-	Total Quality Management
VMI-	Vendor Managed Inventory

CHAPTER ONE: INTRODUCTION

1.1 Background

In the 21st century business environment, products and services can be out-mode within months and corporate market share at risk almost on daily basis, hence the reason why supply chain management, as a source of sustainable competitive advantage, is a very hot topic in business today. Supply chain management choices and strategies have an increasing critical influence on strategic business outcomes. Currently, supply chain management practices, in terms of the convergence of information flows, products and service flows, logistics, and payment flows, are transforming the ways that companies produce goods, market them and provide services and hence create increasing value for customers (Gekonge, 2006). Hence effective Supply Chain Management may not only be the source of survival and growth but also the origin of strategic relationships for a competitive advantage.

1.1.1 Supply Chain Management

A supply chain is the sequence of organizations, their facilities and functions that are involved in producing and delivering a product or a service. The sequence begins with the basic suppliers of raw materials and extends all the way to the final consumers. Facilities include warehouses, processing centers, distribution centers, retail outlets and offices. Functions and activities include forecasting, inventory management, information management, quality assurance, scheduling, production, distribution, delivery and customer service. There are three kinds of movements in these systems; the physical movement of materials, the flow of cash backward through the chain and information which moves in both directions along the chain (Stevenson, 2007).

Supply chain management is the strategic coordination of the business functions with the business organization and throughout its supply chain for the purpose of integrating supply and demand management. Supply chain managers are the people at various levels of the organization who are responsible for managing the supply chain and demand both within and across business organizations. They are involved with planning and coordinating activities that include sourcing and procurement of materials and services, transformation activities and logistics. Logistics is the part of the supply chain involved with the forward and reverse flow of goods, services, cash and information. Logistics management includes management of inbound and outbound transportation, material handling, warehousing, inventory, order fulfillment and distribution, third party logistics and reverses logistics which is the return of goods from customers (Stevenson, 2007).

Therefore supply chain management is the management of all the activities that are involved in the provision of a product or service that is required by the end customers. It starts with the acquisition of raw materials, processing and distribution and ends with the backward flow of cash and information which flows in both directions. The main purpose of SCM is to satisfy both supply and demand requirements of customers in the chain.

In the modern world the main focus of competition is not only between different companies but also between supply chains. As the satisfaction of the final customer is of utmost importance for the successfulness of the whole chain, effective management of those processes is crucial. Organizations increasingly find that they must rely on effective supply chains, or networks, to successfully compete in the global market and networked economy. Indeed, strategic alliances between different actors in the supply chain have grown in importance with the recognition that

suppliers can contribute expertise, which enhances competitive advantage across borders (Ellram, 1992). In doing so, synergy is derived and a symbiotic relationship is fostered. Supply chain management (SCM) is a business practice that aims to improve the way a business sources all its raw materials, and delivers final products to end users. SCM is important for modern businesses because it coordinates and synchronizes activities of partner businesses, giving higher efficiency.

1.1.2 Supply Chain Management Practices and Challenges

Supply chain management is a long, complex and dynamic process whose successful implementation needs thorough understanding of the concept itself (Whipple and Frakel, 2000; Savage, 1990; Neely, 1998). Its implementation depends on the ability to create, manage and re-shape relationships between individuals, organizations and networks within the supply chain. It requires new organizational arrangements and culture which calls for considerable commitment, resources and time to develop (Neely, 1998). Its overall success is associated with the challenging and difficult development of a new culture on shared learning, greater transparency and trust.

In response to competitive market pressures, companies are using logistics-based strategies to distinguish themselves from their competitors. Although, these strategies are initiated to reduce inventory levels (resulting in reduced costs), they include other issues such as transportation and information technology. A company's understanding of these logistics issues allows them to become more competitive which may lead to improved customer service. "Leading edge" companies are primarily the leaders in the implementation of competitive logistical practices and use them as competitive weapons to secure and maintain customer loyalty (Bowersox et al.,

1989). Small and rural manufacturers many times are required to adopt such practices simply to do business with these “leading edge” companies. As companies develop and implement sophisticated logistics policies, new and innovative management practices emerge. In response to the challenges faced by companies in maintaining a competitive advantage, supply chain management (SCM) has come to the forefront of business practice today. SCM is a philosophy that strives to actively manage the supply chain. The supply chain for a product consists of all companies involved in production and distribution from the raw material stage to the final customer.

The small scale tea sector, which is engaged in tea manufacturing, is found in the food industry that is vast and diversified, and is one of the largest branches of industries which are made up of micro, small, medium and large processors. Each segment of the industry need different supply chain strategies such as procurement and sourcing, inventory management, warehouse management, packaging and labeling system, and distribution management, thus, the uniqueness characteristics of food supply chain (Georgiadis et al. 2005). Perishability of agricultural products creates uncertainties within the supply chain in respect to product quality, safety and reliability. Since supply chain partners are aware of deterioration problems, to avoid losses, the partners tend to stock less quantities. To ensure product quality of agricultural raw materials for a long time requires efficient designed storage facilities (Georgiadis et al. 2005) that many firms cannot afford to buy and install.

SCM encompasses a set of interdependent companies that work closely together to manage the flow of goods and services along with the value-added chain of agricultural and food products, in

order to realize superior customer value at the lowest possible costs (Wood, 2004) as well as the associated information flow (Byrne and Heavey, (2006). The supply chain includes not only the processor and the suppliers but also the transporters, warehouses, retailers, and even the customers themselves (Chopra and Meindl, 2008). Exploring seriously the potential of SCM concept, a firm may realize a significant revenue growth (Gunasekaran, et al. 2008). Simchi-Levi et al. (2003) have shown that using more supply chain strategies, the firm can save about 10 percent of its annual operations. Application of SCM strategies have been widely pronounced in other manufacturing and service providing sectors such as in auto-mobiles, electronics, books, hotels, telephone companies among others.

Supply chain management must address several challenges that include distribution network configuration and well coordination of activities in order to achieve the lowest total logistics cost. Trade-offs in logistics may increase the total cost if only one of the activities is optimized. Trade-offs is a key to developing the most efficient and effective Logistics and SCM strategy. Integration of processes through the supply chain to share valuable information, inventory Management and cash-flow management that involve arranging the payment terms and methodologies for exchanging funds across entities within the supply chain are other challenges.

1.1.3 Small Scale Tea Sector in Kenya

Tea was introduced into Kenya from India in 1903 by a European colonial settler Mr. G. W. Caine who planted the first tea plants in Limuru area. The early settlers and the colonial government restricted tea growing to large scale farmers and multi-nationals to lock out the locals (Africans). When Kenya attained independence in 1963, such laws were changed which allowed Africans to grow tea as small scale farmers. The Special Crops Development Authority

(SCDA) which managed the tea industry before independence was converted into Kenya Tea Development Authority (KTDA) in 1963. This divided the tea industry into two sectors namely the small scale sector managed by the KTDA and the large scale sector managed by the Kenya Tea Growers Association (KTGA). The large scale tea sector is owned mainly by large multinational companies with big plantations under tea with a processing factory within the farm. The KTDA was mandated to develop and run the small scale tea sector under the Tea Act (Cap 343) of the laws of Kenya (Kirambi et al, 2008). The KTDA inherited one initial factory serving 19000 growers with only 4,700 ha of tea (Gesimba, 2005) and today has about 60 tea processing factories serving about 560,000 registered small-scale tea farmers who cultivate about 100,000 ha of tea.

A small scale farmer is one who owns a piece of land and has a tea license permitting growing and plucking of green leaf and delivering it to a buying centre run by KTDA. On average tea land holdings are very small, some having less than half an acre. Indeed 70% of small scale tea farmers own half an acre and less and 90% own one acre and less. Cultural factors have greatly contributed to land subdivisions. However some farmers with farms more than 50 acres are also classified as small scale farmers (Kamau 2008). This implies that a small scale farmer, in Kenya, is classified as small not because of the size of the farm but due to lack of a processing factory within the farm and is therefore forced to sell his green leaf to the KTDA Ltd managed tea factories.

The small -scale tea sector is composed of small- scale tea farmers who are the suppliers of the raw materials, the processing factories and the Kenya Tea Development Authority (KTDA), now the Kenya Tea Development Agency Ltd (KTDA Ltd). The small scale tea farmers supply the

only primary raw material (green leaf) which is plucked (two leaves and a terminal bud) from the tea plant. The raw material is very perishable and so is transported to a tea factory for processing soon after harvest. This is the reason why the factories are located near the tea farms (raw materials) in the rural areas. The tea factories, managed by KTDA Ltd, are therefore involved in manufacturing black tea which is used as a beverage. The KTDA Ltd is the managing agent of the whole sector from the farm level, processing factories, marketing up to the reverse flow of cash to the tea farmers who are at the bottom of the chain.

The Kenya Tea Development Agency Ltd (KTDA Ltd) was incorporated on 15th June 2000 as a private company under CAP 486 of the laws of Kenya and took over all the assets and liabilities of its predecessor, KTDA the parastatal. The KTDA was mandated to develop and run the small - scale tea sector and hence was authorized to manage the whole sector by controlling all the activities involving the small-scale tea farmers. The company controls all the activities from regulating tea planting to the sale of the final product and payments to the tea farmers. (Kirambi et al, 2008). This means that the KTDA Ltd is the core and only Management Company in the small scale tea sector. Therefore all the management systems in the sector were introduced and determined by the KTDA Ltd. Consequently the supply chain systems in the small- scale tea sector were decided by the KTDA Ltd which means that the supply chains in the sector implies the supply chains in the KTDA Ltd management systems.

The small scale tea sector plays a very important role to the Kenya economy. The sector contributes significantly to employment as the harvesting of green leaf and tea processing are both labour intensive processes. The tea industry is the largest employer in the private sector with more than 100,000 people working in the estates and about 5 million people earning their

livelihood from the sector (Gesimba, 2005). The sector also assists in regional and local development by accelerating rural industrialization which uses the locally available raw materials. The tea factories improve some facilities like roads within their areas of operation. It also contributes to the GDP, Economic growth and wealthy creation which assist in poverty reduction especially in the rural areas. The tea industry assists the country in getting foreign exchange earnings which assist in foreign exchange transactions. The small scale tea sector and the tea industry in general are some of the key pillars of the Kenyan economy as they contribute a lot to the economic activities and foreign exchange earnings.

1.2 Research Problem

The small scale tea sector makes a significant contribution to the Kenyan economy in general. The businesses that operate in the sector will only survive and grow if they are able to compete internationally as their final product (manufactured tea) is exported. To compete internationally, the focus is no longer on the management, survival, growth and competitiveness of individual organizations, but on supply chains. Suppliers can be a crucial source of competitive advantage for an organization in their own value package they offer to the customers in the market.

The small scale tea sector has had tremendous growth from 1963 when it was started by the government. The sector started with only one factory serving 19,000 growers and has now about sixty tea factories serving over 560,000 farmers who produce about 750 Million kilograms of green leaf annually. The sector produces over sixty percent of Kenyan tea (Gesimba, 2005).

