EFFECT OF VERTICAL LINKAGES ON FOOD QUALITY MANAGEMENT OF BEEF SMALL AND MEDIUM ENTERPRISES IN KENYA

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Effect of Vertical Linkages on Food Quality Management of Beef Small and Medium Enterprises in Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.

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DEDICATION

To my dear parents, departed dad Isaac Kibuchi and mum Judy Wanjira

To my husband James and daughters, Judy and Abigail

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To all God bless you.

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ABBREVIATIONS AND ACRONYMS

Codex	Codex Alimentarius
CCPs	Critical Control Points
EU	European Union
FAO	Food and Agricultural Organization
FMD	Foot and mouth disease
GDP	Gross Domestic Product
GHP	Good Hygiene Practice
GMP	Good manufacturing practice
HACCP	Hazard Analysis and Critical Control Points
ISO	International Organization for Standardization
KENAS	Kenya Accreditation service
KEBS	Kenya Bureau of Standards
LMSK	Livestock Marketing Society of Kenya
MoLD	Ministry of Livestock Development
MoI	Ministry of Industrialization
NASA	National Aeronautics and Space Administration
PDCA	Plan, Do, Check, Act
QMS	Quality management Systems
SPS	Sanitary and Phytosanitary
TQM	Total Quality Management
UNDP	United Nations Development Programme

DEFINITION OF TERMS

Beef The flesh of cattle that is consumed by people in various forms as beef products (Bergevoet, & Engelen, 2014). Food products derived from the flesh of cattle and sold by Small and Medium Enterprises (SMEs) for human consumption (Abdirahman & Sauvée, 2012) which the current study has adopted.

Collaboration Supply chain collaboration is a long term relationship where participating SMEs generally cooperate, share information, and work together to plan and even modify their business practices to improve joint performance (Nyaga, Judith & Daniel, 2010). Supply chain collaboration looks to capitalize on the expertise and skill of individual firms to collectively provide benefits to end consumers. Fawcett, Chad, Amydee and Gregory (2010) state that collaboration's goal is to have parties work cooperatively to devise and implement better approaches to solving problems and delivering the value customers expect. This study defines collaboration as a voluntary will by SMEs to actively seek to develop new or improved practices in order to deliver customer value.

Food This is any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans. Any

	substance, whether processed, semi-processed or raw which is intended for human consumption, including drinks, chewing gum and any substance which has been used in the manufacture, preparation or treatment of "food" but excluding cosmetics, tobacco and substances used only as drugs (Tuominen, 2009). The study defines food as any substance originating from a farm consumed raw or processed.
Food SMEs	These are businesses that because of their size, lack of technical expertise, economic resources, or the nature of their work, encounter difficulties in implementing HACCP in their food business (World Health Organization, 1999).
Hazard	In the Alinorm 97/31A established by the CAC, the term "hazard" is defined as the biological, chemical or physical agent in or condition of food with the potential to cause an adverse effect. The concept "hazard" in the HACCP terminology is expressed in terms of a danger to food safety from a biological, chemical or physical point of view. The term "hazard" refers to any part of a production chain or a product that has the potential to cause a safety problem. Analysis is the identification and assessment of the seriousness and likelihood of occurrence of a hazard (Loc, 2010).

Information Sharing Information sharing in a supply chain is the regulated flow of information from one unit (firm, work group, individual to the other unit. It involves communicating needs, sharing proprietary information, providing helpful information, keeping each other informed of events or changes that may affect them. For the purpose of this research, information sharing refers to the information transmission process among supply chain members for the quality management purposes.

Quality Management ISO 9000: 2000 defines quality management as "coordinated activities to direct and control an organization with regard to quality" (Matebu, 2006). Quality Management is defined as an integrated approach to achieving and sustaining high quality output, focusing on the maintenance and continuous improvement of process and defect prevention at all levels and all functions of the organization, in order to meet or exceed customer satisfaction (Grimwood, 2009). Quality management is dealing with how to manage food technology processes such that required quality levels can be improved and variability in quality of natural products can be exploited (Tilburg *et al*., 2007).

Quality standards This refers to specific buyer standards such as appearance, size, and packaging (Batt, 2008). For beef, statutory quality standards relate to safety and labeling while commercial standards are communicated via brand labels (Monika &

Morven, 2002).The United Nations Economic Commission for Europe (UN/ECE) outline quality standards for Agricultural products as food safety, nutritional aspects, production methods, shape, presentation and taste (Will & Guenther, 2007).

Supply chain A Supply chain consists of all the stages that are required to satisfy the customer request. It starts with the supplier and passes through the manufacturing, distribution, and retailing and finally reaches the customer. SCM is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer (Syed, 2012).

Total Quality Management (TQM) TQM is a people-focused management system that aims at continual improvement in customer satisfaction and continually lowers real cost. It is a total system approach and integral part of high level strategy which works horizontally across functions and departments, involving all employees top to bottom, and extends backwards and forwards to include the supply chain and the customer chain (Rahman & Bullock, 2005).

Value Chain Porter (1980) defined the "value chain" as a representation of a firm's value-adding activities, based on its pricing strategy and cost structure. Value Chain describes the full range of value-adding activities required to bring a product or service through the different phases of production,

including procurement of raw materials and other inputs, assembly, physical transformation, acquisition of required services such as transport or cooling, and ultimately response to consumer demand (Kaplinsky & Morris, 2002).

Vertical linkages

These are the relationships between participants with adjacent roles within the value chain, as product is enhanced or services added through the chain (Hobbs & Young, 2001). It refers to how the structure of producers, processors and retailers are organized in the food supply chain so that each successive stage in the production, processing and marketing of a product is appropriately managed and interrelated (uddin, 2011).Vertical linkages is the organizational design of a firm in which it owns two or more stages in the value chain and controls the decision making on product attributes and the logistics. On the other hand, vertical linkages supply chains are institutional arrangements between actors in the market (Cuong, 2011).

ABSTRACT

In today's liberalized and globalized markets, high product quality is required for an enterprise to become more competitive in the local and international market and quality management has become the ultimate weapon. In the food industry, concerns over food safety and quality have been increasing as a result of a number of food safety scares. Governments worldwide have responded to these concerns through encouraging SMEs in the food industry to use quality assurance such as HACCP, ISO 9000, TQM and ISO 22000. In Kenya, the importance of quality is now being recognized. The beef sector in Kenya is small, but beef production is increasing dramatically in line with growing consumption of beef products. To address the increasing demand for beef quantity and quality, SMEs innovativeness in form of closer vertical co-ordination is becoming a prevalent feature for the purpose of enforcing proper quality management. The food industries in Kenya and in particular the beef sector are characterized by weak vertical linkages the result of which firms are suffering from quality related problems such as poor performance of products in the market due to lack of innovativeness, information asymmetries, insufficient raw material supply and customer dissatisfaction. The purpose of this study was to gain an understanding on whether a closer vertical linkage among the beef SMEs enhances food quality management in their enterprises. The study adopted a descriptive survey of 160 beef SMEs comprising beef producers and processors from Kajiado Central in Kenya. Data was collected using a self-administered semi-structured questionnaire to address the research objective of the effects of vertical Linkages on the food quality management of the small and medium beef enterprises in Kenya, guided by the specific objectives of Transaction Uncertainty, information sharing, Transaction Cost and Collaboration Advantage. Structural Equation modeling was adopted to construct the study model while multiple regressions was used to establish the effect of the moderating variable of Enterprise quality policy. It was

observed that transaction uncertainty influenced quality management the most, while Transaction Uncertainty influenced the least. It was found that Enterprise quality policy had a moderating influence on producer and processing SMEs in vertical alignments for quality management. The study therefore concluded that SMEs that vertically align themselves achieve chain-wide competitiveness by better quality management because they have access to information, better risk mitigation strategies, reduced transaction costs and a more collaboration advantage. The study recommended a proactive policy regarding quality management and also SME training in managerial, entrepreneurial as well as technological aspects of quality.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The world food economy is expanding rapidly due to a shift of diets and food consumption patterns towards livestock products such as meat (FAO, 2007). World meat consumption has increased from 47 million tons in 1950 to 260 million tons forecast for 2014 (McAlpine, Etter, Fearniside, seabrook & laurance, 2009) with the consumption per person ranging 17 to 40 kg per year, out of which beef is 10 kg (FAO, 2007) as beef has become a status symbol of the growing affluence of the new consumer societies (Bruinsma, 2009). However, in view of the liberalization of global trade, beef entrepreneurs globally are experiencing changes in regard to an increased emphasis on closer vertical coordination and quality management (QM) schemes at all levels of the supply chain (Takenaka, 2005).

In developed countries such as the United Kingdom (UK) and Canada, these changes have largely been a direct result of consumer concerns about food safety or a desire for international competitiveness. Tilburg, Trienekens, Ruben and Boekel (2007) focusing on the tropical food system in general, emphasize, as reasons for closer vertical coordination, changing consumer preferences and collaboration advantage such as technological advantage which facilitate product differentiation and the tailoring of products to specific market segments.

Producers' choice for vertical linkage is influenced by the transaction costs of different governance alternatives. The vertical linkages would enhance the sharing of information on market prices, consumer changes, thus reducing the need to inspect quality and also enhance delivery of products on time in the quality and quantity desired. Besides

reducing transaction costs, the reduction of uncertainty and information asymmetry is an important consequence of vertical linkages for quality management (Hobbs, 2001). In a survey of Thailand rice growers, Thongrattana, (2012) established that high levels of uncertainty surrounding the producer-buyer transaction favored the adoption of standardized written contracts. The uncertainty surrounding a business transaction for the buyer can be an uncertainty of quality, a reliable supply, timeliness or quantity. On the other hand, it can be the seller searching for a buyer. For both agents, price can be uncertain. Thus, uncertainty, a feature of transaction costs, as well as partnerships influences the governance choice between auction and vertical linkage in a buyer-supplier relationship. Additionally, a high level of supply timeliness leads to lower uncertainty (Hobbs & Young, 2000; Cao & Zhang, 2010).

The involvement of producer SMEs in quality tends to influence closer vertical linkages between buyers and suppliers because it demonstrates supplier commitment to the quality of its outputs. In this case, better supplier outputs mean better buyer inputs into the production system, influencing buyer performance (Han, Trienekens & Omta, 2011). Sharing of accurate and timely as well as relevant information may also reduce the need for buyers to monitor supplier deliveries and quality of inputs as well as reduce the need to enforce penalties in the case of lower quality inputs (Cuong, Tru, Hoa, Phuong & Hanh, 2011). Increasing quality may lead to reduction in transaction costs, which in turn reinforces the vertical linkage relationship which ultimately rewards supplier involvement in quality (Khoi, 2011). Supplier involvement in new product development also tends to influence the development of a closer vertical linkage because suppliers can provide information feedback about materials, pricing, and process capabilities for improvements in product performance.

Empirical studies on new product development (Mishra & Shah, 2009; Hudnurkar, Jakhar & Rathod, 2014) have suggested that collaboration advantage may positively

contribute to improve entrepreneur's ability to develop new products. Trust-based collaborations can reduce opportunistic behavior by suppliers and improve co-innovation of new products. Long-term collaborations among entrepreneurs in the same sector reduce the need for buyers and suppliers to spend long periods of time and effort during meetings to negotiate and write complex contracts in order to safeguard their investments in the relationship. By reducing the time and effort required to negotiate and monitor the relationship for quality compliance, buyers (processors) and suppliers (producers) can focus on quality management activity that mostly contributes to new customer-focused quality product development (Daley, 2009).

Information sharing can help the buyer obtain information about innovation occurring on the supplier side. In this case, new components and product parts can contribute to incremental and even radical product development for better quality management (Fawcett, Chad, Amydee & Gregory, 2010). In Kenya, favorable macroeconomic and sectorial policies, norms and regulations on certification services and innovation incentives call for closer vertical linkages among the different actors in the food industry especially as regards innovation, training of human resources, development of training and technical assistance market services as well as in financing (RoK, 2005).

1.1.1 Beef Small and Medium-sized Enterprises (SMEs)

The Small-Medium-sized Enterprise (SME) sector is an important part of any national economy (Syed, 2012). In Kenya the sector is a primary source of employment and income. It expanded from employing 3.7million people in 1999 to over 5.1 million in 2002 according to a recent report Sessional Paper No. 3 of 2004 (GoK, 2005). The concept of small and medium enterprises (SMEs) is not new in many developing countries such as Kenya, and varied definitions of SMEs exist because employment, turnover and capitalization vary among different industries. It should be noted that the

Kenya, micro enterprises are businesses employing up to 10 workers including the owner, small enterprises employ more than 10 and up to 50 workers while medium enterprises employ more than 50 but less than a 100 workers (GoK, 2005).