On several occasions small scale tea farmers have been reported complaining of several problems associated with supply chain management practices in the sector. The farmers have

always complained of low and delayed payments, both of which are supply chain problems. The supply chains in the sector are said to be too long and this adds costs to the business which results in reduced payments to the farmers who are at the bottom of the supply chain. The low payments to farmers are beginning to negatively affect production. This is evident in some areas where tea farms are being neglected and in some extreme cases tea bushes uprooted (Kirambi et al, 2008). In other cases the tea farmers sell their green leaf to unlicensed middlemen to get quick cash. Such practices by tea farmers may cause supply chain management challenges to the sector.

Kamau (2008) did a study on the critical factors that affect accessibility of credit services by small scale tea farmers in Kenya. He found that small scale tea farmers lack credit services due to lack of collateral, costs charged and lack of information and this together with the cultural practices of subdivision of land are challenges that affect small scale tea farming in Kenya. Gikanga (2008) focused on approaches and challenges of privatization by Kenya Tea Development Agency Ltd (KTDA Ltd). His findings were that privatization was driven by politically related factors and was very challenging. There was also very high demand for transparency and accountability in managing the small scale tea grower which was brought about by the shareholder empowerment through the privatization process. Hence the KTDA Ltd faces some challenges which include competition from large scale estates, new entrants into tea production, processing and management and high costs of management systems and processes. These have the potential to destabilize the small scale tea growers in various geographical regions.

Orukoh (2007) did a case study on supply chain management practices at Numerical Machining Complex Ltd. He found that although Numerical Machining Complex Ltd appreciate and supports the principles of effective supply chain management, the company was not practicing them. Both Ngari (2008) and Ngugi (2008) have done studies on supply chain management practices at the University Of Nairobi and UNICEF country office respectively, in which they found out that supply chain management was being practiced. The first two studies have focused on only two components of the small-scale tea sector in Kenya leaving out the other component. The first is on the farmers who are the suppliers of the raw materials while the other is on the managing agent KTDA Ltd. The other studies are on the supply chain management practices at different organizations. Many of the studies have concentrated on supply chain practices in general. But none of these have focused on the SCM challenges facing any firm in Kenya.

To the best knowledge of this researcher, no studies have been done in Kenya on the supply chain management practices and challenges for the small-scale tea sector as whole as some studies were done on only the components of the sector. This study therefore was intended at establishing answers to the following questions; “What are the Supply Chain Management Practices for the Small Scale Tea Sector in Kenya?” and “What are the challenges that face the sector?”

1.3 Research Objectives

The purpose of this study was to focus on the SCM practices and challenges for the small scale tea sector in Kenya with the KTDA Ltd as its managing agent. The objectives of this study were;

- (i) To establish the supply chain management practices for the small scale tea sector in Kenya.
- (ii) To find out the supply chain management challenges facing the tea sector.

1.4 Value of the Study

The findings of this study are expected to generate knowledge and an understanding of supply chain management practices for the small scale tea sector in Kenya. It is expected to be beneficial to;

1. Business Organizations.

SCM contributes significantly to the overall success of any business organization as every business is part of at least one supply chain. The study will assist businesses employ superior Supply chain management (SCM) strategies to enhance their competitive strength, through integrated supply chains. It will also assist in getting the benefits of SCM that include improved product and delivery process, improved quality, shorter delivery times, more reliable delivery promises, fewer schedule disruptions and cost savings.

2. Scholars and Researchers

SCM is a relatively new area of management in which a lot of research needs to be done to gain competitive advantage. This study is expected to add to the existing knowledge and understanding on the supply chain management practices and challenges and methods of improving the SCM practices in theory and practice.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Supply Chain Management (SCM) is a business practice that aims to improve the way a business sources its raw materials, and delivers its final products to the end users. For any product or service offered by any business, there are usually a number of different business entities involved in the various stages of the supply chain, including manufacturers, wholesalers, distributors and retailers; the last group in a supply chain is consumers. SCM is important for modern businesses because it coordinates and synchronizes activities of partner businesses, giving higher efficiency.

Hugo *et al* (2004:3) acknowledge that many contemporary authors writing on the topic of supply chain management refer to this trend as a “new” or “relatively new” concept in management theory. However, Gattorna (1998:2) holds that the role of supply chain management has changed considerably over the past 30 years, thereby concluding that the concept has been around for a considerable period of time. According to Lamming (1996:2), the concept was introduced by Houlihan in 1984.

Warner (2002:6278) claims that Forrester is the true father of the philosophy of supply chain management. Further, as noted in Hugo *et al* (2004:3), the literature often claims that supply chain management is an “extension of logistics” and also that it is a further development in managing the supply base and therefore a development of the purchasing function. Kotler (2000:551) believes that physical distribution (logistics) has been expanded into the broader concept of supply chain management. Simchi-Levi *et al* (2000:3) have another belief, namely

that there is no distinction between supply chain management and logistics and the former is an evolutionary extension of logistics. Although different authors have opposing views, supply chain management is a product of the dramatic changes in business during the 1990s. Supply chain management developed over at least four decades, but the fact remains that it developed from logistics and purchasing. Besides logistics, other functional areas such as marketing, finance and operations management made an equally significant contribution (Hugo et al 2004:3). Despite the fact that there is no generally agreed definition, supply chain management (SCM) is generally intended to cover all business processes between vertically linked organizations (Bowersox et al., 1999; Cooper et al., 1997; Lambert et al., 1998; Bask and Juga, 2001).

2.2 Supply Chain Management (SCM)

Supply Chain is a linked set of resources and processes that begins with the sourcing of raw materials and extends through the delivery of end items to the final customer (Bridgefeld Group ERP/Supply Chain Glossary, 2004). While the separation of supply chain activities among different companies enables specialization and economies of scale, there are many important issues and problems that need to be resolved for successful SC operation – this is the main purpose of SCM. According to the definition of SCM by the Global Supply Chain Forum (GSCF), SCM is “the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customer and other stakeholders” (Chan & Qi, 2003). We can only talk about SCM, if there is a proactive relationship between a buyer and supplier and the integration is across the whole supply chain, not just first-tier suppliers (Cox, 2004).

There are several important problems in SCM that need to be resolved for efficient operation. Most of those problems stem either from uncertainties or inability to coordinate several activities, and partners (Turban, McLean, & Wetherbe, 2004). One of the most common problems in supply chains is the so-called bullwhip effect. Even small fluctuations in the demand or inventory levels of the final company in the chain are propagated and enlarged throughout the chain. Because each company in the chain has incomplete information about the needs of others, it has to respond with the un-proportional increase in inventory levels and consequently even larger fluctuation in its demand to others down the chain (Forrester, 1961; Forrester 1958). There are many practical examples from various industries that support this finding

It has been proved however that the production peak could be reduced from 45% to 26% by transmitting the information directly from the customer to the manufacturer (Forrester, 1961; Holweg & Bicheno, 2002). Another problem is that the companies often tend to optimize their own performance, disregarding the benefits of a supply chain as a whole (local instead of global optimization). Additionally, human factors should also be studied: decision-makers at various points in the supply chain are usually not making perfect decisions (due to the lack of information or their personal hindrances). Those two problems are also interconnected as employee reward systems often focus simply on growing sales or on gross margins (McGuffog & Wadsley, 1999).

2.3 Supply Chain Management Practices

In the face of a competitive global market, organizations have downsized, focused on core competencies, and attempted to achieve competitive advantage by more effectively managing all internal and external value-adding activities. Many firms have reduced their supply base so they can more effectively manage relationships with strategic suppliers (Tully 1995). The literature indicates that buying firms are developing cooperative, mutually beneficial relationships with suppliers and viewing suppliers as virtual extensions of their firm (Mason 1996; Copacino 1996). Superior supplier capability can lead to exceptional quality or rapid integration of the latest technological breakthroughs into the buying firm's own products through early supplier involvement (Ragatz et al. 1997). Suppliers may also participate earlier in the product design process to render more cost-effective design choices, develop alternative conceptual solutions, select the best components and technologies, and help in design assessment (Monczka et al. 1994; Burt and Soukup 1985).

As companies move towards increased global competitiveness, supply chains face new issues and challenges. These include increasing demands to reduce costs, increase quality, improve customer service and ensure continuity of supply (Goebel et al., 2003; Pearson et al., 1996). The supply chain environment is characterized by globalization, increased customer responsiveness, channel integration and advances in information and communication technologies (ICT). Organizations in supply chains are compelled to restructure and re-engineer relentlessly to increase their effectiveness and satisfy customers. This realization requires firms to look beyond their organizational boundaries and evaluate how the resources and capabilities of suppliers and customers can be utilized to create exceptional value.

Supply Chain Management is an important area of management and business in these days of volatile and dynamic business environment. The business environment is replete with ever changing competitive challenges that call for equally responsive and matching management strategies and hence the urgent need for an effective Supply Chain Management for any firm. Companies must, therefore, ensure that their Supply Chain Management practices are sufficiently agile, adaptable and aligned to the changing environmental conditions in order to achieve a sustainable competitive advantage (Gekonge 2006).

In the following paragraphs some best supply chain management practices are discussed.

2.3.1 Information Technology Systems

Information technology (IT) is essential to develop and maintain a successful SCM philosophy. Companies implement information systems to monitor inventory levels and schedule production, to provide high levels of customer service, and to enhance their competitive position through partnerships. SCM is concerned with product flows and information flows. Information flows in both directions through the supply chain. The current emphasis on supply chain re-engineering essentially means changing an organization from the flow of things to the flow of information (La Londe and Powers, 1993). The two applications of IT on which companies have focused are electronic data interchange (EDI) and bar coding. EDI is essentially a paperless computer to computer exchange. “The purpose of EDI is to eliminate duplication of data entry and to improve the speed and accuracy of the information flow by linking computer applications between companies” (Emmelhainz, 1994). The key element of EDI is the elimination of human interaction which reduces or eliminates data entry and minimizes the time required for data entry

(Emmelhainz, 1994). EDI improves product flow coordination and allows companies to share product information, particularly inventory levels. A major benefit of EDI is decreased inventory levels through the availability of more current data. EDI makes it possible for different firms to integrate their systems and databases despite differences in compatibility. It is increasingly replaced by more flexible, cost effective e-commerce (and other web-based systems) (Hugo, et al, 2004: 81).

EDI improves product flow coordination and allows companies to share product information, particularly inventory levels. A major benefit of EDI is decreased inventory levels through the availability of more current data. For example, Volvo Transport AB of Sweden estimates that it avoids carrying over \$28 million in excess inventory stocks each year through its EDI based information network” (Coyle, Bardi, and Langley, 1996). Like EDI, bar coding removes the human element in checking and tracking inventory (Cooke, 1994). No technology is more crucial to update and upgrade IT quality than bar codes (Cooke, 1994). Bar coding is a popular and cost effective technology that captures data in real-time at the point of origin. It provides the means to track products from the point of manufacture to the point of sale. Bar coding increases stock check-in accuracy to better than 99 percent and one food industry supplier virtually eliminated customer claims for mis-shipments by using bar coding (Cooke, 1994).

2.3.2 Information Sharing in the Supply Chain

In recent years numerous studies have emphasized the importance of information sharing within the supply chain (e.g. Barrat, 2004, Lambert, & Cooper, 2000; Lau & Lee, 2000; Stank, Crum & Arango, 1999). Indeed information sharing is a prerequisite for successful operation of the SC

(Mason-Jones & Towill, 1997). While there is no doubt about the importance of information in the supply chain and about the fact that information technology (especially various Internet applications) can greatly reduce the costs, strategic planning of this process and utilization of information is crucial. Information should be readily available to all companies in the supply chain and the business processes should be structured in a way to make full use of this information.

It should be noted that the use of information technology, networks and e-business applications alone is not sufficient to realize the benefits. It was found that Internet adoption alone has demonstrated no benefits in terms of reduced transaction costs or improved supply chain efficiency in Scottish small and medium enterprises (Wagner et al., 2003), and has not led to a decrease in the inventory level in Slovenian small and middle-size enterprises (Trkman, 2000).

Additionally, only sharing of information will not lead to improvements, but also coordination of activities is crucial (Disney, Naim & Potter, 2004). While it should not be claimed that Internet alone reduces certain costs, strategic utilization of the information is of the utmost importance and business process modeling and renovation can be of great help in achieving this desired coordination. Sharing of information can obviously be a problematic issue as the companies in a supply chain may not be prepared to share their production data, lead times, especially when those companies are independent of each other (Terzi & Cavalieri, 2004). Indeed, the lack of trust between business partners is one of the main hindrances to collaboration in the supply chain context (Barrat, 2004; Ireland & Bruce, 2000).

Information sharing helps to reduce uncertainty and leads to lower inventory levels. “It is not necessary that all channel members have access to the same information, but only the information which is needed for them to better manage their supply chain linkages” (Cooper and Ellram, 1993). During the 1980s, “the idea of reducing uncertainty by exchanging information for inventory, received widespread recognition as a means of reducing costs and increasing effectiveness among trading partners” (Ellram and Cooper, 1990). Information sharing is an essential characteristic of the SCM philosophy. A broken supply chain could occur if firms do not communicate. “A broken supply chain has substantial stock at one point to enable another node in the supply chain to skate by with minimal stock” (Davis, 1993). This is an inefficient supply chain because there is more inventory being held than is required. The SCM concept focuses on holding inventory where it is optimal for the entire chain (Ellram and Cooper, 1990). “Each player in the supply chain optimizes its own position by holding all of the inventory it needs or requiring other supply chain members to hold additional inventory” (Ellram and Cooper, 1990). There will always be some level of inventory within the supply chain, but the real difficulty is to know how much to hold and where to hold it (Davis, 1993). Coordination is the reason that SCM exists and has become increasingly popular within firms.

2.3.3 Reduced Inventory Investment in the Supply Chain

In the past, holding large amounts of inventory was a typical business practice. This was due to the uncertainty involved in dealing with many suppliers. The current business trend is to reduce or eliminate inventory wherever possible, but it is important to understand the balance between customer service and inventory. Ballou (1992) states that increased customer service is a reason to hold inventory. “Inventories provide a level of product or service availability, which, when

located in the proximity of the customer, can meet a high customer service requirement” (Ballou, 1992). Inventory close to the customer can also reduce cost of lost sales and result in repeat customers. Holding any amount of inventory may result in some form of expense particularly carrying costs. On the other hand, the reasons for holding inventory can indirectly reduce operating costs realized in other company activities (Ballou, 1992). These cost reductions can be price-quantity discounts, lower transportation rates, or holding safety stock to insure against stock outs (Coyle, Bardi, and Langley, 1996).

Safety stock is held to buffer uncertainty or variability involving external factors, including supplier relations, economic conditions, and raw material supply. Many firms hold safety stock due to the time variance during product delivery and unknown demand requirements. Uncertainty has traditionally been buffered with inventory (Ellram and Cooper, 1990). SCM strives to minimize the uncertainty involved in business transactions among firms in the supply chain which leads to building safety stock inventory (Coyle, Bardi, and Langley, 1996). Reducing uncertainty can lower inventory levels held within the chain by reducing the number of suppliers a firm deals with and enhancing the relationships with the remaining firms. Sharing information about anticipated demand, orders, and production schedules reduces uncertainty and can lead to lower safety stock inventory (Coyle, Bardi, and Langley, 1996). Inventory is not necessarily eliminated completely from the channel, but rather only the redundant inventory levels. For example, Xerox took over \$700 million of inventory out of its operation within two years by applying SCM techniques (Cooper and Ellram, 1993).

2.3.4 Supply chain collaboration

Collaboration can best be described as an inter-organizational relationship type in which the participating parties agree to invest resources, mutually achieve goals, share information, (Ring and Van de Ven, 1994; Gray and Hay, 1986; Stank *et al.*, 1999; Barrat and Oliveira, 2001) resources, rewards (Phillips *et al.*, 2000) and responsibilities as well as jointly make decisions and solve problems (Spekman *et al.*, 1998). Collaboration is based on mutual trust, openness, shared risk and shared rewards that yield a competitive advantage, resulting in better performance than it would be without the collaboration (Hogarth-Scott, 1999). It implies cooperation and some form of alliance between two or more organizations. These are formed for sharing the costs of large investments, pooling and spreading of risk, and access to complementary resources. Similarly, firms establish close, long-term working relationships with suppliers and customers who depend on one another for much of their business, developing interactive relationships with partners who share information freely, work together when trying to solve common problems when designing new products, who jointly plan for the future, and who make their success inter-dependent (Spekman *et al.*, 1998). More and more companies are collaborating in the supply chain because of market diversity, competitive pricing and shorter product life cycles.

Various authors refer to inter-organizational collaboration as joint ventures (Doz and Hamel, 1998), networks (Jones *et al.*, 1997) inter-organizational alliances (Dickson and Weaver, 1997), strategic alliances (Vyas *et al.*, 1995), consortia (Aldrich and Sasaki, 1995), partnerships and inter-firm cooperation. For firms seeking to innovate within their supply chain it is important that in entering into relationships, the firms that need to innovate ensure the relationship allows them

to acquire additional knowledge and build capabilities that add to their innovative capacity. A strategic partnership is defined as “a mutual, ongoing relationship involving a commitment over an extended period, and a sharing of information and the risks and rewards of the relationship” (Ellram, 1991). Collaboration between supply chain partners will reduce risk and greatly improve the efficiency of the overall pipeline. Supply chain efficiency therefore relies heavily on successful long-term relationships (partnerships) where information sharing, joint problem solving, and trust are key success factors (Hugo, et al, 2004: 11).

Third party logistics is a type of strategic alliance and is increasingly becoming an essential aspect of competitive companies. It “involves the use of external companies to perform logistical functions that have traditionally been performed within an organization” (Lieb, 1992). The number of firms offering third party services has increased at a rapid rate over the past few years, including larger companies such as United Parcel Services, Federal Express, and Roadway Express (Lieb, 1992). Companies seem to have mixed reviews on the importance and value of third party logistics. Those that say it is valuable feel that the manufacturing company should focus on its core competency and allow other companies to manage the logistics function. This results in a competitive advantage and lower costs. Opponents say that using third parties leads to less control, less contact with customers, and increased costs (Lieb, 1992). The companies in this study seemed to agree with the opponents, since none of them currently participate in third party relationships. Cross-organizational integration focuses on the integration of supplier and customer network processes. The purpose is to create an optimized material flow pipeline, free of all obstruction and wasteful activities (Hugo, Badenhorst-Weiss & Van Biljon 2004: 70).

2.3.5 Co-operative Relationships between Supply Chain Partners

As noted by Corbett et al. (1999), the open exchange of information and coordinated decision making typical of a long-term supply-chain partnership can reduce the inefficiencies inherent in less collaborative relationships, such as excess inventories and slow response. Different from project-based partnerships, supply-chain partnerships are typically characterized by a level of investment that further improves the joint supply chain productivity to mutual advantage.

A good example of this productive engagement is that of Hewlett Packard and Venture Manufacturing. In the case of a traditional buyer-seller relationship setting, well-managed and organized strategic alliances enable buying and supplying firms to combine their individual strengths and work together to reduce non value-adding activities and facilitate improved supply chain performance.

The more open ended nature of supply-chain partnerships makes them more challenging, particularly when it involves cross cultural, cross national boundaries and cross organization issues. The notion of co-operative relationships has been receiving increasing attention in the literature, be it in the form of mergers, collaborative arrangements between departments, or total partnerships. Sergienko (2001) mentions three basic forms of cooperative relationships between firms that are currently found in the developed market economy, namely, 1) relationship that involves a condition of various forms of joint ownership of assets, 2) a system of relationships structured on contract agreements, and 3) informal co-operative agreements. Using Sergienko's thesis, a strategic alliance can therefore be classified under one or a mixture of these three basic forms.

In order for both parties to remain committed to this form of relationship, however, mutual benefits must exist (Ellram, 1992; Stevenson, 1999). Studies of successful partnerships have also noted certain key recurring characteristics such as free exchange of information (e.g., sharing cost and demand data) and coordinated decision making to reduce the inefficiencies inherent in less collaborative relationships (Corbett et al. 1999; Whipple and Frankel, 2000). Mutual trust is crucial to reassure firms that information shared with a partner will not be used against them.

Also, it is usual to expect firms that are attempting to establish supply chains in emerging markets or developing economies to foster such developments by forging strategic alliances with either local partner companies or integrated logistics solution providers. However, the literature has reported that firms with such strategic alliances also face numerous logistics (and other) barriers (Ellram, 1992; Pearson, 1998). Pearson (1998), in a study on such firms in China notably the smaller ones, further mentions that some of these firms have constructed strategic actions to overcome specific barriers such as communication, unfamiliarity with local business practices, and bureaucracy.

2.3.6 Supply Chain Integration

Kwon and Suh (2005:26) regard supply chain integration as a strategic tool aimed at reducing costs and thus increasing customer and shareholder value. Hence effective supply chain planning, built on shared information and trust among partners is a vital part of successful supply chain functioning. Monczka et al (2005:98) define integration as “The process of incorporating or bringing together different groups, functions, or organizations, either formally or informally, physically or by information technology, to work jointly and often concurrently on a common business-related assignment or purpose”.

Other good supply chain management practices include total quality management in the supply chain, Just in Time (JIT) and outsourcing. Total quality management (TQM) and continuous improvement (CI) encompasses quality management of the entire supply chain and include all the suppliers and customers in the supply chain down to the final customer. The aim of just-in-time (JIT) is zero inventory and waste reduction. JIT aims to reduce inventory and waste to zero and will ultimately ensure that the objectives of supply chain management are met. A great deal of trust and cooperation in the various links between firms are required. Outsourcing means purchasing materials which were previously made internally, assemblies and other services from outside to reduce costs of operations.