SMEs are created by and are home to entrepreneurs. An entrepreneur creates something new, something different, always searching for change, responding to it, and exploiting it (Syed, 2012). They are respected for their role in creating new jobs, providing new competition to existing businesses, improving product quality, reducing prices, introducing new goods and services through innovation and technology advancement (Cooper, Rayson, Botchway, & McCafferty, 2005). In the beef sector, SMEs act as specialist suppliers of quality raw materials to beef processors in a bid to reduce the production and other transaction costs as well as ensuring a stable and reliable supply of the raw materials to enhance the creation of new products (Talib, Ali & Idris, 2013).

In Kenya, beef SMEs are inadequately managed and riddled with high transaction costs that affect profit potential along the entire chain (Kibue, 2007). Underlying inefficiencies limiting the beef SMEs competitiveness domestically or abroad include uninformed entrepreneurs, inadequate market infrastructure, and poor management, lack of transparency and traceability systems, thus impacting negatively on the quality of the beef products. Additionally, a lack of transparency has a bearing on the logistics advantage as well as the innovative capabilities of the beef SMEs. A study by Bergevoet and Engelen (2014) on the Kenyan meat sector affirms that, the Kenyan beef producer and processors SMEs are viewed as unreliable in supplying consistent quality, desired volumes or competitive pricing. The food industry and especially the beef sector are characterized by very complex supply chains that are not well coordinated. The production SMEs are very fragmented posing a challenge for the SMEs further downstream that desire guaranteed and consistent quality attributes.

Changes and innovations that require adoption/adjustment across the entire SMEs chain are much more difficult to adopt and implement due to inappropriate coordination (Bröring 2008). Though integrating beef processing, new product development and quality in the management of beef SMEs increases competitiveness and contributes significantly to the establishment of sustainable food enterprises that are consumer oriented, most beef SMEs in Kenya still experience a lack of market knowledge and organizational capacity. Additionally, inadequate information inhibits their ability to achieve maximum producer surplus (I-DEV, 2014). Like other food SMEs, the beef SMEs lack the basic facilities to meet quality control standards and demand in high potential markets (Yan & Makinde, 2011).

Usage of quality management systems such as TQM is relatively low due to high costs and inadequate entrepreneurial competencies which hiders the required strategic and global view of the enterprises to conduct quality management (Sahran, Zeinalnezhad & Mukhtar, 2011). Moreover, the beef SMEs in Kenya are unable to comply to international quality standards because they are not aware of the technical requirements in importing countries, they are not able to meet the technical regulations due to cost and a lack of adequate quality infrastructure for exports (Kibue, 2007). The food processing sector is especially constrained by inadequate innovations, information asymmetries and weak linkages with producers and poor marketing skills (Zahra, Sapienza &Davidsson, 2006). Study by I-DEV (2014) reveals that, Knowledge of quality management and strengthening of the current weak linkages would enable the beef SMEs to capture market share and greater value for their products.

1.1.2 Concept of Quality and Food Quality Management

In the food industry, emphasis on quality is a vital aspect in that it determines the level of customer satisfaction. It also helps an enterprise maintain a competitive edge, allows

for cost cutting in the long run and is an essential requirement for an enterprises' successful growth (Brown, 2009). Food quality is a concept that transcends all steps and all actors within the food chain and it is perceived individually (Batt, 2008). Quality is defined as fitness for consumption (Peri, 2006). It is the requirement necessary to satisfy the needs and preferences of the consumer and it is considered synonymous with innate excellence which can only be recognized through experience (Socaciou et al.,ud). It is a measurable comparison to pre-determined or ideal standards (Crosby, 1980). Perceived quality is the customer's perception of the overall quality or superiority of the product with respect to its intended purpose, relative to the alternatives and is therefore an intangible, overall feeling about the product, which is usually based on some underlying dimensions such as product reliability and performance (AbWahid, 2010).

Intrinsic quality attributes are related to the product physical characteristics such as appearance, colour, size, and shape while extrinsic quality associates quality with value. A label attached to products from a specific producer, distributor or retailer aims to convey information or to persuade a potential customer about the quality, reliability, social status, value for money or safety of the product (Batt, 2008). Experiential quality attributes include taste, flavor and other eating quality attributes like texture, fleshiness and juiciness. Credence attributes are product benefits like nutritional value, wholesomeness and health that cannot be experienced (Hurburg & Lawrence, 2010).

Food carries a symbolic meaning and has a psychological significance beyond its nutritional value. Religious norms often specify what food may be consumed and which is forbidden. Food ideology combines attitudes, beliefs, customs and taboos affecting the diet of a given group. Consumers want to know about the safety of the products they consume, place of origin, how it was produced and (organic), handled, processed (Halal), environmental quality conservation, sustainability or social equity (worker welfare, child labor, fair trade) (Loc, 2010). Labeling is required to provide nutritional

information and to identify what components have been added to the food as well as the presence of genetically modified organisms (GMOs).Quality associated with packaging will include aesthetic requirements concerning its presentation and information conveyed by the label (Batt, 2008).

Food quality management has become increasingly important in the agro-food sector due to the changing consumer requirements, increasing competition, environmental concern and governmental interests (Khoi, 2011). Figure 1.1 shows a comprehensive approach to quality.

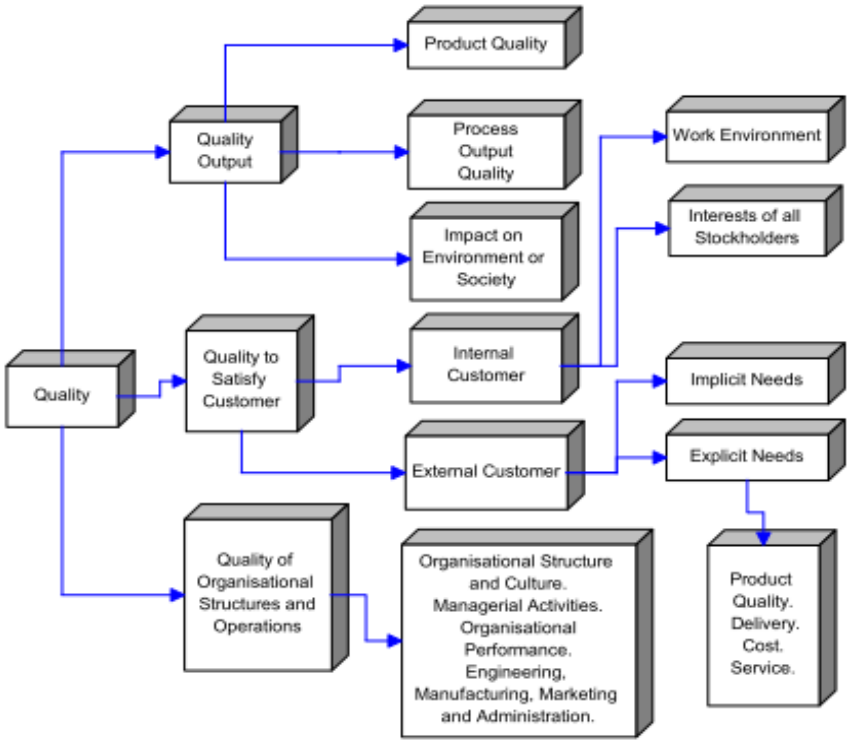

Figure 1.1: A Comprehensive Approach to food Quality (Grunert, 2005)

Quality management involves quality control of all the activities that need to be executed, in order to fulfill quality objectives of the organization in all steps from the input of material to the output of production (Nguyen, 2012). Quality, control should be directed to the process performance such as supply of raw materials, distribution, food processing, packaging, transportation and logistics. Technological elements of quality control entail maintenance of production equipment and training of employees (Khoi, 2011). Quality assurance encompasses the actions directed towards providing consumers with food quality. The international markets demand that all steps in the food supply chain address customer and consumer quality preferences to assure consistent quality (Satin, 2005).It guarantees the highest standards of quality and safety maintenance and involves the measurement, evaluation, corrective action and certification (Matebu, 2006). Quality improvement requires that the entrepreneur should not be satisfied with the current quality level but to continuously improve quality. Old bad habits should be abandoned in favor of real quality improvements. Short-term goals of quality improvement should be extended to long-term and permanent improvement strategies. Getting closer to the customer and employee empowerment is two of the basic requirements for achieving quality improvement as this helps to minimize risks and costs (Luning, 2006).

1.1.3 Vertical Linkages

Vertical coordination within Agricultural enterprises is associated with Mighell and Jones (1963) whose studies focused on the economic innovation of organizational design that could impact the industry more than technological innovations. They called the new organization methods vertical linkages, and included all ways in which the vertical stages of production are controlled and directed (Colecchia, 2008). Collins (1961) had noted the failure of the spot/auction market relationship to address the food enterprises' quality problems because processing firms were not guaranteed of regular supplies in

terms of volume as well as quality specifications particularly as defined by the global market (Khoi, 2007).

The entrepreneurial concept of vertical linkage is based on the premise that, a single firm is not able to address quality requirements of all customers in the market because firms are limited in terms of skills and resources to execute all activities needed to produce and deliver the demanded products or services (Canver, Hans, Trijp & Beers, 2008). High transaction costs and inadequate innovation competencies make single firms inefficient. The use of other people's resources especially in the start-up and growth stages of an enterprise is an important approach for entrepreneurs. They do not have to own resources to control them; rather, being able to influence the deployment of resources such as, human capital (technological skills; innovativeness; managerial skills), space, equipment or other material lent provided inexpensively or freely by customers or suppliers within a business network is crucial (Timmons & Spinelli, 2009).

Today's business environment requires enhanced co-ordination among raw material producers, processors and distributors. Therefore, effective vertical, or 'chain' relationships are being considered a key source of competitiveness (Lie, 2010). Effective business relationships can help to reduce transaction uncertainty associated with unreliability of timely deliveries of raw materials, quantities and quality of products by securing a stable inflow of orders; contribute to better access to crucial resources such as raw materials, capital and specialized skills resulting in higher business productivity by enhancing loyalty among suppliers (Fischer, 2008).

Vertical linkages are the relationships between participants with adjacent roles within the value chain, as product is enhanced or services added through the chain. Timmons and Spinelli (2009) affirm that entrepreneurs uphold a leadership that instills across the firm a vision of greatness and an owner's mentality, a virtual that perpetuates

information sharing, collaboration advantages throughout the organization resulting in high standards of performance. Within vertical linkage, a value creating entrepreneurial culture teaches and rewards teamwork, streamlines logistics and ensures that everyone creates a mechanism for sharing wealth with those who contributed to it. The closer the vertical supply chain linkages, the more the firm is able to respond to the quality needs of different markets, enhancing pricing efficiency and operational efficiency (Hobbs, 2001). Leaders of most successful ventures define authority and responsibility in a way that builds motivation and commitment organization goals.

Trienekens (2010) illustrates the consensus approach to entrepreneurial management in that, entrepreneurs further from delivery of the final product are dependent upon participants further up the chain to continue to buy their product (as opposed to sourcing elsewhere). They provide them with relevant and accurate information on market demand, which strengthens their ability to produce to customers' exact specifications. SMEs further down the chain often receive critical inputs or services from those above them. Vertical relationships are therefore important in moving knowledge and benefits down the chain (Njenga, 2010). The various Vertical linkages in a value chain are illustrated by figure 1.2.

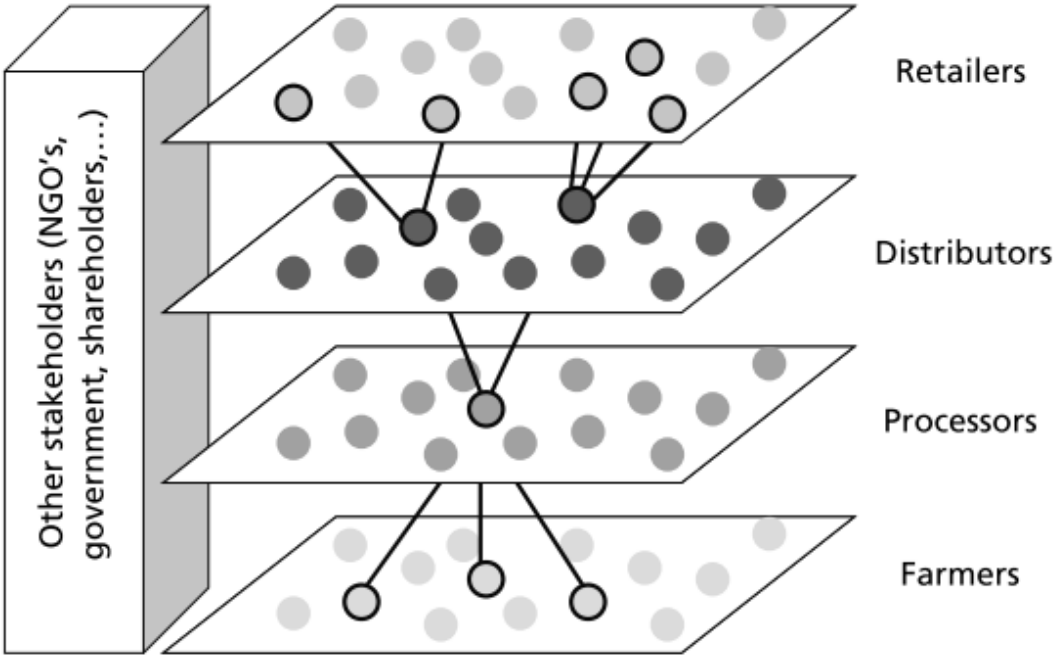

Figure 1.2 Vertical Linkages (Lazzarini, 2001)

Value added is created at different stages and by different actors throughout the value chain such as quality, delivery times, delivery flexibility, and innovativeness. Value adding in beef production focuses in particular on product quality, process quality all customer focused by well a well-trained and motivated employees.

1.1.4 Beef Sector in Kenya

Kenya has an estimated population of 14 million beef cattle from which beef and beef products are produced. The Agribusiness information portal on the beef value chain in Kenya (2013) indicates that the beef sector is one of fastest rising economic sectors

within the agricultural sector driven by growth of beef exports and the increases in population, urbanization and household income. The beef cattle are mainly zebu, Sahiwal and Boran found in the arid and semi-arid lands (ASALS) which contribute about 70% of beef production and dairy herd culls contribute about 30% to the beef industry. The annual per capita consumption of red meat (meat and offal from cattle, sheep, goats and camels) is approximately 15-16 kg resulting to a national average of 600,000 MT of red meat per year and is on the rise (Otieno, 2012) as shown on table 1.1.

Table 1.1: Expected change in Consumption of meat in Kenya 2000 and 2030 ('000MT)

Meat	**2000**	**2030**	**% increase**
Beef	286.9	514.3	179
Mutton	55.8	90.5	162
Pork	11.4	37	325
Poultry	54.8	164.6	300
Total	**408.9**	**806.4**	**197**

Source: Agritrade, 2013

Cattle (beef) are the main source of red meat accounting for approximately 77 percent of Kenya's ruminant off-take for slaughter. Small and medium enterprises (SMEs) in the beef sector comprise of input suppliers, producer SMES, beef processors and beef retailer SMEs. Most beef producer SMEs target domestic price-oriented markets, however; there are exports to the regional markets (Uganda and Tanzania), COMESA (Democratic republic of Congo, Mauritius, Madagascar,) and United Arab Emirates. Poor beef production conditions/practices have resulted to low-quality beef carcasses that cannot compete effectively on the export market. Ineffective disease surveillance and control measures have rendered the ASALs sub-optimal for export beef production. Producers SMEs and other enterprises of low quality meat represent 98% of total red

meat volume. The highest quality beef producers in Kenya are ranches that produce approximately 2% of the Kenya's red meat, selling to hotels, restaurants and supermarkets targeting high income quality oriented consumers, including both affluent Kenyans and Expats/ tourists ((Jeo, 2010). The beef processor SMEs are owned by consumer brands, such as Farmers Choice, Alpha Fine Foods or ranches such as Ol Pejeta or Borana who adopt quality management practices such as quality breeding and fattening for quality beef products that are distributed to high-end retailers. Low-end beef processors serve informal markets such as Keekonyokie Butcheries Limited and Dagoretti or government owned and operated export quality grade such as Kenya meat Commission (KMC) and Isiolo. These meat processors depend on linkage for services such as slaughter (I-Dev, 2015; Agritrade, 2013; Jeo, 2010). The butcheries are the largest category of retailers of beef in terms of volume, selling 65% of total beef production (Jeo, 2010).

In Kenya, the beef processing sector remains largely unexploited. Weak vertical linkages between producer and processors SMEs and production is largely by disorganized small scale producers, who have no formal relationship with the processors, resulting in uncertainties of supply in terms of quantity and quality (Luig, 2011).Ultimately, this translates into high transaction costs that processors pass on to consumers. Moreover the beef SMEs lack innovation product development capabilities, production technology knowledge, market information, economies of scale, and business relations; additionally, they operate in a policy environment that limits their participation in a quality-oriented supply chain (London & Ted, 2010). The beef sector value chain is as shown by figure 1.3.

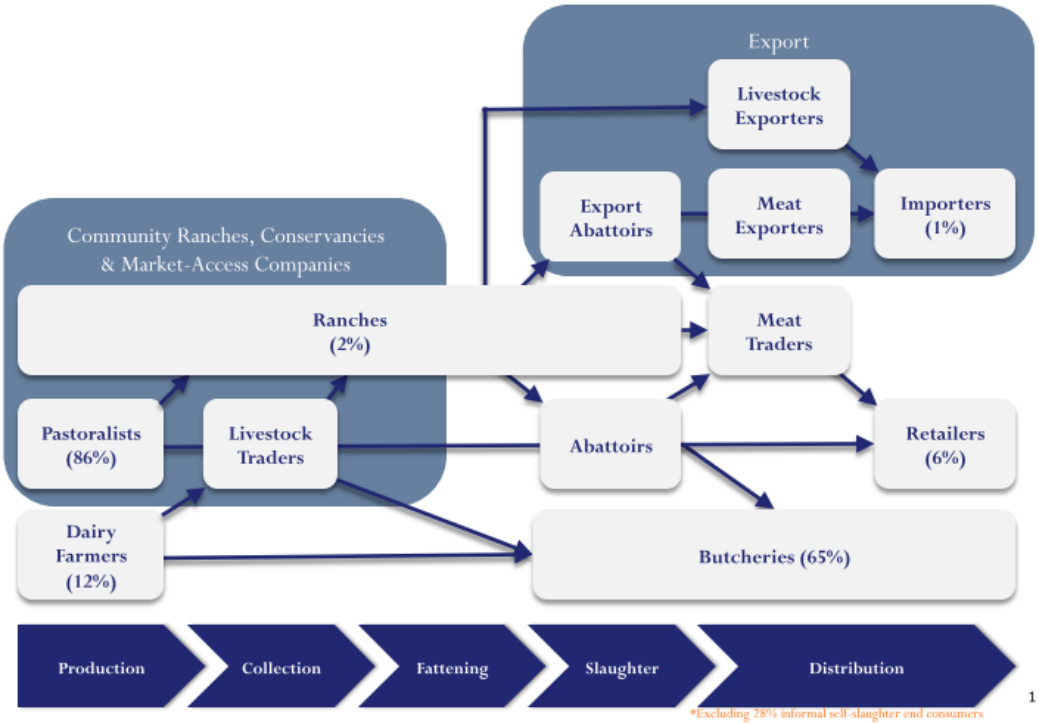

Figure 1.3: The Beef Value Chain in Kenya (AGRITRADE, 2013)

In Kenya, the responsibility for coordinating food quality management rests on the state Department of Public Health (DPH) under the Ministry of Public Health and Sanitation. The basic Kenyan laws for food quality and safety enforced by DPH include the Food, Drugs and Substances Act, Chapter 254, the Public Health Act, Chapter 242 and the Meat Control Act, Chapter 316 (Jeo, 2010). Food-borne diseases are still a major problem in Kenya because of the enormous informal sector in the food industry accounting for at least 80% of the supply to the domestic markets where hygiene controls are rudimentary (Abila, 2003).

Most Kenyan standards are adopted from international ones, such as International Organization for Standardization (ISO) and Codex Alimentarius Commission (CAC). In the food supply chain, farmers have to apply Good Agricultural Practices (GAP), sellers of commodities/raw materials at local or international level have to apply Good Distribution Practices (GDP), and manufacturers have to apply Good Manufacturing Practices (GMP) (Mwangi, Nambiro & Murithi, 2005). Food supply chain operators have to apply either national (mandatory) standards or private (voluntary) standards. Kenya Bureau of Standards (KEBS) is the major chain enabler, the National Codex Contact Point, and is the National Enquiry Point of the World Health Organization (WHO). Despite the existing legal framework for food safety and quality controls, some processed food products in the Kenyan market are of sub-standard quality (Will & Guenther, 2007).

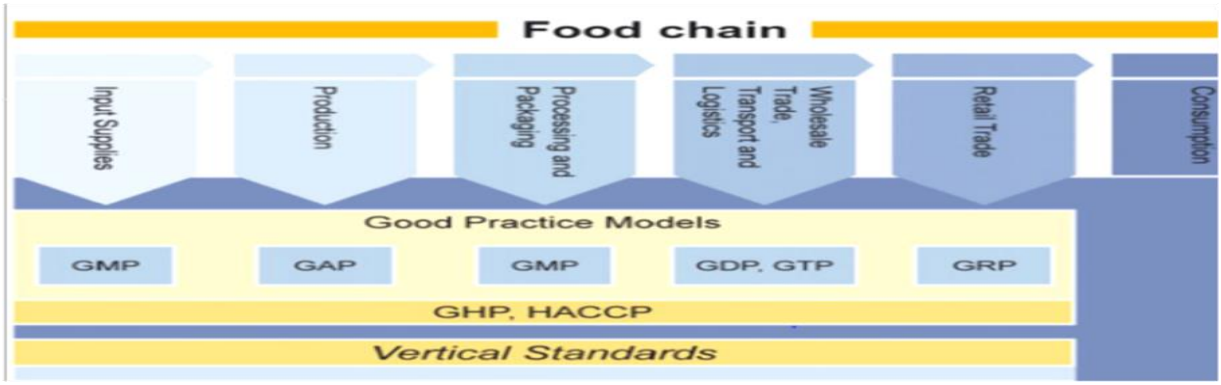

Figure 1.4: Quality standards in the food value chain; (I-DEV, 2014)

GMP=Good Manufacturing Practices; GAP=Good Agricultural Practices; GDP=Good Distribution Practices GTP=Good Transportation Practices; GRP=Good Retail Practices; GHP=Good Hygiene Practices; HACCP=Hazard Analysis Critical Control Point. Kenya lacks a defined and published policy on food safety as part of a wider National Food and Nutrition Policy there exists food laws designed to protect the

consumers (Henson & Humphrey, 2009). Food safety control agencies operate under the Ministries of Trade, Industrialization, Public Health and Sanitation, Livestock, Fisheries Development, and Agriculture (FAO, 2005). The agencies include Kenya Bureau of Standards (KEBS), Kenya Agricultural Research Institute (KARI), Kenya Plant Health Inspectorate Services (KEPHIS), Department of Public Health (DPH), Weights and Measures Department (WMD), Government Chemist's Department, Department of Veterinary Services (DVS) among others (Global Agricultural Information Network, 2005). The functions of these agencies include sensitization and implementation of codes of hygiene and agricultural practices by SMEs in Agriculture throughout the food chain. Despite these, Kenya experiences major problems of non-compliance with basic food quality safety and agricultural health practices in local markets. The level of awareness of the said practices among small producer SMEs is negligible (World Bank, 2005)

1.2 Statement of the problem

The importance of the beef sector is positioned at Kenya's Vision 2030. It specifically aims at planning and implementation Disease Free Zones (DFZs) and beef processing facilities to enable Kenyan meat to meet international marketing standards to enable more domestic processing of these products for regional and international markets. In response to this, leading meat-processing SMEs like Farmers Choice and Quality meat packers (QMP) have invested heavily to develop cold chain to provide the consumers with brand products. The processing SMEs have established closer vertical coordination with their retailers through franchise and long-term contracts (Gamba, 2006). However, loose coordination still prevails among the SMES in the beef supply chain in Kenya and quality problems are still of great concern to Kenyan consumers, moreover, beef SMEs are constrained from gaining a competitive advantage and entering into the world market in spite of high transaction cost (Luig, 2011). The lack of monitoring on the small

producers also produces safety problems. An Empirical study by Zhou and Dai (2005) has indicated that Short-term traditional spot market transaction are still the most popular market channel that producer SMEs use in selling their beef which has brought uncertainty in quantity, quality and price to the processors on one hand, difficulty in making decisions on production and marketing to the producers on the other hand (Zhou & Dai, 2005).

The result of this Scenario has been low innovativeness, slowed enterprises growth (beef marketing growth is 3% annually) and even closure of enterprises (Wanjohi, 2009). While other Agricultural enterprises such as in horticulture have made a jump in exports from 100,000 tonnes in 1997 to over 350,000 tonnes in exports in the year 2014 with a global share of 1.28%, the beef sector exports have been minimal barely exceeding $1.8 million in 2011 due to unreliable deliveries and inability to deliver quantities and specifications originally ordered. Associated logistic and delivery companies are inadequate and unreliable forcing most beef SMEs to exit the business (RoK, 2014). The need to link Vertical linkage with quality has become especially important for SMEs striving to achieve food quality management (Luig, 2011; Bergevoet et al., 2014). However, there are insufficient documented evidences that exist for the relationships between vertical linkages and quality management. Thus, the relationship remains blurred. Also, there is paucity of rich literature that directly investigates the role of enterprise quality policy on the relationship between vertical linkages and food quality management. This is the rationale for conducting this research.