In summary best Supply Chain Management Practices provides strategies and methods of integrating separate organizations in the supply chain and their functions into a cohesive operating system. The benefits of the best Supply Chain Management Practices include lower inventories, lower costs, higher productivity, greater agility, shorter lead times, higher profits and greater customer loyalty. These benefits may lead to a competitive advantage that subsequently leads to increase shareholder value.

2.4 Supply Chain Management Challenges

The food industry sector is vast and diversified, categorized by different segments such as fresh food industry, organic food industry, processed food industry and livestock food industry. Each segment need different supply chain strategies such as procurement and sourcing, inventory management, warehouse management, packaging and labeling system, and distribution management, thus, the uniqueness characteristics of food supply chain (Georgiadis et al. 2005).

The complexities of food supply chain impose enormous challenges to the manufacturers and food processors. Local firms have been performing inefficiently or going out of the business because they could hardly withstand the competition. The food industry is one of the largest branches of industries in any developing country including Kenya and is made up of micro, small, medium and large processors. Micro and small food processors operate in an informal sector and use labour intensive and poor technologies, while medium and large scale industries use improved and modern technologies with large capacity output. Small and medium industries are the majority of local manufacturers of consumer goods. The largest production sectors of food industry are brewing, milling, baking, confectionery, animal and vegetable oils, sugar, dairy products, fruits and vegetables, soft drinks, fish and meat processing, ethyl alcohol distillation, spirit blending, wines, bottling of natural spring and mineral waters, among others.

The food industry which has lagged behind for many years in terms of technology and equipment is still facing enormous, diverse and demanding challenges which hinder the sector from growing at a noticeable pace to significantly contribute to the country's economic development. In addition to technology and equipments, other challenges identified by processors include; technical knowhow, research and development, capital, managerial and physical infrastructure. Foreign investors have grabbed a bigger market share by using their advanced technologies and huge capital resources posing great pressure to small and medium entrepreneurs as they are still not able to generate sufficient value added products. Small scale of production due to low investment capital and irrationally structured firms make them less competitive. Supply chain management (SCM) has benefits that include product and delivery process quality such as shorter delivery times, more reliable delivery promises, fewer schedule

disruptions, cost savings and risk reductions (Christopher, 1998; Bask and Juga, 2001). However the implementation of good supply chain management practices faces many challenges.

The tea supply chain begins in a smallholder farm or a plantation, where the tea leaves are grown and plucked. The leaves are then either transported to a bought-leaf factory, in the case of smallholders, or processed in the factory on-site, in the case of large plantations. The processing is done in the producing country because tea must be processed within hours of its being picked to maintain quality. The tea is then usually taken to the local auction centre, where its price is determined on a day-to-day basis. Only about 16% of tea is sold outside the auction centres through direct contracts. For the domestic market, the tea would next be blended and packed, while for exports, the supply chain would include an exporter before blending and packing. Tea will generally reach the supermarket shelf within 20 to 30 weeks of leaving the bush (Aduda, 2002).

In the following paragraphs some possible supply chain management challenges are discussed.

2.4.1 Processing challenges for small scale tea farmers

The problem with tea is that it is a very perishable commodity both before and after processing. Producing high quality tea relies on smooth transport and other infrastructure networks to get the tea quickly to and from the processing factories. The green tea leaf cannot be stored for longer than six hours without damaging its quality, and it is recommended that there is a maximum of three hours interval between plucking and processing for good quality tea. Likewise processed tea has a shelf life of only a year before experiencing a serious drop in quality. The longer the tea is kept the higher transaction costs are as the tea may need repeated quality assessment and

grading. The fact that smallholders grow their tea in geographically dispersed areas makes it difficult for the marketing system to move the tea efficiently and quickly. The small producers sometimes have very little choice in whom to sell their tea to, and in such cases they are forced to sell to whichever buyer can process it relatively quickly (Aduda, 2002).

2.4.2 Technology development as a challenge

Nairobi is the main location for the distribution of tea machinery and its related spare parts. This means that all the suppliers of tea machinery and spare parts are all located in Nairobi (Mathews 1987). However, according to a large manufacturer of tea processing equipment, the basic design of tea machinery has not undergone a major, successful innovation in Kenya. A standard mechanical process, still in demand today, has been in operation since the late nineteenth century. This explains partly the reason why it is very expensive to process tea in Kenya as the machineries have not been innovated. This example reflects the lack of product innovation in Kenya's machinery producing sector (Mathews 1987). In comparison to India, there is a considerable number of tea processing machinery firms which produce and export their products. The Kenyan tea sector imports tea processing machinery and hence requires much to be improved. Other tea production goods especially fertilizer is purchased in bulk, mostly from international suppliers. A large portion of the Kenyan imports come from Romania, Ukraine, United States, Europe, Middle East and South Africa. Tea fertilizers, mainly NPK (Nitrogen, Phosphoric acid and Kalium) fertilizer account for 21% of the national consumption. Tea fertilizer imports have risen by 85% from the previous period. (Ariga et al, 2006)

2.4.3 Rising labour and other operating costs

The most worrying problem in the tea industry is the danger caused by the rising costs of production. This applies most forcibly to the estate sector (large plantations) where labour account for some two thirds of production costs ex-factory. The main problem arises from the pattern of wage awards imposed on the industry. Since 1990, the basic wage rate has risen more than 10 times. In fact since 1998 it has gone up by more than 50% and is still rising. The danger signals are evident in the small producers who have been resigning from the industry in order to escape the statutory basic wage award. The labour costs at Kericho are twice those paid in Uganda. Daily rates paid by smallholders in rural areas for labor have made tea farming loss making and it will only be a matter of time before they are taken out of production. Unreliable electricity, high costs of fuel and packaging materials further increase production costs. The factories have been the hardest hit by the ban on procurement of wood fuel from the forest (Gesimba, 2005).

The cost of production (COP) of Kenyan tea is considered high when compared to other tea producing countries. This is causing uncertainty in the future of tea farming in Kenya and it could be sad if this industry collapsed the way the South African tea industry did. The cost of production in Kenya is USD 1.33 per Kg of made tea. This compares poorly with other tea producing countries like Vietnam (USD 0.81 per Kg), Indonesia (USD 0.58 per Kg), Rwanda (USD 1.32 per Kg), Uganda (USD 1.20 per Kg), Tanzania (USD 1.16 per Kg), Malawi (USD 1.14 per Kg) and Zimbabwe (USD 1.11 per Kg). The main factors contributing to the high cost of production are; high labour demand, high cost of farm inputs particularly fertilizers, high cost

of energy/fuel at the factories, high cost of transport due to poor road and rail transport system and numerous taxes and levies (Kirambi et al 2008).

2.4.4 Unstable world tea prices

The other threat comes from the weak trend in the export price of tea. This export price problem is as a consequence of world tea export increases which have occurred more rapidly than world consumption. Over the last ten years, there has been a consistent surplus of tea into the world market, which has the effect of depressing auction prices. In Kenya the number and acreage under tea production has persistently grown over the years. Small-scale tea farming in Kenya has had a remarkable history and growth. First introduced and allowed by law in 1963 it has steadily risen and currently there are over 560,000 small-scale tea farmers in Kenya. In terms of area under tea and production the small-scale tea farmers have also surpassed that of the large estates. The dollar price released for Kenya tea is at the same level as it was ten years ago (Gesimba, 2005). This problem can be solved by a number of measures, some of which are long term in nature while others can be implemented immediately. Regulating the supply of tea into the world market has been suggested. However, with only a small domestic market, it will not be easy for Kenya to absorb any percentage of its exports. It will also be very difficult to store some tea for future sale when small scale farmers are waiting to be paid for the same tea.

2.4.5 Climate change

Climate change also creates challenges to tea producers and manufacturers. Although the districts that grow tea receive adequate amounts of rainfall, drought periods affect production leading to very wide fluctuations in output. During the wet season the processing factories are

also faced with the problem of excess supply of the green leaf for processing. Output fluctuations in production can be very high. In 2009, drought in India, Sri Lanka and Kenya affected crop outputs and evidence suggests that the increasing impacts of climate change are generating unpredictable harvests leaving many small scale tea growers struggling to plan for the future. Output fluctuations contribute further to the decline in the real earnings. Use of drought tolerant clones may overcome this challenge. Output fluctuations affect quality and also contribute further to the decline in earning to farmers. Lack of credit facilities is a major concern to the small scale tea grower. Poor infrastructure, Long supply chains also contribute to the loss of income to the tea farmers. The sale of green leaf to unlicensed middlemen is a big challenge especially in those areas which border with large scale producers.

2.4.6 Tea value Addition

The supply chain in the small scale tea sector has 12 cost centres who share from the revenue generated from the sale of tea. Transactions between and among these levels incur certain costs which contribute to the overall cost of tea production. Value addition on tea starts at the factory where processing and grading are done. After grading, most of the tea is sold in bulk, either directly or through the auction. Traditionally Kenya tea has been sold to the market in bulk form and is much sought after by leading tea companies to blend and add taste to the most respected tea brands in the world. The second stage of value addition takes place at the blending and packaging stage. These are mainly foreign based since most of Kenyan tea is destined for the export market. Kenya can earn more from her tea through value addition and therefore more efforts should be made to promote value addition before exporting. In the last few years, Kenya has increased the volume of value added tea sales to about 12 percent. Invariably most of the

benefits accruing from value addition activities/processes are reaped elsewhere and the Kenya tea farmer remains impoverished. To this end it is worth noting that Dubai is fast emerging as a key tea buying, blending and packaging centre for Kenyan tea (Aduda).

2.5 The Management Components of SCM

Physical and technical management components represent one sub-group of the management components, and include planning and information management systems. A study by Lambert et al. (1998) clearly indicates that supply chain actors understand physical and technical management components better than the other group of management components. Hence, the physical and technical management components are indeed relevant for comparison of companies.

The group of physical and technical components includes the most visible, tangible, measurable, and easy-to-change components (Lambert et al., 1998). The work flow/activity structure is the first component, and describes how activities in the supply chain are carried out. Organizational structure indicates how functional areas are integrated within and between the focal companies, and the product flow facility structure reveals the managerial complexity. The fourth component, the structure of the communication and information flow, describes how effective information is made available throughout the chain. The fifth component is planning and control methods that include collection, processing and distribution of information, both within the focal company and across company boundaries. The methods are either functional, for example in keeping track of transportation operations, or cross functional, when handling the order process, inventories, sourcing and invoicing. Planning and control methods are crucial for enhancing SCM

competitiveness for several reasons. First, these methods may reduce transaction costs considerably, by retrieving and processing data electronically. Secondly, the level of locked up capital can be diminished simply because a smooth and speedy flow of relevant information reduces the uncertainty of the demand patterns in the flow. But even more importantly, modern management methods open up for new business opportunities and radical improvements in the supply chain. For example, electronic commerce is assumed to be one of the most important forces shaping business today (Wagner et al., 2003).

2.6 Role of ICT in Supply Chain Management

The concept and practice of global supply chain stems from the fact that improvements in ICT usage have resulted in two-front benefits; (i) efficiency improvements, essentially driven by better information flows translating into better material management, which resulted into the implementation of technologies such as, electronic data interchange (EDI) and (ii) effectiveness improvements, driven by better information flows which resulted into re-engineering of entire supply chain. Internet and e-business offer many possibilities for effective information sharing that enable seamless flow of transactions in the supply chain. They can also facilitate relationships by their ability to transfer information (Wagner, Fillis, & Johansson 2003). Newly developed relationships can drastically change the underlying business processes and different new approaches are emerging, such as vendor managed inventory (VMI), computerized point-of-sale (POS) systems, material requirements planning (MRP), manufacturing resource planning (MRP II) etc. (Turban, McLean, & Wetherbe, 2004).

However it should be noted that information technology alone is not a panacea for all SC problems. Even more, the most often quoted problems of online purchasing are not related to technology but rather to logistic and supply chain problems (Hoek, 2001). This is even truer for traditional companies that are usually even less prepared for new e-commerce related challenges.

The efficiency of supply chains can generally be improved by reducing the number of manufacturing stages, reducing lead-times, working interactively rather than independently between stages, and speeding up the information flow (Persson & Olhager, 2002). It was shown that electronic data interchange (EDI) could reduce swings in inventory and safety stock levels. The simulation results showed that (among other improvements) the standard deviation of the stock level was reduced from 749 to 272 tons, leading to \$ 400,000 annual savings (Owens & Levary, 2002). Only the implementation of new technology without changes in company's operation will realize only part of all possible benefits.

2.7 Measures of SCM Successfulness

The most important measures of SCM successfulness can be the final level of service, customer satisfaction, and SC competitiveness and profitability as a whole. However as these are difficult to measure or use as a guideline to monitor improvement, more operational measurement methods and indexes were developed. On a more operational level the key performance indicators are total costs, quality and lead times in the SC (Persson & Olhager, 2002). Survey of performance measures (Beamon, 1998, 1999) showed that cost and customer responsiveness dominate as the most often mentioned measures.

A survey of top management showed that throughput, lead-time, and utilization are considered among the most important (Tatsiopoulos, Panayiotou, & Ponis, 2002). Different authors emphasize slightly different aspects of those measures. However the common conclusion from above can be that achieving high customer satisfaction with low costs, combined with flexibility to react to unforeseen changes, is crucial. While the final customer is mostly interested in the total quality and effectiveness of the supply chain as a whole, changes in a single company should also be studied. A company is unlikely to participate in integration project if it does not also bring benefit to that company. Sometimes individual companies may even sacrifice their internal efficiency to overall chain optimization.

Additionally, the performance measures should be integrated across different departments and all companies in the supply chain (Barrat, 2004; Lengnick-Hall, 1996). Otherwise the concentrated effort towards the realization of those goals is not possible. Ideal performance measures would both facilitate the improvements and enable the measurements of achieved results. A common approach to predicting and measuring the effects of SCM is the use of simulations (Bosilj-Vuksic, Indihar Stemberger, Jaklic, & Kovacic, (2002) for an example of simulating the effect of business process renovation and Terzi & Cavalieri, (2004)for a coherent review of literature).

In summary, while benefits may accrue from the implementation of collaborative supply chain management, this will require both an effective and comprehensive change programme, and the competences to support the change. Understanding and implementing good practices in SCM should bring about dramatic changes in work and business processes, with positive results in efficiency, cost reduction, and better-quality services. In today's climate of a single marketplace,

intense competition, dynamic business environment, and proliferation of innovation and new disruptive technologies, organizations must implement SCM. There is need for more assistance to help develop SCM systems to achieve higher productivity. This calls for help in establishing the basic SCM infrastructure required for the efficient movement and distribution of goods and services.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research Design

Any research needs a design or a structure before data collection or analysis can commence. A research design is a work plan that details what has to be done to ensure that the evidence obtained enables one to answer the research question as unambiguously as possible. Hence research design deals with determining the type of evidence or data that is needed to answer the research question (or test the theory) in a convincing way.

This research study sought to establish the supply chain management practices and challenges for the small scale tea sector in Kenya by conducting a survey as the research design. The survey research design is a very valuable tool for assessing opinions and trends. As long as the survey is well designed and one is prepared to be self-critical, one can obtain an accurate representation of an opinion. Quantitative surveys can provide information and explanations that are adequate enough for drawing reasonable conclusions. The survey design was used to provide an opinion of the supply chain management practices and challenges for the small scale tea sector in Kenya.

3.2 Population

This study involved an examination of the supply chain management practices and challenges for the small scale tea sector in Kenya. The required data on all these issues are available at the offices of the management agent of the sector. It is therefore necessary to obtain the required data from the managing agent, KTDA Ltd. The KTDA Ltd has its management staff at its head office in Nairobi, at the regional offices and factory premises which are spread across the country. Each factory has about ten management staff that specializes in different areas which

include extension services, logistics and production and operations. The extension staff are specialist in agriculture who advice farmers on crop husbandry. The logistics staff specializes in fleet management and is in charge of green leaf transport from the collection centers to the processing factories and also paying farmers for their green leaf deliveries. The factory staff specialize general management and are in charge of tea manufacturing, grading, packing and distribution of the manufactured teas to the various warehouses at the port of Mombasa. As the KTDA Ltd manages about sixty tea processing factories, the total population involved about six hundred, all of whom are management staff.

3.3 Sample Design

The researcher used stratified random sampling technique in order to obtain the required data. This method of data collection has the advantage that it considers respondents with different qualities. As stated earlier there are different categories of staff in the field (factories) that have different qualities which make stratified random sampling the most suitable method of data collection. They include tea extension staff, logistics staff and manufacturing staff in factories. There are also another category of staff at the head office who are working in stages of the supply chain. These categories of staff include those in charge of tea transportation to warehouses, warehousing, marketing, ICT and others. All these categories of staff provided the required data on the supply chain management practices and challenges for the small scale tea sector in Kenya.

The researcher sent questionnaires to one sixth ($1/6$) of the total population of members of staff. This will gave a sample of one hundred questionnaires and this sample size was representative enough to provide the required data. The sample size included a total of one hundred members of staff from each of the four categories (strata) and involved extension staff, logistics staff,

operations staff and the general staff at the head office. The sample size was analyzed in table 3.3.0.

Table 3.3.0: Population and sample statistics

Category of Staff	POPULATION		SAMPLE	
	No. of Staff	Percentage	No. of Staff	Percentage
Extension	50	8.3	5	05
Logistics	50	8.3	5	05
Factories	200	33.4	30	30
Head Office	300	50.0	60	60
Totals	600	100.0	100	100

Source: Research study

This particular sample was selected using a simple convenient stratified random sampling technique. The sample size is bigger than the sample taken by Gikanga (2008) who had a sample size of 10, Ngure (2001) who used a sample size of 40 and Arithi (2001) who had a sample size of 50. According to Ngure (2001), sample size can also be determined by the availability of resources which are very scarce especially in this study where the respondents are spread in different parts of the country.

3.4 Data Collection

The researcher collected data using a structured questionnaire most of which were sent using either electronic mail or the postal mail. The others were hand delivered to the respondents who filled the questionnaire for later collection. The questionnaires were sent to the staff who work away from Nairobi and hand delivered to those who work within Nairobi. Also a face to face interview was conducted on selected respondents on the other challenges that face the sector.

This was done to get explanations and a deeper understanding of the supply chain management practices and other challenges that face the sector. The data collected was analyzed and used to explain the Supply Chain Management practices in the Small Scale Tea Sector in Kenya and also the management challenges that face the sector. A follow up was made using e-mail and telephone conversation to increase the number of returned questionnaires.

3.5 Data Analysis

All the returned questionnaires were thoroughly checked for any inconsistencies and errors which may have occurred in the process of data collection. Any such errors were corrected before analysis was done.

The data was tabulated for analysis which included mainly descriptive statistics and factor analysis. Tables were used in summarizing the analyzed data and hence assisted in answering the research questions. The descriptive analysis was used to give an opinion or picture of the Supply Chain Management practices in the sector. The same analysis also revealed the general patterns of the supply chain management practices. Factor analysis was used to analyze the supply chain management challenges for the small scale tea sector in Kenya. Factor analysis has the advantage of reducing many variables to a small number of factors that easily explain a phenomenon. Hence factor analysis was used to reduce the variables which were initially 22 to only 8 factors that explain the challenges which face the sector.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

This study surveyed the Supply Chain Management practices and challenges for the small scale tea sector in Kenya. The survey analyzed and interpreted responses to questions asked respondents on issues relating to Supply Chain Management practices and challenges for the small scale tea sector in Kenya. The responses were obtained from the different categories of staff who work along the supply chain in the sector. The respondents were composed of staff who advise the small scale tea farmers in their farms on tea farming (tea extension staff), the logistics staff who mainly transport green leaf from buying centres to factories and pay the farmers, staff who process green leaf (manufacturing) into made teas in tea factories and the Head Office staff. Their responses were analyzed and discussed under the various headings in this chapter.

4.1.2 The questionnaire

Data was collected using a questionnaire that asked different questions relating to good supply chain management practices and also the possible challenges that face the sector. The questions were put in a very simple language for ease of understanding and interpretation. Respondents were asked to state the extent of their agreement or disagreement with various statements relating to supply chain management practices, on a 1-5 point Likert-scale. The questionnaire asked questions related to supply chain contracts, relationships with suppliers, importance of supply chain contracts, relationships among supply chain members and importance of integrating with supply chain members. Respondents were also asked to indicate the extent of their agreement or disagreement with statements relating to the importance of information sharing, importance of aiding and locating closer to suppliers, supply chain stages, reducing the supply chain stages will

minimize operating costs and importance of supply chain management delivery, flexibility and innovation.

On the part of supply chain management challenges, a 1-5 point scale (where 1 means the most challenging and 5 means the least challenging), respondents were asked to rate the challenges mentioned in the questionnaire from the most challenging to the least challenging using the scale. Respondent were also given some free space to mention other challenges that may have been omitted in the questionnaire.

4.1.3 Survey response rate

Out of a total number of 100 respondents targeted for this study, only 48 completed the survey instrument. This is because most of the respondents were located very far away from Nairobi, in the tea processing factories, where they are very busy with their daily operations and so did not see the need for answering the questions. The others at the Head Office were also busy and therefore saw no benefit of answering the questionnaire. We noted that this time of year (October to December) is very busy period for this sector because this is the time when the small scale tea farmers are paid the second payment which is also popularly called bonus. Hence the field staffs were busy with the payments. At the same time this period coincided with the short rains period which is also a peak period in tea production. However, the field staffs that were found at the Head Office on official duty responded positively and filled the questionnaires. A breakdown of the total number of respondents per category who filled the questionnaire is shown in table 4.1.1.