1.3 Study Objectives

The general objective of the study is to examine the effects of vertical linkages on food quality management of SMEs in the beef sector in Kenya.

The specific objectives are:

i) To explore the effect of Transaction Uncertainties on food quality management of small and medium enterprises in the beef sector in Kenya.

ii) To investigate the effect of Information Sharing on food quality management of small and medium enterprises in the beef sector in Kenya.

iii) To examine the effect of Transaction Costs on food quality management of small and medium enterprises in the beef sector in Kenya.

iv) To assess the effect of Collaboration Advantage on food quality management of the small and medium enterprises in the beef sector in Kenya.

v) To determine the moderating influence of Enterprise Quality Policy on the relationship between vertical linkage and food quality management of small and medium enterprises in the beef sector Kenya.

1.4 Research Hypotheses

This study will use hypotheses as state below:

H_1: Transaction Uncertainty affects Food Quality Management of small and medium enterprises in the beef sector Kenya.

H2: Information Sharing affects Food Quality Management of small and medium enterprises in the beef sector Kenya.

H3: Transaction Costs affect Food Quality Management of small and medium enterprises in the beef sector Kenya.

H4: Collaboration Advantage affects food quality management of small and medium enterprises in the beef sector Kenya.

H5: Policy Support Services moderate the relationship of Vertical Linkages and Food Quality Management of small and medium enterprises in the beef sector Kenya.

1.5 Significance of the study

The SMEs in the food industry and in particular beef SMEs have played an important role in increasing the Kenyan gross domestic product and improving international competitiveness (RoK, 2005). The beef SMEs however, have continued to experience a number of major challenges which include; declining market share due to escalating competition from more entrepreneurial and aggressive competitors; devastating consequences from food safety difficulties in obtaining information about customer quality preferences and accessing technological as well as innovation skills (Pelrine, 2009). Opportunities exist for the beef SMEs to improve their competitive position including high quality infrastructure support and reliable beef enterprise policies (RoK, 2005). Empirical findings have identified that the beef SMEs in Kenya are underperforming in terms of global competitiveness and declining productivity performance (Otieno, 2012; Mbwika & Farmer, 2012). Studies have also been carried out aimed at introducing specific change management initiatives to assist the SMES in the beef sector to improve its overall performance (Tilburg *et al*., 2007; AGRITADE, 2013; Bergevoet & Engelen, 2014; Kang'ethe, 2015). There is scanty evidence of an increasing awareness by the beef SMEs of the importance of quality management and the role that vertical linkages can play to ensure quality management uptake by the beef SMEs for competitiveness. Study by Takenaka (2005) reveals that, many developing countries have only a few food-exporting enterprises with modern quality assurance and

improvement systems in place and thus processed food products from these countries cannot compete well in the international food market. Additionally, the transaction Cost Economics (TCE) theory argues that transaction costs and Uncertainty among interdependent SMEs hinder vertical linkages and quality management practices.

This study therefore sought to validate the TCE theory in the beef SMEs in order to improve the relational structure and quality management perception of the food-processing industry. Export-focused policy is one of the main reasons for slow adoption of quality management practices in SMEs. Since most of them are not involved in food exports directly, they have never felt the need and urgency to implement quality in their enterprises. Emphasis on voluntary compliance has not paid rich dividends (Wever, 2010). The findings of this study sort to shed more light on the influence of policy on the relationship between vertical linkage and quality management to enable SMEs make strategic as well as operational decisions to access markets and competitive in a liberalized and globalized economy.

Justification for this research is based on the proposition that there is an opportunity to improve the industry's quality management through frequent sharing of accurate and relevant information, minimizing transaction costs and uncertainties as well as collaborating among SMEs by developing vertical linkages across the beef industry.

1.6 Scope of the study

The aim of this research was to conduct an empirical study on the effects of vertical linkages on food quality management of the beef SMEs. The research dwelt on the quality management practices exhibited by the beef producer and processor SMEs mainly; customer focus, employee involvement product quality and process quality. The study does not include other forms of linkages such the horizontal linkages, partnerships

or governance structures such as spot markets or full integration. Also, the research scope does not aim to develop a vertical coordination for quality management for solving problems related to all kinds of beef SMEs quality management, as the generic food enterprises' quality management practices are well documented in the literature.

This study focuses on the development of measurement instruments of vertical linkages and its effects on food quality management, including the following issues to: conceptualize and operationalize vertical linkages; develop a scale for the measurement of vertical linkages and food quality management; validate vertical linkages and food quality management measurement scale through robust empirical tests; investigate how the vertical linkages affect quality management. To achieve this, the beef SMEs were sourced from Kajiado County, which host over 80% of the beef animals consumed in Nairobi and hosts majority of the contracted beef producer SMEs by the beef processors (Engiida *et al.*, 2013).

1.7 Limitations of the study

The following limitations are worth mentioning. The sample population was drawn from a segment of small and medium business firms in the beef sector. Care should be taken in generalizing the results of this study because the competitive situations of small and medium business activity in the food industry may differ in other parts of the country. Though empirical literature revealed a variety of possible operationalization of vertical linkages, it was not possible to study all in respect to their effect on food quality management. This study aimed at generating basic understanding of the interaction effects of vertical linkages and food quality management. The other limitation may be in the measurement of the dependent variable of food quality management. The measures used pertained to quality management aspects of the customer focus, employee

satisfaction, product and process quality but there may be other measures or dimensions that are better indicators of food quality management.

The sample size (n=134) for this study is recognized to be small but acceptable. However it was a census of 160 beef processor and producer SMEs and the response rate was adequate to draw conclusions about the population. The main purpose of this research however, was to explore and test the feasibility of hypothesized relationships for future research. The data has been collected from a single country, Kenya. This facilitated data collection and controlling diversity. The findings were based on respondents' self-reported cross sectional data and therefore may not reflect changing situations and the series of relationship phenomena between vertical linkage and food quality management. The cross sectional data is likely to be affected by the respondents' predisposition of any events that have happened in the past or conditions at the time of filling in the questionnaire. Acknowledging these limitations, the research authenticates the developed framework and these limitations did not affect the quality of this study and recommendations addressing these issues are discussed in the section below.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Small and Medium enterprises (SMEs) must compete in a complex and challenging business landscape that is being transformed by many factors ranging from liberalization, globalization, technological advancement, rapid changes in customer tastes and preferences, to rapid environmental changes. This new landscape requires SMEs to design entrepreneurial managerial strategies as the traditional orientations of the marketing function do not respond adequately to the quality requirements demanded by the consumers. This chapter attempted to integrate the innovative aspects of vertical linkages, enterprise quality policy and the Transaction cost economics (TCE) theory in order to provide a theoretical and conceptual framework that can be a source of sustainable competitive advantage for the SMEs. It provides an overview of related literature and also looks at related past studies in this area and the gaps inherent in SMEs in terms of Vertical linkages considerations and food quality management.

2.2 Theoretical Framework

In an attempt to explain the relationship between Vertical linkages and food quality management, this research focused on three theories as debated by numerous empirical studies: Transaction cost economics, Inter-organizational Communication, Transaction value and the concept of Total Quality Management (TQM). Transaction cost economics scholars argue that humanly devised constraints shape human interactions and the ‘rules of the game’ needed to limit transaction costs incurred for using a market. The theory further argues that uncertainty from transaction business partners may arise due to Opportunistic behavior. Inter-organizational communication theory focuses on

entrepreneurs' participative decision making in order to identify and take up business opportunities. However, the Transaction value theory recognizes the value of collaborations for better innovativeness and uptake of new technologies. The concept of Total Quality Management emphasizes on the need for entrepreneurs to be customer focused by innovating new quality products and processes.

2.2.1 Transaction Cost Economics (TCE) Theory

Transaction cost theory (Williamson, 1985) has been used to advance the current understanding of why different types of firm linkages emerge. A transaction occurs whenever a product must move between separable stages in production, processing, or distribution (Hobbs, 1997). Transaction costs are the costs of carrying out a transaction, with the nature and size of these costs determining the optimum method of vertical coordination. Economic activity will be organized in such a way as to minimize these costs in the long run (Hobbs, 2001, Martinez & Poole, 2004). Cost that arise from using market mechanisms and affect the optimal method of vertical coordination are; searching costs, negotiation costs, and monitoring costs. Searching costs are the costs that SMEs face in the search for information about product price, inputs, and potential buyers or sellers.

Increased consumer demand for the intangible aspects of food products, such as food safety, assurances of animal-welfare friendly production practices and use of genetically modified materials raises the searching costs (Khoi, 2011). Negotiation costs are the costs associated with the actual transaction incurred while negotiating and writing contracts or agreements, hiring lawyers and investment in machinery. Negotiation costs also arise when a third party or intermediary is required to facilitate a transaction (Liu, Luo & Liu, 2009).After an exchange has been negotiated a transaction may require that a firm or an individual monitor the quality of goods from a supplier, monitor the

behaviour of either party to ensure that all the conditions of the transaction are met, or monitor the activities of employees to ensure managerial orders have been carried out. The costs associated with this action are known as monitoring costs and will also include costs incurred to legally enforce an agreement (enforcement costs) such as ensuring quality of goods and behavior of the parties (Hobbs, 1996). These costs may increase as agents to a transaction do not always possess perfect information, which results in uncertainty associated with prices, product quality, and the actions of other individuals in the market. The economic agents are characterized by bounded rationality, opportunism, imperfect information, either incomplete information or asymmetric information, and conditions of asset specificity are widespread (Williamson, 1986).These concepts determine how transaction costs affect vertical coordination in a particular supply chain.

Increased vertical coordination allows supply chain participants to move towards pricing based on the identification of product attributes that are not easily measured under an existing system. Processors will also prefer increased coordination in situations where uncertainty arises as a result of information asymmetry about product attributes (Han,*et al*.,2006). The presence of information asymmetry may result in processors purchasing substandard products at a premium price (Hobbs, 1996). Opportunistic behaviour can arise as information can be hidden prior to a transaction that may result in adverse selection by buyers. To curb the tendency to act opportunistically buyers and sellers will likely choose the vertical coordination when transaction specific investments are involved and use contracts or alliances as an alternative to carrying out transactions on the spot market (Vieira, 2008). Asset specificity occurs when one partner in an exchange invests in assets that are specialized to the needs of that particular exchange and have little or no value in an alternative use (Hobbs, 1996).

In the beef sector, such investments can include improved herd genetics, specialized inputs related to the production process, new processing technologies, and investments related to specialized human capital. TCE posits that relational mechanism and choice of coordination are derived from economic rationality such as when transaction costs of using spot market system rise, it is efficient to carry out the transaction by a strategic alliance that has closer vertical coordination (Williamson, 1985; Hobbs, 2001).Therefore, the study seeks to address the question; Do transaction costs affect Quality management practices in the beef SMEs. In Transaction Cost Economics (TCE), uncertainty is also a central theme that affects the size of transaction cost and enterprises' quality management (Williamson, 1985; Hobbs & Young, 2000). In addition, uncertainty is defined as a main problem facing top level organizational administrators and can originate either from the broad environment surrounding an economic exchange between parties (market uncertainty),or from transaction partners within exchange relationships because of these partners opportunistic behavior (supplier or buyer behavioral uncertainty) (Ralston, 2014).

Empirical research shows that standard TCE arguments typically refer to the growing uncertainty in food chain especially in meat industry to give reasons for closer vertical coordination to minimize the uncertainties of inter-firm transactions (Hobbs & Young, 2000; Schulze, Spiller & Theuvsen, 2006). Lack of vertical coordination and a lack of a stable market may lead to high price volatility in the beef industry, especially for the upstream industries where price uncertainty is a major factor. Hobbs (1997) discussed uncertainty in cattle marketing as a cause of higher transaction cost in information search, monitoring, and sorting cost. Price uncertainty imposes greater information cost while grade uncertainty imposes greater monitoring cost. At the producer level, price uncertainty may also involve the compliance of grading. Ralston (2014) has found that the greater the uncertainty about future needs, the more explicit the vertical linkage

contingencies which fosters adoption of the exchanges given that level of uncertainty. Due to the natural variations in quality, seasonal patterns, and high perishability, the uncertainty may propagate in beef supply chain through the variation in demand and supply and can be worse if there is incomplete or imperfect information between the participants. Based on these arguments, this study sort to find out whether vertical linkages would be an appropriate entrepreneurial strategy to handle transaction cost and uncertainties for better food quality management among the beef enterprises in Kenya.