Table 4.1.1: Sample response rate

SAMPLE		
Category of Staff	No. of Staff	Percentage %
Extension	3	6.3
Logistics	4	8.3
Fac. operations	12	25.0
Head Office	29	60.4
Totals	48	100

Source: Research study

This represents a response rate of 48% of the targeted sample. The rate for the extension staff was 60% of the target while it was 80% for the logistics staff. The response rate for the factory staff was 40% of the target while it was 48.3% for the Head Office staff.

4.2 Supply Chain Management Practices

A supply chain management is a system that involves various practices undertaken by players within the supply network. Respondents were asked to indicate the extent of their agreement or disagreement with statements relating to various issues on good supply chain management practices. Their responses were analyzed and discussed under different headings of this section.

4.2.1 Supply Chain Contracts

Respondents were asked to indicate on a scale of 1-5 (where 1 is strongly agree and 5 strongly disagree) with statements relating to suppliers/ farmers contracts with KTDA, relationships with farmers /the suppliers and roles of suppliers. Their responses were recorded and mean scores calculated. The mean scores of their responses are summarized in table 4.2.1.

Table 4.2.1: Supply chain contracts

Supply chain practice	Mean score
KTDA has contracts with suppliers	1.33
It is important to have supply contracts	1.35
KTDA relationship with suppliers is good	2.5
Suppliers know their roles	2.5
Aiding suppliers is important	4.3

Source: Research data

The results indicate that KTDA Ltd has contracts with suppliers and also the small scale tea farmers and it is important to have such supply contracts with players in the supply chains. Such contracts may lead to collaboration which may lead to competitive advantage. Collaboration can best be described as an inter-organizational relationship type in which the participating parties agree to invest resources, mutually achieve goals, share information, (Ring and Van de Ven, 1994; Gray and Hay, 1986; Stank *et al.*, 1999; Barrat and Oliveira, 2001) resources, rewards (Phillips *et al.*, 2000) and responsibilities as well as jointly make decisions and solve problems (Spekman *et al.*, 1998). Collaboration is based on mutual trust, openness, shared risk and shared rewards that yield a competitive advantage, resulting in better performance than it would be without the collaboration (Hogarth-Scott, 1999). It implies cooperation and some form of alliance between two or more organizations. These are formed for sharing the costs of large investments, pooling and spreading of risk, and access to complementary resources. This is in agreement with the good supply chain management practices.

However it was noted that KTDA has not established long lasting relationships with its suppliers as was evidenced by the frequent seeking of suppliers through tenders. In today's competitive environment, firms establish close, long-term working relationships with suppliers and customers who depend on one another for much of their business, developing interactive relationships with partners who share information freely, work together when trying to solve common problems when designing new products, who jointly plan for the future, and who make their success inter-dependent (Spekman et al., 1998). More and more companies are collaborating in the supply chain because of market diversity, competitive pricing and shorter product life cycles. This is very strange for the KTDA Ltd as long lasting relationships may result in some advantages over competitors

This explains partly why the relationship with suppliers is not very good. It was noted that some of the suppliers do not know their roles especially on issues concerning quantity and quality specifications and time of delivery. This was noted especially on middle level suppliers located in the small towns near the factory companies. This is very strange especially in a very competitive environment where organizations are pooling resources together for long term benefits.

Respondents disagreed with the statement that it is important to aid suppliers in terms of information, location and specifications of contract requirements. This implies that KTDA believes that it is not important to aid suppliers within the supply chains. In to-days competitive environment, suppliers may be a source of competitive advantage in business and therefore need to be aided. It is surprising that suppliers are not aided for an organization like KTDA Ltd which competes in the competitive international markets. Aiding suppliers is a form of integration

which may reduce operating costs. Monczka et al (2005:98) define integration as “The process of incorporating or bringing together different groups, functions, or organizations, either formally or informally, physically or by information technology, to work jointly and often concurrently on a common business-related assignment or purpose”. Kwon and Suh (2005:26) regard supply chain integration as a strategic tool aimed at reducing costs and thus increasing customer and shareholder value.

4.2.2 Importance of Supply Chain

Respondents were also required to indicate the extent of their agreement in a 1-5 scale (where 1 is strongly agree and 5 strongly disagree) with statements relating to importance of integrating with supply chains, stability of relationships among supply chain members, effective supply chain improves performance, supply chain members readily share information and whether supply chain is key to a sustainable competitive edge. Their responses were recorded and mean scores calculated. The mean scores of their responses are summarized in table 4.2.2.

Table 4.2.2: Importance of Supply Chains

Importance of Supply Chains	Mean score
Integrating supply chain is important	1.7
Relationship among SC members is stable	2.4
Effective SC improves performances	2.0
Supply chain members share information	2.8
SC is key to sustainable competitive edge	1.6

Source: Research data

From the table, it is evident that respondents' belief that integrating supply chains is important. Integrating supply chains may mean forming partnerships that are intended to benefit the partners. Supply-chain partnerships are typically characterized by a level of investment that further improves the joint supply chain productivity to mutual advantage. Supply chain integration reduces costs and hence increases shareholder value which ultimately leads to sustainable competitive advantage. This is consistent with existing supply chain management practices.

Respondents also agreed with the statement that supply chain is a key to a sustainable competitive advantage. Implementing good SCM practices results in efficiency, cost reduction, and better-quality services which finally gives a business a sustainable competitive advantage. This is in agreement with best supply chain management practices. Respondents interviewed belief that effective supply chains improve performance. Effective supply chains may mean best supply chain management practices. Such practices may lead to efficiency and this may also lead to reduced inventories, reduced lead times, reduced costs and better service to customers. Such benefits of best supply chain management practices not only improve performance but also lead to competitive advantage in the long run.

Respondent's belief that the relationships among the supply chain members is partly stable and that supply chain members partly share information. In recent years numerous studies have emphasized the importance of information sharing within the supply chain (e.g. Barrat, 2004, Lambert, & Cooper, 2000; Lau & Lee, 2000; Stank, Crum & Arango, 1999). Indeed information sharing is a prerequisite for successful operation of the SC (Mason-Jones & Towill, 1997). While there is no doubt about the importance of information in the supply chain and about the fact that

information technology can greatly reduce the costs, strategic planning of this process and utilization of information is crucial.

Information should be readily available to all companies in the supply chain and the business processes should be structured in a way to make full use of this information. It is strange that information is not fully shared among the supply chain members and this explains why the relationship among members of the supply chain may not be very stable. The relationship among members may not be good because of stiff competition among the supply chains members. Such competition is expected especially in this industry where we have very many players competing for the same scarce resources. Under such circumstances the players may not share information among themselves more especially among the small businesses that may not only afford but also see the benefits of information technology. The respondents interviewed belief that Supply chain members partly share information. This is strange as information sharing is important as it leads to better understanding and in making of timely decisions.

4.2.3 Supply Chain Stages in the Sector

Respondents were also asked to indicate the extent of their agreement or disagreement with the statements relating with the length of the supply chains in the sector. The statements included supply chains in the sector is too long, each stage in the supply chain involves costs, reducing the stages minimizes operating costs and reducing the stages improves performance. Their response was tabulated, mean sores calculated and recorded in table 4.2.3.

Table 4.2.3: Supply Chain Stages

Supply chain practice	Mean score
Length of the SC is too long	1.5
Each stage involves costs	1.4
Reducing the stages minimizes costs	1.2
Reducing stages improves performance	1.3
SCM deliver, flexibility and innovation is important	2.5

Source: Research data

Respondents agreed with the statement that the supply chains in the sector are too long and each stage involves some costs. Such long stages of supply chains add some costs of operations. As stated earlier the stages are too long as compared with the large scale estates that have short and efficient supply chains. The stages in the large estates have been shortened through supply chain collaboration, supply chain partnerships and sharing of information. Such good supply chain management practices which are very efficient are not practiced in the small scale tea sector.

Respondents agreed that reducing the stages minimizes costs and also improves performance. This may be done through cooperative relationships with other supply chain members. In the case of a traditional buyer-seller relationship setting, well-managed and organized strategic alliances enable buying and supplying firms to combine their individual strengths and work together to reduce non value-adding activities and facilitate improved supply chain performance. Supply chain deliver, flexibility and innovation may also be important.

In summary it is evident that suppliers have supply chain contracts and some of the suppliers know their roles. KTDA Ltd partly beliefs that information sharing, integrating with supply chains and stable relationships among supply chain members are important. The company also beliefs that supply chain is key to a sustainable competitive advantage. The KTDA Ltd has a stable and long term relationship with the small scale tea farmers while the same company does not have long term relationships with suppliers as contracts for tenders are always done either annually or as per requirements.

The supply chains in the sector are said to be too long involving at least twelve stages which increase operating costs. Respondents strongly agreed that the stages are too long and reducing such stages will not only reduce operating costs but will also improve operations. Respondents also agreed that Supply chain management delivery and flexibility are partly important.

4.3 Supply Chain Management Challenges

Respondents were asked to state the extent of the most challenging factors in the sector. They were to indicate on a 5 point- scale, the most challenging and also the least challenging factors in the sector. Their responses were tabulated as raw data and analyzed using (SPSS) package for factor reduction technique to determine the important factors that challenge the sector.

4.3.1 Factor analysis

Factor analysis was used to identify the not directly observable factors based on the variables. The goal was to identify a smaller set of factors to represent the relationships among the variables parsimoniously (i.e. to explain the observed correlation with fewer factors). In this research, principal components analysis with Eigen values greater than one was used to extract

factors, and varimax rotation was used to facilitate interpretation of the factor matrix. The factors are assumed to represent the variables and were done sequentially in several stages that include;

(i) **Correlation matrix**

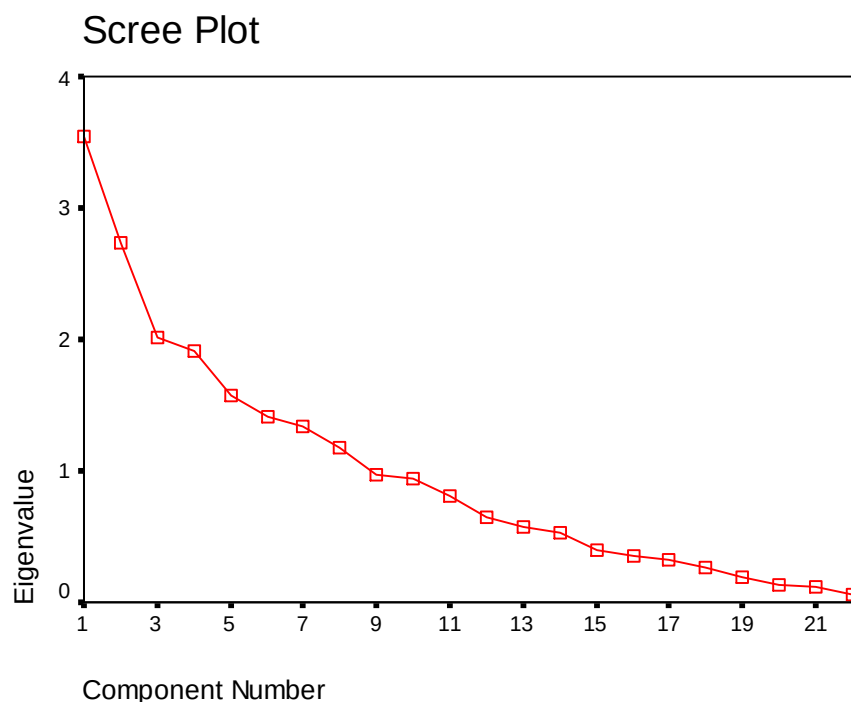
A matrix of correlation coefficients was generated for the 22 variables. This was done to show the inter-relationships between the different variables. Since the purpose of factor analysis is to link variables together into factors, those variables must be related to one another. Variables which measure the same dimension or dimensions are expected to be correlated because they measure the same things. If the variables do not correlate to each other then they should be removed. On the other hand those variables that are highly correlated may cause the problems of multi-co linearity or singularity. The correlation matrix for the variables is as shown in table 6. From the matrix it was found that two variables, namely green leaf variability and lack of transport were not or were poorly correlated with the other variables.

It was noted that two variables namely, green leaf variability and lack of transport were poorly correlated with the other variables. As noted earlier, variables that are highly correlated are expected to measure the same things, factor or factors. Variables that are not highly correlated may not measure the same factor. This implies that these two variables may not jointly measure or be associated with one same factor. Hence the two variables may not be grouped together with the other variables in factor extraction. The same variables had very low factor loadings in the rotated component matrix on table 8 meaning that the variables were poorly correlated with the factors extracted. As the variables were not correlated with any of the variables, the two variables were removed from the analysis and therefore do not appear anywhere in factor reduction process. Table 4.3.0 below shows the correlation matrix for the variables.

(ii) Factor extraction

The next stage is the extraction of factors from the correlation matrix. The most common method of doing this is by using the principal factors technique which is sometimes referred to as principal components extraction technique (PC). The factors were selected one by one using the Eigen values greater than one as selected. The Eigen value of a factor is the total variance accounted for by the factor. The first factor extracted has the largest Eigen value, the second the next largest Eigen value and so on. The process of extraction continues until the factors extracted account for a negligible proportion of the total variance. The Eigen values greater than one explain a very big percentage of the total variances that explain the challenges that face the small scale tea sector in Kenya. When the Eigen values of successive factors are plotted against the ordinal numbers of the factors, they form a curve called a Scree plot, as shown below.

Scree plot for the factors



The factors with Eigen value greater or equal to one was used to determine the number of factors to retain. This was further illustrated by using the scree plot (above) which indicates that the screens started to tee-off after factor 8 implying that only 8 factors explain the challenges that face the small scale tea sector in Kenya. Table 4.3.1 shown below indicates the Eigen values for each component (factors) together with their associated percentages of the variances explained.

Table 4.3.1: Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.551	16.141	16.141	3.551	16.141	16.141
2	2.730	12.407	28.548	2.730	12.407	28.548
3	2.015	9.160	37.708	2.015	9.160	37.708
4	1.912	8.691	46.399	1.912	8.691	46.399
5	1.572	7.148	53.547	1.572	7.148	53.547
6	1.418	6.443	59.990	1.418	6.443	59.990
7	1.331	6.052	66.042	1.331	6.052	66.042
8	1.172	5.327	71.368	1.172	5.327	71.368
9	.964	4.382	75.750			
10	.937	4.261	80.011			
11	.804	3.656	83.667			
12	.651	2.957	86.624			
13	.570	2.590	89.214			
14	.531	2.414	91.629			
15	.402	1.830	93.458			
16	.346	1.571	95.029			
17	.324	1.474	96.503			
18	.268	1.219	97.723			
19	.184	.838	98.560			
20	.135	.615	99.175			
21	.121	.551	99.725			
22	.060	.275	100.000			

Extraction Method: Principal Component Analysis.

It is evident from the table that only eight factors (items with Eigen values greater than one) can be extracted to explain the challenges. These eight factors explain up to 71.2 % of the challenges and the remaining percentage of 28.8 can be explained by other factors.

(iii) **Factor rotation**

The last process is factor rotation where factors are rotated to maximize the relationships between the variables and some of the factors and minimize their association with others. The most common method of doing this is by using the varimax technique. This method maintains independence among the mathematical factors. The factors are rotated around the fixed original until the loadings meet certain criteria. The set of loadings that satisfies the criteria are called the rotated factor matrix. The purpose of rotation is to arrive at a factor matrix with a pattern of loadings that is easier to interpret than the original factor matrix, hence a minimum number of factors. The rotated component matrix for the 22 variables is as shown in table 4.3.2

Table 4.3.2: Rotated Component Matrix

VARIABLE	Component							
	1	2	3	4	5	6	7	8
TRUSTSC	.143	.007	-.197	-.009	.144	.749	-.027	-.041
INTEREST	.025	.020	.163	-.039	.031	-.134	-.040	.843
GOODIS	.070	.192	-.628	-.112	.149	.090	.213	-.087
COMPETIN	-.017	-.066	.455	.621	.010	-.210	.088	-.074
COOPSC	.142	-.185	-.140	.673	.077	.338	.205	-.102
SCCOOP	.198	.085	.041	.216	-.039	.445	-.031	.560
LICENCES	-.041	.105	.028	.185	.436	-.256	.620	.184
WEATHER	.183	.083	.796	-.047	.073	-.029	.154	.155
INPUTS	.046	.150	.020	-.708	-.268	-.058	.102	-.438
RISCOSTS	-.446	.173	.288	.061	-.198	.537	.164	-.010
GLVARIAN	.228	.445	-.094	.444	-.288	-.261	-.409	-.176
TRANSPT	.270	.243	.294	.194	-.031	.388	-.409	-.381
MTMAITAN	.782	-.169	.270	-.038	.172	.089	.081	.109
ENVIRMEN	.729	.154	-.108	.166	-.007	-.067	-.094	-.018
INVENTOR	.023	.056	.014	.042	-.122	.105	.788	-.158
UNPRICES	.770	.312	.151	-.018	-.039	.224	.021	.050
POLITICA	.474	.346	.631	-.137	.278	.148	.079	-.124
ROUTING	.118	.121	.032	.076	.898	.089	.026	-.050
FLTMAGT	.128	.778	-.172	-.189	.159	-.120	.238	.003
IFFLOWS	.168	.702	.037	-.036	-.054	.230	-.017	.033
QUALITY	-.119	.510	.116	-.353	-.554	-.020	.018	-.207
DIRECTOR	-.116	.541	.380	-.044	.386	-.020	-.221	.139

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 15 iterations.

The factors extracted are summarized and explained in table 4.3.3 below.

Table 4.3.3: Factor Reduction for the Supply Chain Management challenges for the Small Scale Tea sector in Kenya

Factor	Item Description	Factor Loadings	Interpretation of the factors
1	(i) Motor vehicle maintenance (ii) Poor working environment (iii) Unstable world tea prices	0.782 0.729 0.770	Unstable working environment
2	(i) Fleet management (ii) Lack of Information flows in the supply chain system (iii) Interferences from directors/ famers	0.778 0.702 0.514	Lack of good management policies
3	(i) Lack of good information system (ii) Unpredictable weather conditions (iii) Political interferences	-0.628 0.796 0.631	Unpredictable interferences from the environment
4	(i) Competition from large producers (ii) Lack of cooperation within supply chain (iii) Lack of farm inputs	0.621 0.673 -0.708	Stiff competition within the supply chains
5	(i) Motor vehicle routing (ii) Poor quality of raw materials	0.878 -0.554	Quality problems
6	(i) Rising operating costs (ii) Lack of trust in the supply chains	0.537 0.749	Increasing operating costs
7	(i) Licensing of tea farmers (ii) Poor management of inventories	0.620 0.788	Poor management
8	(i) Lack of interest in the supply chains (ii) Lack of supply chain cooperation	0.843 0.560	Lack of supply chain linkages

In summary, only eight important factors can be used to explain the challenges that face the small scale tea sector in Kenya. The factors are Unstable working environment, Lack of good management policies, Unpredictable interferences from the environment, Stiff competition within the supply chains, Quality problems, Increasing operating costs, Poor management and Lack of supply chain linkages.

4.4 Other challenges.

Respondents were asked to state other challenges that may have not been included in the data collection instrument, the questionnaire. Although some of the challenges were mentioned above, a total thirty three of respondents explained further some challenges which seriously threaten the survival of this sector. The researcher was therefore forced to get some clarification on some of those other challenges that were mentioned. Hence, a face to face interview was done on eight selected respondents for further explanations. In the process the respondents explained some challenges that threaten the continued growth and survival of this sector. In the following paragraphs the other challenges which were mentioned and subsequently explained by the respondents are discussed.

4.4.1 Rising operating costs and unstable world tea prices

The KTDA Ltd signed a management contract with tea factory companies owned by small sale tea farmers for managing the sector for a fixed management fee of 3% on net revenues. The managing agent is now under pressure from the stakeholders who demand a lot of accountability and transparency. Hence it is very difficult to increase the management fee despite changing conditions.

The operating costs both at the factories and the KTDA Ltd are consistently rising, reducing the net revenues. The labour costs in particular are rising at an alarming rate and are said to be more than double the rates charged in Uganda. The prices of fuels particularly Electricity, diesel and furnace oil and lubricants are also rising at an exorbitant rate.

The world tea prices have stagnated for a very long time, without changing at all. The dollar price per kilogram of tea has remained constant for at least ten years now. This is caused partly by the consistent surplus of tea supply into the world market which depresses auction prices. The recent big payments were partly caused by serious droughts that pushed up prices due to some shortages.

4.4.2 Subdivision of tea farms

Sub-division of tea farms is a challenge that is continuously reducing productivity from the small scale tea farms. This is encouraged by the African cultural practice where ancestral farms are divided among the sons when they get their families. This continues to increase the number of tea farmers but at the same time reducing farm productivity. This has the effect of reducing the farm sizes which has made some farms not to be economical to operate, leading to abandonment of tea farming or hawking of green leaf. In other instances it has lead to theft of green leaf, (raw materials) which is generally called green leaf falsification, and this affects performance at the factory level.

4.4.3 Hawking of green leaf

Hawking of green leaf to unlicensed middlemen is a challenge in some operating areas of the small scale tea sector. This is common in the areas around Kericho, Kisii region and the some areas around Kiambu region where there are large scale tea producers. Some small scale tea

processing factories are now operating below capacity because of this problem. If this trend continues, then some tea factories may be forced to close business due to shortage of raw materials.