2.2.2 Theory of Inter-organization Communication

Inter-organization communication is an essential enabler to improve the performance and comparative advantage of an enterprise and a supply chain. This applies especially for the food sector, because of agri-product market globalization, the perishability nature of foods, shelf-life constraints and food safety. These characteristics of foods necessitate real-time, relevant, reliable and adequate communication of information flows in perishable food supply chain. Inter-Firm Communication between a buyer and key suppliers should be detailed and frequent enough and also well regulated to enable flow of information from one unit (firm, work group, individual) to the other unit. It involves communicating needs, sharing proprietary information, providing helpful information, keeping each other informed of events or changes that may affect them (Carr & Kaynak, 2007). The benefits to Inter-organization communication entail, transmitting persuasive information, participative decision making is fore casted, programmes are coordinated, power is exercised, and commitment and loyalty are encouraged. Additionally it enables sharing of resources between two or more organizations, and benefits all participants (Liu, Luo, 2009). Forrester (1958, 1961) introduced the theory of Industrial Dynamics which explained the dynamics of how the delays, oscillation in the flow of demand information affected enterprise operations mostly the inventory levels and production rates. He emphasized that, management was on the verge of a breakthrough in

understanding how enterprises' success depended on the interaction between the flows of information, materials, money, manpower, and capital equipment. The way these five flow systems interlock to amplify one another and cause changes forms a basis for anticipating the effects of decisions on quality, coordination forms, and investment choices. Lee (2000) developed the term *bullwhip effect* (Forrester effect) rooted in Forrester's Industrial dynamics(1961), to explain the phenomenon of order information distortion and amplification as demand orders move up a Supply chain. The bullwhip effect can misguide upstream partners in their inventory and production decisions. This effect is associated with demand signal processing, rationing game, order batching, and price variations, however it can be mitigated through the combination of planning and sell data, exchange of inventory status information, order coordination and simplified price schemes (Ralston, 2014). Study by Forrester (1958,1961) laid the foundation for understanding industrial dynamics, the impact of information distortion in the supply chain, and values of information sharing for efficient vertical coordination for quality management.

Peng (2011) classifies these values as; Norms and willingness of information communication which are shared expectations for communication behaviours and guide appropriate conduct of the parties in a communication relationship(Heidi&john,1992), communication behavior which includes the communication media used, types/contents of information communicated, communication frequency, information intensity, key people and departments involved, information direction, and communication formality, Communication quality which is information quality, and satisfaction with communication. Fawcette *et al.*, (2010) asserts that, though profitability and competitive advantage are indirect results of information sharing, direct results might be cost reductions, problem resolutions, as well as quality management and control. Information quality is a function of completeness, credibility, accuracy, timeliness and adequacy of

communication flows. This study therefore sought to determine whether information sharing enhances food quality management.

2.2.3 Transaction Value Analysis (TVA) Theory

Transaction Value Analysis (TVA) posits that choices on strategic marketing exchange partners undertake are not only influenced by transaction costs but also the value enterprises claim to obtain. TVA proposes another focus in analyzing the inter-organizational coordination strategy which is claiming the maximized joint value of the two (or multi) exchange partners (Zajac & Olsen, 1993). Brandenburger and Nalebuff (1997) similarly observe that enterprises rarely create value in isolation but instead, they align themselves with customers, suppliers, processors, producers and many others to develop new markets and expand existing ones by embracing quality. Zajac and Olsen, (1993) emphasize the effect of transaction value on vertical coordination choice, noting that, when the pursuit of transactional value necessitates higher transaction costs, and expected joint gains outweigh transaction cost considerations, inter-organizational strategies having a greater joint value will typically require the use of less efficient vertical coordination. Transaction value Analysis emphasizes the co-effect of transaction cost and transaction value, compared with a matrix of low transaction and low joint value, exchanging partners may choose the structure matrix of high transaction and high joint value because the expected high joint value overwhelms the high transaction cost.

While this structure is not efficient according to transaction cost economics due to its high transaction cost, but it´s chosen due to its overwhelming joint transaction value. Chain agents, as benefit-searching units, choose specific vertical coordination structure due to their considerations in achieving collaboration advantages. They intend to pursue joint advantages through a win-win transaction to implement their strategic management objects such as quality management in their enterprises. Furthermore, joint advantages

are related with the resource capability of chain agents, which help them to build competitive advantages in the chain (Thongrattana, 2012). Simatupang et al. (2002) found that the joint interests will be created through coordination between chain agents through operational vertical linkages and organizational vertical linkages, and the mutual benefits lie on improvements in logistics synchronization, information sharing, incentive alignment and collective learning, in which collective learning implies collaborated technological benefits, innovative benefits. Since transaction value refers to joint improvements achieved by exchange partners, Autora (2012) explained transaction value as collaboration advantages whereby, collaboration advantages refer to the joint advantages achieved through transaction (mutual activities) of coordinating enterprises such as mutual improvements in logistics systems, innovation, and technology. Therefore, the study sought to investigate whether Collaboration Advantage influences food quality management in beef SMEs.

2.2.4 Total Quality Management (TQM) Concept

Feigenbaum (1956) introduces the concept of total quality management (TQM) as an organizational approach to keep the existing quality standards at a high level while improving quality through the whole organisation. TQM is an organisation-wide philosophy that requires all employees to engage in continuously improving the quality of products and processes. In this philosophy, quality is a way to determine the attitude and behavior of everyone in the organization and inspires the development of a quality culture throughout the organisation (Deming 1986; Ishikawa 1990). TQM involves a number of practices such as, top management involvement, employment involvement, training and education, focus on the customer, management by fact, continuous improvement that can make organisations doing things right in the first time.

The final key practice of total quality management is empowerment of employees. In this practice employee are encouraged to be proactive in resolving quality-related problems. Khan (2003) suggests that, all employees in the total quality management environment should be treated as internal customers because the internal customer has to deliver satisfaction to external customers. Quality management issues in the agro-food sector are based on the premise that the food supply SMEs chain proceeds in hierarchical strategic networks with a powerful focal firm in a supply chain network. This focal enterprise has the ability to exert managerial discretion so that the quality management concept has to be installed by all actors throughout the network. Eventually each SME must share a homogeneous understanding of quality management, which provides a collective action for quality management practices for vertically linked SMEs (Hanf & Pieniadz, 2007). Quality chain management is responsible for developing a positive reputation for an enterprise. This can only be accomplished if SMEs create and disseminate confidence in food beyond credence attributes such as food safety. Because food quality hazards can enter the food chain at any stage, adequate control and communication throughout the network, as well as the loyalty of the supply chain partners, are essential (Hanf & Dautzenberg, 2006).

Bremmers, Poppe,Wijnands and Meulen (2008) observed that Total Quality Management is a practical approach to enhance product and process quality aspects, strategic attitude (top-management involvement) and organizational behaviour through empowerment of employees. Consumer needs is the starting-point of all quality processes. The basic idea is that quality has a price which could be excessive compared to the advantages, so that the net-effect is negative. Prevention costs increase with higher levels of quality assurance between inter-linked SMEs, while at the same time failure costs are reduced (costs of non-compliance, such as is the case with food safety).

2.3 Conceptual Framework

A conceptual framework is a concise description of the phenomenon under study and is accompanied by a visual depiction of the major variables of the study highlighting the key variables and their relationships (Mugenda, 2008). Kombo and Tromp (2009), define a conceptual framework as a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation. Vertical linkage constructs have been adopted from the study by Singh and Mishra (2014) on supply chain management through vertical coordination in vegetable industry in India. His study operationalized the vertical linkages as risk reduction by reducing perishability, assurance of availability, system transparency through sharing of information and standard improvement.

The vertical linkage proposed for the Kenyan beef Value Chain consists of four elements which are: Transaction Uncertainty, Information sharing, Transaction Costs Collaboration Advantage (Simangunsong, Hendry & Stevenson, 2011). These constructs should be well planned to enhance implementation of quality by the beef SMEs. Enterprise quality policy is the moderating variable that may influence the relationship of the vertical linkage on the food quality management as studied by (Hodgins, 2011) on the Canadian agri-food systems and product segments. The framework is based on four independent variables, and one dependent variable and a moderating variable as shown in figure 2.1.

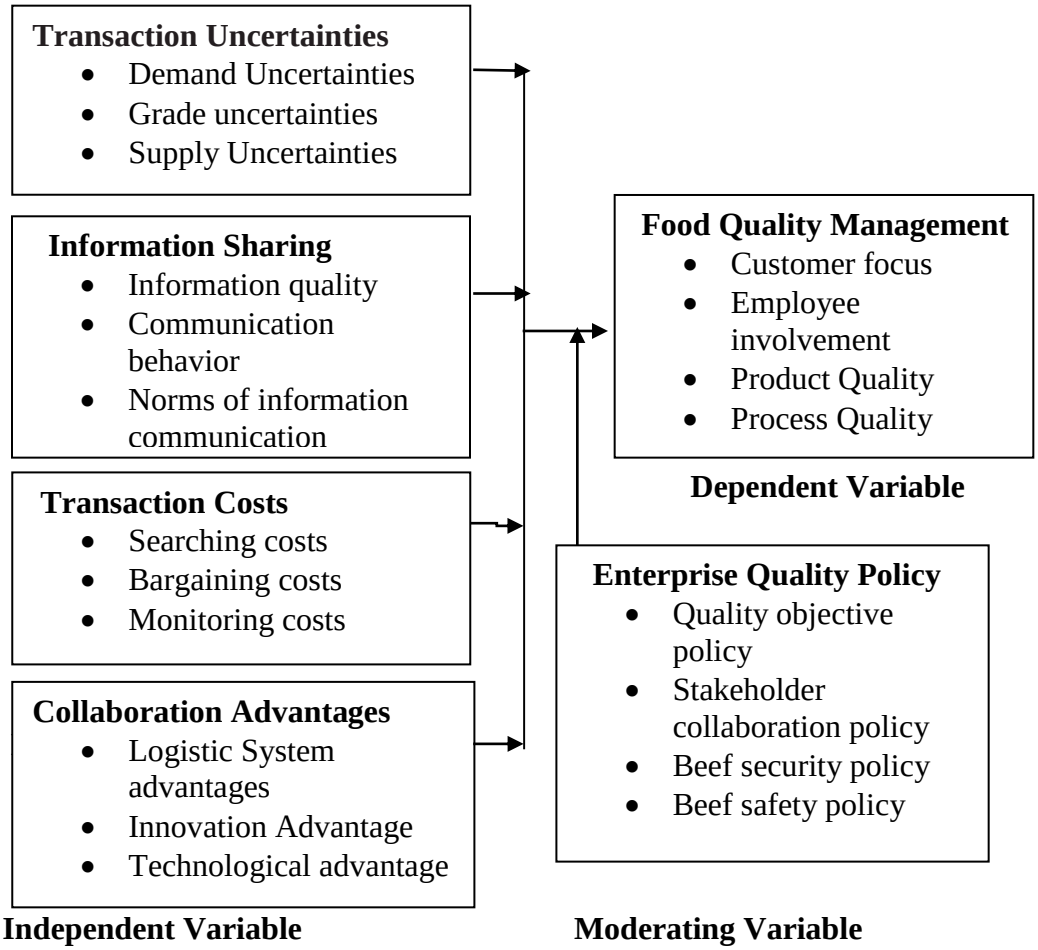

Figure 2.1: Conceptual Framework

2.4 Review of Literature on Variable

2.4.1 Transaction Uncertainty

Risk taking is a dimension of entrepreneurial practice and is considered as one of the major attributes of entrepreneurship (Kasumawardhani, 2013). Risk taking is a SMEs' willingness to engage in calculated business-related risks in the market place in uncertain outcomes. It involves committing resources and entering unknown markets with uncertain outcomes. In vertically linked SMEs, risk and uncertainty minimization is the core element in any competitive strategy (Ying, 2012). Study by Autora (2012) on governance structure choices in supply chain management on the Spanish and Chinese Pork Chain enterprises categorized uncertainty as environmental uncertainty and behavioral whereby, the environmental uncertainty is attributed to unpredictability of demand volume and differences in product variety. Behavioral uncertainty pertains to quality and safety evaluation and information asymmetry problems when SMEs partners are not reliable. The study based on 323 respondents realized that uncertainty factors increase transaction cost and influence the firm's willingness to vertical alignment.

Entrepreneurs will adopt vertical linkages in order to curb demand and supply uncertainties associated with perishability, product wastage, uncertain yields, non-seasonal availability assurance, quality control, risk reduction, grade standard improvement, and support technology. A study by Singh and Mishra (2014) on supply chain management through vertical coordination in vegetable industry in India on 107 producers of potato, brinjal, cabbage, cauliflower and okra, established the need for entrepreneurs to take calculated uncertainty risks of demand, supply as well as grade uncertainties.

The beef sector is involved with high risk and uncertainty because of the intrinsic and extrinsic quality requirements. Seasonal variations create production and supply uncertainties of meat products. A strategy from product driven supply chain to market-driven supply chain would work best where a set of interdependent companies link together to manage the flow of goods and services in supply chain. This entrepreneurial and innovative strategic alliance can meet the issues of multidimensional customer demand, quality, and profitability with a better cost structure. Study by Tang and Musa (2010) identifies various types of uncertainties within a vertically linked SMEs supply chain as; price uncertainty, demand uncertainty, supply disruption uncertainty, quality uncertainty and technological uncertainty among others.

Quality uncertainty is associated with a firms' failure to comply with good manufacturing practices at either the production stage, or raw material quality problem from the supplier or a component quality problem from the suppliers. Therefore supply chain risk is inherent quality uncertainty of raw materials, ingredients, production or logistics in any of the supply members triggering a cascading effect that spreads through a multi-tier supply network (Vukina, 2008). José, Karim and Fabrício (2014) analyzed quality management strategies of the fruit SMEs. The interviews conducted with 19 fruit exporters in Brazil and 15 fruit importers in the UK realized that, quality management can help to reduce uncertainty/complexity in the trade of a product. In most cases, uncertainty arises in transactions when the buyers have doubts about the capacity of producers to deliver products with the required quality level. A way to guarantee the desired attributes in the products and, consequently, reduce the level of uncertainty would be to use quality management procedures in the production processes. It is important to observe that once uncertainty is under control the chances are high that the complexity of the trade relations will also decrease.

Study by Batt (2008) states that transaction uncertainty may include aspects such as product quality fluctuations, product quantity fluctuations; and time fluctuations. Other factors that increase uncertainty in the food SMEs include; seasonality of production, product perishability and demand uncertainty (food safety scare).These uncertainties make the agri-food SMEs chain very difficult to predict and control (Mooi &Gosh, 2010).Hence, the greater the degree of uncertainty between partner SMEs, the greater the need to adopt a vertical coordination, and the lower the possibility to establish closer coordination mechanisms between independent SMEs in the chain. Lee, Kwon and Severance (2007) observe that a coordinated enterprise relationship can reduce risk and uncertainties in transaction and provide many returns such as lower product or services costs, enhanced quality, innovation and responsiveness, and a better firm performance. Uncertainties in vertically aligned SMEs relate to factors such as quality grade uncertainties, conformance to quality of supplies, response time and reliability of delivery.

The potential damage from grade and supply uncertainties may include the direct costs of empty shelves or factories without raw materials to process, loss of customer confidence and broader reputational damage relating to failures in food safety (Ying, 2012). Uncertainties in demand and supply may be caused animal diseases such as Swine fever which would lead to a lot of loss to the producers. Therefore, producer SMEs are in a great need to find a manner to avoid risk, and vertical coordination arises from there. Evan (2006) in his study on new venture risk taking indicates that vertical linkages reduce quality as well as quantity uncertainties and therefore generate efficiencies in moving products through the system. This enables beef producers to obtain a higher price for their products. Linkages convey clear signals and incentives to the producer regarding grades and standards that best meet consumer demands and may result in faster response to consumer demands than cash market signals (Arfini &

Mancini, 2010). Added value associated with early plant deliveries lower supply and quality risks, better utilization of plant labor often are passed on to producers in the form of higher prices for value received and producers are generally satisfied (Trienekens, Omta, & Han, 2007). Supply uncertainty mainly originates from the producers side or the merchants not delivering the raw materials to the processors. The processing firms may delay the supplies to the demand market as result of unmanaged collaborations along the supply chain (Thongrattana, 2012). Processors use marketing linkages to ensure supply and quality, but with lower capital requirements. The control of a substantial volume of their supply needs in advance reduces the likelihood of bidding wars to keep plants running. In vertical linkages, costs are negotiated in advance while others may be based on future markets (Khoi, 2011). Wall (2011) observed that, most food processing SMEs are operate below their attainable production capacity as a result of the combined effect of quality problems of market and raw material supply. Underutilization of capacity has led to loss in profit and ultimately to bankruptcy and business closure. The urgency of quality concept implementation to most of these industries is apparent (Nguyen, 2011). Therefore the study hypothesized that; H1a: Transaction Uncertainty does not affect food quality management of small and medium enterprises in the beef sector in Kenya.

2.4.2 Information Sharing

Inter-firm information sharing involves the sharing of information across firm boundaries which is needed so that inter-linked firms can compete effectively in their environment. Information is an intangible resource identified as an asset that provides competitive advantage to organizational networks when it is shared (Daley, 2009). Study by Kushwaha and Barman (2010) shows that both the quantity and quality of information shared are important for the practices of quality and chain management. Shared information can vary from strategic to tactical in nature and from information

about logistics activities to general market and customer information. Akhtar (2013) has suggested that the key to a seamless supply chain is making available undistorted and up-to-date marketing data at every node within the supply chain. SMEs partners who exchange information regularly are able to work as a single entity. Together, they can understand the needs of the end customer better and hence can respond to market change quicker (Hurburgh, Loy & Lawrence, 2010). In beef chain, the retailer is the closest link to the market and the consumer, while beef cattle producer is the closest to the breeding and producing process. Retailer has the most information about market, price and consumer, while the beef cattle producer has the most information about safety and quality of the breeds. If they can establish a transparent, fluent and accurate chain information exchange system, the information asymmetry will be controlled into the lowest level and safety and quality of the product will be well guaranteed (Autora, 2012).

Transparent, accurate chain information collection and exchange ensures a traceability system which is a tool that contains the information of the whole chain which makes the products be traced from “farm to table” and “table to farm”. Traceability system is an important manner of exchanging information, especially information of safety and quality (Talib *et al*, 2012). Food traceability can be defined as necessary information to describe the production history of a food crop, and any subsequent transformations or processes that the crop might be subject to on its journey from the grower to the consumer's plate. Traceability is part of the food business systems and thus has to be integrated with logistic processes, good manufacturing/agricultural practices (GAP) and food safety programs, such as HACCP. Two ways to trace the information of products are “bottom up” and “top down”. “Bottom up” traces the products’ information from raw material supplier to the Point of Sale (POS) in order to check the reasons that could raise safety and quality problems and to check the characteristics and origin of the

products. “Top down” means that when the consumers encounter safety problems of the food, they can trace back to the origin of the food and make sure where the problem exists, this is always used in the reclaim of the products (Autora, 2012). Through open information sharing up and down the vertical marketing system quality improvements can be made. Wever, Wognum, Trienekens and Omta (2010) argue that though information collection and sharing is costly, if an individual participant uses information only for his own benefit and not that of the vertical market chain, information sharing is squelched. Baban (2013) in the study of the effects of governance on vertical linkages in the Manufacturing industry in Turkey suggested that, communication norms, which are shared expectations for communication behaviors, are positively associated with communication frequency and formality. Communication norms facilitated by the means of communication are crucial for entrepreneurs to achieve vertical linkages, hence considered to attain SMEs chain quality management. Communication willingness, or SMEs openness to communicate relevant information honestly and frequently impacts enterprises’ operational performance and it is critical to the development of a real information sharing capability.

However, many companies place most of their emphasis on connectivity and often overlook willingness. As a result, information sharing between firms seldom delivers on its promise to enable the creation of the cohesive supply chain team (Fawcett et al, 2010). Communication behaviour also includes the communication media used, types/contents of information communicated, communication frequency, information intensity, key people and departments involved information direction, and communication formality. The assessment of information quality is a function of completeness, credibility, accuracy, timeliness and adequacy of communication flows. Study by cook (2005) addressed for the first time a channel members satisfaction with communication, and found empirical evidence that information quality is positively linked to satisfaction with external communication. It is imperative that SMEs

communicate formally and informally. Formal communication could occur through meetings, cluster activities, integrated supply chain systems, industry associations, conferences, and exchanging price information. Informal channels can be created by having a transparent culture within the SMEs' supply base (Webber & Labaste, 2010).

Well aligned partner SMEs will work best when the partners trust each other. Trust is gained through open information sharing and exchange. Withholding or misrepresenting relevant information that is important to vertical members of the value chain increases distrust and inhibits attainment of a common goal of supplying high quality, safe beef to the world (Ferry, Kevin & Rodney, 2007). Too often in the beef industry information is withheld across vertical segments because incentive asymmetric information provides individual profit opportunities at the expense of someone else. Information flow is essential in a well-coordinated market system. Without clear, transparent, and detailed information flow, improvements at each segment are nearly impossible and the value chain fails to send appropriate information to participants. However, with information sharing also come responsibilities of parties to work together. Organizations should view their information as a strategic asset and ensure that it flows with minimum delay and distortion (Daley, 2009). SMEs in the beef chain need to be motivated to change the way they produce goods and services to meet standards, and they need information to do this. The incentives include shared knowledge of the requirements that reflect the additional costs and work involved in meeting requirements. One aspect of creating trust is ensuring that proper information channels are available and being used; these will give the Value Chain actors and producers confidence that they will obtain fair rewards for the costs of implementing new processes to meet standards (Autora, 2012). Therefore the study hypothesized that;

H1a: Information Sharing does not affect food quality management of small and medium enterprises in the beef sector in Kenya.

2.4.3 Transaction Costs

Study by Bijman (2006) on governance structure in the Dutch fresh-produce industry revealed that inter-firm transaction process always involves common cost such as costs of searching information on potential buyers or sellers, product prices, costs of negotiating such as writing contracts, hiring lawyers, investment in machineries, intermediary auctioneers, costs of monitoring or enforcing pre-agreed terms of transaction such as ensuring quality of goods, and behaviour of the parties.

Based on the TCE theory, transaction costs may increase depending on the information asymmetry, bounded rationality (decision making under partial information) and opportunistic behaviour between partners in transactional relationship. Cost can also be affected by relation specific investment, uncertainty, and frequency in the transaction. For example, a sunk cost, arising from a broken contract can be very high if the relation specific investment is high, although, formal contract can be a major tool to protect specific investment and safeguard the cost of opportunism (Liu *et al*, 2009). Environmental and behavioural uncertainty may induce SMEs to vertical collaborations to invest large resources in monitoring and bargaining costs (Mooi & Gosh, 2010). The monitoring of the SMEs activities requires resources to plan and to carry out the controls. Bargaining costs are also critical due to the difficulties of observing several quality characteristics (Raynaud, Sauvee and Valceschini, 2005). For each characteristic the monitoring costs depends upon the capacity of the party to observe the action of the counterparty SME. These costs increase with the information asymmetry and can be exacerbated by the opportunistic behaviour (Raynaud, Sauvee & Valceschini, 2009). The complexity of the product characteristics may increase the ex post monitoring costs. An inadequate monitoring system could determine similar consequences. Furthermore, unforeseen contingencies concerning the technology or the market may require the parties to adapt their activities in order to sustain their coordination. Lacks in the

coordination patterns cause the emerging of maladaptation costs pushing the governance structure out of the alignment (Williamson, 1991& Gosh, 2010). The increasing ex post transaction cost may determine failures in achieving the quality strategic objectives. The monitoring system, while guaranteeing the compliance with quality standards, also complements vertical linkage as a coordination oriented safeguards (Gonzàlez-dìaz, Fernandez Barcala & Rayanud, 2009).

A survey administered to 73 cow-calf operators in the Canadian beef industry by Brocklebank (2004) demonstrated that entrepreneurs in the beef industry are willing to make trade-offs between the benefits received from improved coordination and the transaction costs that arise, as long as the benefits exceed the increase in costs. The survey on supply chain coordination also revealed that, the potential long term reduction in ongoing searching costs may be greater than the short-term search costs that must be incurred. Similarly, the negotiation costs associated with a delay in payment may be less than the overall gain associated with reduced negotiations over the long term under a vertically aligned system. Autora, (2012) studied Governance Structure Choices in Supply Chain Management on Spanish and Chinese Pork Chain. The survey collected data from 350 pork slaughtering and processing enterprises found out that the governance structure choice of the chain depends on transaction cost and collaboration advantages. Other variables of information use and exchange and uncertainties influenced vertical collaborations among the chain SMEs. The study ascertains that exchange partners establish more stable and more intense relationship to reduce transaction cost and to maximize collaboration advantages (mutual activities). This value forms as improvements, mainly in mutual logistics systems, cash response, information exchange, technological improvements and innovative improvements leading to quality management improvements. Therefore the study hypothesized that;

H1a: Transaction costs do not affect food quality management of small and medium enterprises in the beef sector in Kenya.