4.4.4 Political interferences

Political interferences by the government through the ministry of agriculture were also mentioned as a challenge to the tea sector. The ministry feels that it should be involved in making major decisions like tendering systems and awarding of such tenders which involve billions of shillings, appointments of senior staff and directors of the KTDA Ltd and factory companies and making major policy decisions. It was said that the government is not giving KTDA Ltd full support in several areas.

CHAPTER FIVE: SUMMARY, CONCLUSIONS &RECOMMENDATIONS

5.1 Summary

The study considered the supply chain management practices and challenges for the small scale tea sector in Kenya. It found that though the KTDA Ltd believes in strong and stable relationships with its suppliers, the reality is completely different. The company has not taken any steps to draw its suppliers into long term stable relationships as it does not offer long term supply contracts. It was found that in many instances supply contracts are drawn annually including specialized and international contracts. This is evidenced by annual tenders and contracts that are always done at specific dates of their annual financial calendars. This is at variance with good supply chain management practices.

The study noted that KTDA Ltd has not established strong and long term relationships with its suppliers. There were also no good relationships among the supply chain members operating within the sector. The members of the supply chain can improve their relationships by creating and maintaining of partnerships among themselves, effective communication and continuous communication, adoption of a culture of competitiveness, quality control and review. It is therefore necessary that members of the supply chain to work in partnership with the KTDA Ltd to achieve full benefits of good supply chain management practices.

The sector is also faced by some challenges that threaten the growth and long term survival of small scale tea farming in Kenya. Rising operating costs especially labour, oil and electricity have made the business unprofitable. These challenges have made small scale tea farming unprofitable leading to either abandonment or diversification of mixed farming away from tea

farming. Some farmers have resorted to hawking of green leaf to make quick cash for short time survival.

5.2 Conclusions

This study concluded that although the small scale tea sector appreciates good supply chain management practices, the same has not been fully incorporated in the operations of the sector. This is evident from the way respondents answered the questions that related to the supply chain management practices.

Several adverse forces presently threaten the growth and the long term survival of the tea industry which include the small scale sector. The most worrying problem is the danger caused by the rising costs of production more especially the labour and oil prices that are continuously rising. For labour, the main problem arises from the pattern of wage awards which have risen more than 10 times since 1990. This has made tea farming to be unprofitable business for some small scale farmers. The danger signals are evident from the small producers who have started diversifying their farming away from tea farming. Some small scale farmers have started uprooting their tea plants while others have either abandoned tea farming or selling their produce to middlemen to get quick cash for survival.

The other threat comes from the weak trend in export price of tea in the world markets. This is caused by a consistent surplus of tea supply into the world markets which depresses auction prices. The dollar price has been constant for a long time.

Although the districts that grow tea receive adequate amounts of rainfall, drought periods affect production leading to wide fluctuations in output. Output fluctuations contribute to the decline in earnings. Poor infrastructure, unreliable and costly electricity, high costs of fuel and packaging

materials increase production costs. All these forces combined cause very serious challenges to the long term survival of the small scale tea sector in Kenya.

5.3 Recommendations

This study recommends that KTDA Ltd carries out research on good supply chain practices which can give it a competitive advantage in its operations. Since the KTDA Ltd exports most of its tea in the international market, it is indeed a world class organization and hence needs to invest heavily in long term relationships with all its supply chain partners for not only continuous improvement and enhancement but also for global competitiveness.

The supply chains in the sector which start from the farms to the retailers of made teas are too long involving at least twelve stages. Each stage in the chain involves some costs which add not only to the total operating costs but also to delays in information flows within the sector. The same supply chains in the large scale tea sector are said to be short and efficient. This is partly because the large scale-sector has formed some subsidiary companies that operate within the industry. For example some subsidiary companies are retailers of made teas and therefore buy some teas directly from their mother companies, avoiding some stages in the supply chains. This reduces total operating costs and also increases revenues due to value additions gained through retailing. The KTDA Ltd teas are sold through the Mombasa auction in bulky quantities to companies that do value addition and sell the same at very high prices. This is expensive to the small scale tea farmers in terms of costs and the revenues received. The KTDA should research on value addition to reduce their supply chains and also increase the revenues to farmers.

The KTDA Ltd was privatized due to political interferences from the government of Kenya through the ministry of agriculture. The same ministry feels that since tea farming is an agricultural activity that should be controlled by the ministry. It is also said that some ministry officials think that KTDA Ltd should be reverted back into a parastatal for easy control by the ministry. The ministry controls parastatals by approving their budgets, appointment of senior staff and influencing awarding of tenders. The way the privatization at the KTDA was done is not clear. Hence the KTDA should find a better method of ensuring that it is completely privatized to keep off the political interferences.

5.4 Limitations of the study

The number of questionnaires that filled and were returned by respondents was generally less than the expected number and hence this may have had some impact on the data collected.

The small scale tea sector is a very sensitive sector partly due to political reasons, its position in the economic stability of Kenya, the peasant farmers it serves and also the volume of money that it handles. As a result of this some of the respondents may have felt uneasy to participate in the provision of data due to their organizational policy on what to share with strangers regarding their organization more especially on the procurement policies.

However, the sample data obtained is believed to be representative enough of the population and therefore any statistical inferences made are also believed to be applicable to the whole population. The sample data generally gave an opinion on the supply chain management practices and challenges for the small scale tea sector in Kenya.

5.5 Suggestions for further study

It has been noted that most of Kenya tea is sold in bulk at the Mombasa Tea Auction. The price charged at the auction is very low compared to the same prices charged to the final consumers of the tea. This because the tea is then blended, branded and packaged by international organizations who charge high prices to the final consumers in the international markets. Hence some further research can be done on value addition so that Kenya tea can fetch better prices to benefit the small scale tea farmers.

The supply chains in the small scale tea sector were found to be too long and inefficient, increasing operating costs. The same supply chains in the large scale tea sector are said to short and efficient. Therefore I suggest that further research can be done to find out how such supply chains can be shortened and hence made more efficient than now.

The small scale tea sector has persistently grown in terms of tea production and sales revenues since 1963 when it started. The persistent growth has happened due to some competitive advantages enjoyed by the sector and also some good management strategies. This has happened despite the many challenges and adverse conditions that threaten the survival of the sector. Therefore it is suggested that further research to be done on the competitive advantages and strategies that have been used to maintain the growth.

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APPENDIX I

Acrimony for variables and their Meaning

TRUSTSC	Lack of trust in the supply chain
INTEREST	Lack of Interest in the supply chain
GOODIS	Lack of a good information system
COMPETIN	Competition from large estates
COOPSC	Lack of cooperation within the supply chains
SCCOOP	Lack of supply chain cooperation from members
LICENCES	Licensing tea farmers
WEATHER	Unpredictable weather
INPUTS	Lack of farm inputs
RISCOSTS	Increasing operating costs
GLVARIAN	Green leaf variability
TRANSPT	Lack of transport
MTMAITAN	Motor vehicle maintenance
ENVIRMEIN	Poor working environment
INVENTOR	Poor management of SC inventories
UNSPRICES	Unstable world tea prices
POLITICA	Political interferences
ROUTING	Motor vehicle routing
FLTMAGT	Poor fleet management
INFLOWS	Lack of information flows within supply chain
QUALITY	Poor quality of raw materials
DIRECTOR	Interferences from directors and farmers

APPENDIX II

SAMPLE QUESTIONNAIRE

Dear respondent,

You are kindly requested to assist in filling this questionnaire on the supply chain management practices and challenges in the small scale tea sector in Kenya. Any information that you give will be treated in the strictest confidence and will not be used for any other purposes than for this research study.

Kindly spare a few minutes of your time to go through the questionnaire and answer the following questions as objectively as possible.

1. Name and title of respondent -----
 2. Name of work section /department-----
 3. For how long have you worked for KTDA-----
 4. Briefly explain your major duties-----

 5. Kindly indicate whether you agree or disagree with the following statements on the supply chain management practices that are currently being practiced in the small scale tea sector in Kenya. In the ranking the digits mean
1- Strongly agree, 2 - agree, 3 - not sure, 4- disagree and 5- strongly disagree
- | | | | | | |
|--|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
- (i) KTDA has contracts with farmers/ suppliers.
 - (ii) It is important to have supply contracts
 - (iii) Relationship with farmers/ suppliers is good

- (iv) Suppliers know their roles/ requirements.
- (v) Integrating with the supply chains is important
- (vi) Relationship among SC members is stable.
- (vii) Effective SC management improves performance
- (viii) Information sharing with SC members is important.
- (ix) Supply chain members readily share information
- (x) SC is key in a sustainable competitive edge.
- (xi) Locating closer to customers is important
- (xii) Measuring SC improves performance
- (xiii) Aiding suppliers is important
- (xiv) The supply chains in the sector is too long
- (xv) Each stage in the supply chain involves costs
- (xvi) Reducing stages in SC minimizes operating costs
- (xvii) Reducing stages in SC improves performance
- (xviii) SCM delivery, flexibility, innovation is important

6. The following is a list of some of the supply chain management challenges that face the small scale tea sector in Kenya. Kindly indicate by tick whether they are challenging or not challenging. The ranking means

1- Most challenging 2- challenging 3- least challenging 4- not challenging 5 not sure

- | | | | | | | |
|-----|-------------------------|---|---|---|---|---|
| (i) | Political interferences | 1 | 2 | 3 | 4 | 5 |
|-----|-------------------------|---|---|---|---|---|

(ii)	Fleet management	1	2	3	4	5
(iii)	Motor vehicle maintenance	1	2	3	4	5
(iv)	Routing of motor vehicles	1	2	3	4	5
(v)	Variability in green leaf production	1	2	3	4	5
(vi)	Quality of green leaf	1	2	3	4	5
(vii)	Made tea transportation	1	2	3	4	5
(viii)	Competition from estates	1	2	3	4	5
(ix)	Rising operating costs	1	2	3	4	5
(x)	Variability in tea prices	1	2	3	4	5
(xi)	Information flows to and from farmers	1	2	3	4	5
(xii)	Competition from other supply chains	1	2	3	4	5
(xiii)	Lack of good information system	1	2	3	4	5
(xiv)	Lack of cooperation from SC members	1	2	3	4	5
(xv)	Poor management of SC inventories	1	2	3	4	5
(xvi)	Lack of interest among SC members	1	2	3	4	5

(xvii)	Lack of trust among SC members	1	2	3	4	5
(xviii)	Interferences from directors/ framers	1	2	3	4	5
(xix)	Environmental factors	1	2	3	4	5
(xx)	Licensing of tea farmers	1	2	3	4	5
(xxi)	Farm inputs and implements	1	2	3	4	5
(xxii)	Weather patterns and roads	1	2	3	4	5

- 7 What are the other challenges that face the small scale tea sector in Kenya? List by starting with the most challenging factors.

Thank you very much for spending some of your time in answering this questionnaire.

K.O.MOENGA,
RESEARCHER