2.4.4 Collaboration Advantage

Investments in vertical linkages design aims at improving logistics performance and also at increasing and preservation of food quality attributes of freshness and safety. The producer SME is dedicated to satisfy the consumers by providing fresh products and this increases the demand for local organic food products. Reducing the travel distance and time could have positive impact on meat quality and animal welfare. During meat transport, the environmental conditions such as temperature, humidity and presence of contaminants may be influenced by type of packaging, way of loading and the availability of temperature conditioned transportation means and warehouses (Bosona, 2013).

Strategic supplier partnerships highlight a direct, long-term relationship and encourage reciprocal plan as well as difficulty or problems solving efforts. Such strategic partnerships support shared benefits among the parties and ongoing participation in one of more key strategic areas such as technology, products and markets and are therefore a critical component of a leading edge Value Chain (Ferry et al., 2007). The interpersonal relationships of entrepreneurs – as agents of the firm – with other individuals and organizations can provide the conduits, bridges, and pathways through which the firm can access and ensure sustained market (Abdul, Ismail & Cooper, 2011). In HACCP quality management system in the beef sector, personal networks with other players are especially favorable for long-term economic success. Entrepreneurial managers are skilled at using their time to develop relationships with people who are crucial to the successful exploitation of their perceived opportunity especially the suppliers of their raw materials. The firms in the supply chains need to collaborate on developing new

customer centric products. Crafting strategies that are responsive to consumer preferences is critical to the success of small scale beef enterprises as consumers of meat seek specific product and service characteristics such as price, sensory qualities such as color and taste as well as convenience which includes, ready-to-eat products. Product differentiation strategies that capture quality features sought by consumers are a key component of the competitive strategies being pursued by small scale beef enterprise (Maumbe & Brown, 2013).

Demand for beef is driven primarily by its "customer value" bundle which is obtained by aligning product characteristics and buyer preferences. The producers, collectors or beef wholesalers ought to be responsible for improving the quality of their products. This ensures both a high price and a high rate of beef food chain acceptance of their products (Bhaskaran, 2009). Firms that embrace entrepreneurial practices have the ability to identify and seize opportunities in a way that differentiates them from conservative SMEs (Martins, 2012). Entrepreneurial firms are frequently involved in frequent and extensive innovations to gain competitive advantage. They take risks to exploit the opportunities in the market place and react aggressively to competitors actions. They acquire and use market information to develop new capabilities to pursue business opportunities (Nguyen, 2011).

Innovativeness relates to perceiving and acting on business activities in new and unique ways (Kusumawardhani, 2013). Drucker (1934) defines innovation as resources new ability to create wealth, which can be trained and learned. Pitt (2007) found innovative capability to be the profitable implementation of creativity to generate business, overcome problems and enhance existing systems. Innovation is what organisations use to incorporate technology, organisation and market change to enhance business success. Martins (2012) on the other hand argued that innovative processes cannot be separated

with business strategies and competitive environment. Findings from a study by Hortoványi (2010) indicate that it is possible for firms to overcome the negative impact of competition on performance through innovation. Similarly, (Wiklund & Shepherd, 2005) pointed out that innovation is a means through which firms can portray their core competencies and transform them into performance outcomes that are critical for success. Innovation involves creation or adoption of an idea new to the organization. Businesses that act entrepreneurially are those that survive the changes embarked upon by doing things differently and innovatively. Such innovative ideas are usually implemented when traditional systems and ways of doing business are no longer effective. The need to pursue new and different work approaches to repeatedly improve the company products and processes or seize opportunities is an innovative indicator (Storer, Ferrer, Hughes & Hyland, 2010). Therefore the study hypothesized that;

H1a: Collaboration Advantage does not affect food quality management of small and medium enterprises in the beef sector in Kenya.

2.4.5. Food Quality Management

Quality management is an integrated philosophy, requiring managerial proactiveness in various areas such as customer orientation, leadership, employee involvement, and supplier relationships (Ying, 2012). Hans and Pieniadz (2007) stated that quality management can be conceptualized into two major elements; quality management practices (input) and quality performance (output). Das et al. (2000) conceptualized various quality management practices, including supply chain management, top management involvement, quality training, employee involvement and customer commitment. Total quality management is a practical approach to enhance product as well as process quality aspects, strategic attitude (top-management involvement) and organizational behaviour through empowerment of employees. Consumer needs is the

starting-point of all quality processes (Bremmers et al., 2008).The basic idea is that quality has a price which could be excessive compared to the advantages, so that the net-effect is negative. Prevention costs increase with higher levels of quality assurance and control but failure costs are reduced, such as is the case with food-borne diseases. Customers are the driving force for product and service design. A customer-oriented or a customer-focused organization maintains its competitive advantage. In a customer-oriented organization, customer satisfaction influences all the company's actions. As customer expectations are dynamic, an organization needs to survey customer expectations regularly and modify its operations accordingly.

The availability of customer complaint information to managers and the extent of the use of customer feedback to improve product quality reveal the level of customer focus in an organization (Hai, 2013). Study by Labuschagne, Louw and Ndanga (2010) indicates that, new driving forces likely to stimulate more vertical linkages include increasing quality demands from customers. Consumers are demanding food products that are guarantee against all food-borne microorganisms. Food SMEs especially the food processors are imposing high standards on process and product security with corresponding links with suppliers becoming more necessary.

Study by Loc (2010) notes that consumers are now aware of the need to consume food that is not just giving taste but the food should be safe, healthy and free from disease causing micro-organisms as well as foreign particles. Study by Haileselassie, Taddele, Adhana and Kalyuo (2013) on a consumer food purchase models revealed that consumer ‘concern’ has a high positive causal effect on food quality perception. Consumers are concerned about safety issues related to food production, process and handling by the food industry. Some consumers have ethical concerns about how food is produced such as effects of production processes on the environment and animal welfare. To provide

information about on-farm production practices, producers, processors and retailers must communicate through closer vertical relations. The beef SMEs should ensure that there is interaction between management and technology in aiming for quality and safety to meet or exceed customer expectations.

A study by Nordenskjöld (2012) on the implementation of a quality management system in food production in the UK says that customer quality requirements have to be communicated to all employees of an enterprise, and all levels of managers and employees of the enterprise have to be trained so that customers can be satisfied. Training in quality for beef SMEs managers is important because they are the ones that set up the company's quality goals. The top as well as middle managers are responsible for training quality control to first line managers and all employees in the enterprise. Employees should be trained by the top and middle managers on the quality issues each group ought to implement (Trung, 2013). Study by Wall (2011) on farm-to-table food safety for Colorado produce crops has shown that SME employees are on the frontlines of food safety, therefore, providing effective training and making food safety information available demonstrates to employees that food safety should be a priority. Insufficient training of food handlers on proper food safety and handling practices is a primary underlying cause contributing to the spread of foodborne illness. Ideally, training will motivate workers to willingly conform to proper sanitary practices.

Study by Raynaud, Sauvee and Valceschini (2009) on governance of the Agri-food chains and quality signalization in Europe realized a relationship between product quality and vertical coordination. Based on the findings of 42 case studies in three sectors (processed meat, cheese, fruit and vegetable sectors), several quality attributes signaled to the consumers depend on prior stages, from processors to, sometimes, producers or input suppliers. Entrepreneurs adopt certain governance structures in the vertical chain that offer greater control over agents who strongly influence final quality.

2.4.6 Enterprise Quality Policy

The management of enterprises should be committed to successfully implement Quality management as resources and management leadership is required. The management needs to establish a sound quality policy which will state the enterprises' policy, its objective (s), its mission and vision for the quality of the enterprises' products and services and its commitment to customers (Jeo, 2010). The contents of the policy should be made known to and understood by all employees. 'The preparation of a properly thought out policy, together with continuous monitoring, makes for smoother production and operation, minimizes errors and reduces wastes (Bremmers *et al*, 2008).

The quality policy requires that management establishes a quality policy with emphasis on the customer by everyone in the company, Identify customer needs and requirements, change organisation culture and management style to sustain the quality culture necessary to meet these needs, educate and train in quality management principles, tools and techniques; concentrate on prevention rather than detection and ensure quality of bought-in materials and services. The quality policy must be widely publicized and understood by all levels of the enterprise and the quality policy plan should include inter-firm training and employee motivation. Policy design and implementation concerning food safety can be improved by implementing vertical linkages supported by adequate institutional framework and legislative reforms at the national level.

As a consequence of many food crises new legislation in the area of food safety has emphasized the primary responsibility of food producer SMEs as well as those of the whole food chain, including processors, distributors and retailers (Cafaggi, 2010). Private regulation influences the structure of the chain and the modes of coordination. But the choice of regulatory process affects the choice of instruments to coordinate compliance and shape of the chain. Coordination within the supply chain depends on

the nature of the adopted standard; Quality management standards are often implemented to increase retailers control over suppliers (Humphrey, 2008). While vertical linkage could yield positive benefits and food safety standards, Hodgins (2011) observed that an enterprises' quality policy has a positive moderating effect as this stipulates how the stakeholders or partners will be selected. Zindiye (2008) affirms that an enterprises' quality policy defines a firms quality specifications and their implementation implying a positive effect on policy to achieve food quality management vertically linked firms.

2.5 Empirical Review

Empirical studies regarding quality management and vertical linkages in the food industry have been one. Vertical coordination within Agriculture is associated with Mighell and Jones (1963) whose studies focused on the economic innovation of organizational design that could impact the industry more than technological innovations. They called the new organization methods vertical coordination, and included under that term all ways in which the vertical stages of production are controlled and directed (Colecchia, 2008). Previous work by Collins (1961) had noted the failure of open market prices to successfully guide adjustments in production and distribution in the agricultural industry.

Study by Thongrattana (2012) on an analysis of the uncertainty factors affecting the sustainable supply of rice production in Thailand realized that the uncertainty factors have a negative effect on the performance of the rice supply chain as was measured by the inventory levels, quality and customer service. The study which focused on supply, demand, process, competitor and government policy uncertainties of 162 rice milling and exporting enterprises realized that, competitor uncertainty had the greatest negative impact on supply chain efficiency while demand and supply uncertainties had a

significant effect on the rice quality. The empirical results confirmed the importance of implementing supply chain management practice in order to improve performance as well as handling uncertainty factors among the SMEs in the supply chain. Martino and Frascarelli (2013) in the study on adaptation in food networks on Italian Agri-food enterprises affirmed that, allocation of decision rights is confirmed as an opportunity to cope with the sources of severe uncertainty in Agri-Food sector mainly technological innovation and quality grade and safety objectives.

The study also realized that there is need to pay attention to these uncertainties in order to design effective vertical linkages which should enhance the performance of the chain. Results of the six case studies showed that, the negotiation concentrates of the allocation of decision rights relating to uncertain circumstance; Innovation issues, quality (and safety) objectives and consumers satisfaction seems the main circumstances requiring the allocation of critical decision rights in vertically linked enterprises. The study concluded that environmental uncertainty was critical to the design of modes of collaboration in agro-industry chain and therefore to their expected performance.

Vorst (2005) states that SMEs uncertainty includes three key aspects: product quality fluctuations, product quantity fluctuations and time fluctuations. In the fresh produce sector we have additional factors that increase uncertainty, such as seasonality of production and product perishability. This together with demand uncertainty (GMOs. food safety scares, avian flu) makes the agri-food chain very difficult to predict and control. Hence, the greater the degree of uncertainty in the supply chain, the greater the need to vertically integrate chain governance structure, and the lower the possibility to establish closer coordination mechanisms between independent members in the chain, and thereby further way from the vertical coordination philosophy, and vice versa. Singh and Mishra (2014) studied supply chain management through vertical coordination in vegetable industry in India and established that entrepreneurs adopt vertical linkages in

order curb demand and supply uncertainties associated with perishability, wastage, uncertain yields, non-seasonal availability assurance, control price fluctuation, quality control, risk reduction, grade standard improvement, and support technology. The study operationalized vertical coordination using nine variables as demand security, perishability reduction wastage reduction, yield increase, non-seasonal availability assurance, quality control, risk reduction and grade standard improvement. The sample size of 107 respondents comprised the experts of vegetable industry and producers engaged in cultivation of vegetables namely potato, brinjal, cabbage, cauliflower and okra.

Study by Dinghuan and Xiaoyong (2009) on contracts, trust and market environment in farmer buyer Relationships on 210 apple growers and their buyers in Shandong province by means of focus group discussion, as well as vegetable growers in Hubei provinces established that, cooperation and coordination will increase in a highly uncertain input/output or competitive sector as marketing channel dyads tend to protect themselves by being better organized. In a high degree of uncertain market demand, buyers and sellers are trying to work together during the difficulty times, such as using vertical coordination to safeguard their enterprises and minimize the impacts of the turbulence from the markets. In a study by Uddin (2010) on the inter-firm relationships and performance factors in the Australian beef supply chain: Implications for the Stakeholders, findings indicate that the SCM of agri-food industry, especially the beef industry, relates to all the linkage from the primary producers to the final consumers such as input suppliers, producers, processors, wholesalers and retailers .

The chains' high risk and uncertainty associated with intrinsic and extrinsic quality requirements and seasonal variation affect the production and supply of meat products.Therefore, customer driven strategic alliance can meet the issues of

multidimensional customer demand, quality, and profitability with a better cost structure and firm performance. For example, some consumer can be sensitive to specific attributes and preparation of meat product that requires the integration of downstream information on market preferences, and requires special arrangement for production, processing and packaging at a reasonable price, such as organic or Halal food preparation. A case study finding on Pharma Consortium SMEs by O'Reilly and Haines (2013) supported the proposition that small food enterprises engage in vertical linkages to deal with market uncertainty.

The most important factors influencing members to join the network were related to SME capacity, such as product differentiation (86%), promotion (86%) and 'to increase consumer demand' (82%). However, market access and information were also important, for example factors such as access to new markets (82%), market information (64%) and flow of information from the trade (71%) influenced most members to vertical linkages. All of the members identified uncertainty as an important factor influencing their decision to join the consortium, while only 27% of the rest identified uncertainty as important. Autora, (2012) studied Governance Structure Choices in Supply Chain Management on Spanish and Chinese Pork Chain. The survey collected data from 350 pork slaughtering and processing enterprises found out that the governance structure choice of the chain depends on transaction cost and collaboration advantages.

Other variables of information use and exchange and uncertainties influenced vertical collaborations among the chain SMEs. The study ascertains that exchange partners establish more stable and more intense relationship to reduce transaction cost and to maximize collaboration advantages (mutual activities). This value forms as improvements, mainly in mutual logistics systems, cash response, information exchange, technological improvements and innovative improvements leading to quality

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Study by Bijman (2006) on governance structure in the Dutch fresh-produce industry revealed that inter-firm transaction process always involves common cost such as costs of searching information on potential buyers or sellers, product prices, costs of negotiating such as writing contracts, hiring lawyers, investment in machineries, costs of monitoring or enforcing pre-agreed terms of transaction such as ensuring quality of goods, and behavior of the parties. These costs may increase depending on the information asymmetry, bounded rationality (decision making under partial information) and opportunistic behaviour between partners in transactional relationship. Cost can also be affected by relation specific investment, uncertainty, and frequency in the transaction. The study revealed that, producer entrepreneurs will opt for vertical alignment to spot market to minimize the transaction costs.

The necessity to increase food safety and quality, to reduce costs and waste, to build customer and stakeholder value requires the whole food chain to act jointly. This condition promotes the process of vertical coordination in the agri-food business. The study on the Ukrainian agri-food SMEs realized that, depending on relative transaction costs and costs of physical product flows, vertical coordination becomes apparent in the form of vertically cooperating hybrids. Consumers value food quality as more important

such that it can no longer be in sole responsibility of a single firm but has to be a key issue of all entrepreneurs in the whole food chain meaning that any visible link of the chain has to guarantee "correctness" of the total food quality (Hanf & Gagalyuk, 2009). The study by Riveros and Santacoloma (2004) on alternatives to improve market access capabilities of rural SMEs in Latin America's crop and livestock established that stronger linkages between producers and processors and between producers and buyers of crops and livestock enhance strong, trusting relationships that foster a 'win-win' situations through risk reduction for both processors and farmers, or cost savings by better production planning and cash flow management. A better understanding by farmers of quality requirements of processors and consumers, as well as increased and more stable incomes from guaranteed market outlets for their products are some of the direct results of improved linkages.

Study by Wever, Wognum, Trienekens and Omta (2010) on the EU pork supply chain notes that, an important aspect of Vertical linkages is the establishment of sustainable, long-term and equitable public-private partnerships. This is achieved by addressing issues of information systems, technical support for quality control in production and processing, market guarantee systems, access to credit/risk capital, appropriate innovations and technologies and training programme for practical experience of trainers, mechanisms to enforce contracts, information sharing about specific market demands, interventions to regulate market services development and regulations to avoid market disloyalties. Canver, Hans, Trijp and Beers (2008) in a their study on the emergent demand chain management: key features and illustration from the beef business with retailers in the beef chain in the state of Rio Grande do Sul (Brazil) observed that, a single firm is not able to serve all buyers in the market because firms are limited in terms of skills and resources to execute all activities needed to produce and deliver the demanded products /services. The study concluded that, customer-oriented

enterprises are vertically linked as only then can they offer innovative customer value proposition in terms of product quality as well as adopting a unique organizational arrangements to coordinate production, beef processing and delivery to final customers.

A Study by Maumbe and Brown (2013) on the UK wineries observed that entrepreneurial practices such as innovativeness and proactiveness are crucial in building strategic collaborations in the Agri food supply chains. Their study realized the need for the food system to quickly adjust to changes in tastes and preferences. As the system becomes more responsive, traditional relationships among producers, especially how they communicate consumers' demands, need to also change. Innovative linkages in form of contracting and integration create new communication methods that increase the ability to transmit consumer demands to food producers as markets are shifting from external coordination toward vertically coordinated contracts and integration. Study by Cook (2005) on livestock supply chain in Nigeria noted that consumers are willing to pay more for meat from a system of production that result in branded, customized product, since consumers place a lot of value on food safety and ability to trace products to the point of origin.

The value added to meat products cannot be captured without an innovative vertical linkage throughout the beef and pork production, processing and merchandising systems. Regarding the poultry SMEs, Cook (2005) observed that, spot market is rare among the small-scale poultry SMEs, but a network of vertical linkages exists from the input supplies to the consumer. A study by (Bhaskaran, 2009) of a project by Land O'Lakes on lamb meat and cheese industry in Former Yugoslavia Republic of Macedonia (FYROM) noted that issues of communication norms and values underpin the relational paradigm in inter-firm collaborations; information sharing and dissemination underpin the transactional paradigm. Chain efficiency is determined by both transactional efficiencies and by competency in customer relationship management

which calls for creation of organizational structures and systems which will increase throughput, transaction efficiencies and relation bonding (trust, cooperation, and communication) across actors in the producer-consumer chain. Trienekens, Omta & Han (2007) in their study on joint impact of supply chain integration and quality management on the performance of pork processing firms in China realized that supply chain integration is directly linked to firm performance through quality management. The study concluded that firms wishing to improve their performance should invest in quality management and that to improve the quality of the products and reduce risks and uncertainty in the pork supply chain, firms should develop more integrated chains with their suppliers. Processors also should pay attention to build strategic relationships with their most important supplies in order to provide high quality pork products to the consumers. A study by Vukina (2001) on Vertical Integration and Contracting in the U.S. Poultry Sector based on the transaction cost framework provided an economic explanation of the existing market organization of the poultry industry. The study found out that, Vertical integration is explained by risk sharing, technological progress and innovation dissemination, consumer demand for product reputation and uniform quality, and access to capital.

In the study of Hobbs (2001), a coordinated approach to production, processing and marketing was regarded as the driving force for the Danish pork industry to remain one of the most successful industries in the world. This approach was built on a thorough understanding of the requirements of different markets, a dedication to quality which includes the ability to provide a consistent and reliable supply of high quality products tailored to the needs of different markets. Cooperation between players at different stages of the supply chain enables information to be shared effectively and efficiently throughout the supply chain. Wever, Wognum, Trienekens and Omta (2010) researched on alignment between chain quality management and chain governance in European Union pork supply chains. The case-study results showed that four different types of

systems can be distinguished for coordinating quality management in EU pork supply chains. The patterns found between quality management systems and governance structures in the examined cases indicate that transaction-cost-economic considerations explain quality management systems choices. Han, Trienekens and Omta (2011) studied the relationship and quality management in the Chinese pork supply chain. The empirical results provide managers of pork processing firms with an insight to use relational governance appropriately for managing pork supply chains under uncertainty and with asset specific investments. The research findings show the importance of both transactions attributes in determining long-term oriented inter- firm collaborative relationships. The positive relationship between vertical integration and quality management systems is proven and thus it is important for managers to opt for appropriate governance arrangements to ensure quality management in the pork chain.

Study by Abatekassa and Peterson (2011) on market access for local food through the Conventional Food Supply Chain by SMEs in Southeast Michigan found out that the "quality" dimension (differentiated and niche products - organic, natural) is the factor in creating economic benefits. Priority to organic, natural or niche/specialty products; requires additional market services from producers/suppliers which calls for entrepreneurial orientation to production. Producers in the Agri-business have always been entrepreneurial by taking risks, innovative and being proactive Vertical linkages offer an opportunity for the producers to be proactive, develop trust-based relationships, and to provide timely and valid information on supply and delivery arrangements.

Food safety incidents, notably E-Coli 0157, and BSE in cattle has resulted in risk management becoming a major driver of vertical alignments in the food supply chain generally, and specifically the beef chain. Research undertaken by Hornibrook and Fearne (2003) on managing perceived risks as a marketing strategy for the UK food

service industry focusing exclusively on the retail sector showed that, perceived risks associated with the production, processing, distribution and consumption of fresh beef have been effectively managed through vertically coordinated supply chains. Through vertical coordination, buying goals are aligned, and perceived risks managed through the use of process controls such as HACCP, ISO 9000 and numerous assurance schemes. The fragmented industry structure makes it more difficult for risk perceptions to be effectively managed through the alignment of buying goals between stakeholders. Study by Hanf and Pieniadz (2007) on Polish dairy enterprises in Poland established that, food is perceived as a complex bundle of characteristics, with an increasing level of importance placed on credence attributes relating to product and methods of food production (e.g. environmental friendliness).

Food processors and retailers must re-design their food chains in such a way that all stages are involved in meeting the requested 'new quality.' Therefore, the coordination mechanisms of existing food chains have to be altered, because spot market transactions are unable to properly coordinate the exchange of credence attributes. These must be substituted by transactions in vertically-coordinated chain organizations. There is evidence that the majority of these agro-food SMEs systems are organized as vertical networks, i.e., supply chain networks. While operative chain quality approaches address food safety and risk issues as well as efficiency issues, strategic chain quality system is used to achieve a qualitative competitive advantage.

Strategic chain quality management considers additional quality attributes, which are credence characteristics. As SMEs seek to remain competitive in today's marketplace, they often look externally for assistance in meeting customer expectations. One way this can be achieved is through collaboration. SMEs Supply chain collaboration is defined as a long term relationship where participants cooperate, share information, and work

together to plan, design and agree on logistics and even modify their business practices and organization to improve joint performance (Ralston, 2014). SMEs actively seek partners to collaborate by utilizing joint effort and skills to provide value neither firm could wholly generate individually (Corsten & Kumar, 2005). Mishra and Shah (2009) examined collaboration's impact on market and project performance in the area of innovations in new product development. The authors utilized the constructs of supplier involvement, logistics alignment and collaborative competence to represent inter and intra organizational collaboration. The results of a survey data from six countries including the United States indicated a direct relationship between collaborative competence and project performance, but an indirect relationship between collaborative competence and market performance mediated through project performance. The findings showed the value of collaboration advantage on innovation in new product development project performance.

Cao and Zhang (2011) conceptualized supply chain collaboration from a resource based view perspective. Their research study employed empirical survey data to validate a structural model in which collaboration was a resource which led to the collaborative advantage capability which positively impacted collaborative performance. Results indicated that, collaborative advantage was a synergistic force that brought SMEs together and helped in creating superior performance. Study by Frankel, Goldsby and Whipple (2005) to define the "how" and "why" of SMEs collaboration analyzed the practice of efficient customer response in the grocery SMEs. The study revealed that SMEs benefitted from the relationships developed between suppliers and retailers. Fifteen pairs of SMES were qualitatively studied regarding customer response and collaboration. Five factors were identified as being key to successful collaboration; a willingness to innovate and change, understanding the other partner's business, common goals and objectives, and information sharing (Frankel et al., 2005).

Uddin (2010) studied 315 firms in the beef industry from the states of Western Australia and Queensland. The sample respondents were categorized as input suppliers, beef-cattle producers, processors, retailers/exporters, and wholesalers. The study which sought to find out the Inter-firm Relationships and Performance Factors in the Australian Beef Supply Chain realized that, 'Transaction Climate' which encompasses mutual benefits is the strongest determinants of developing a vertical coordination, while negotiation power, presence of industry competitors, and the degree of vertical coordination significantly influence the entrepreneurs relationship strength.

Findings also demonstrated that supply chain performance highly positively influences the competitiveness of the beef industry in terms of increased market share and innovativeness. Study by Bosona (2013) on logistics network in local food supply in Sweden shows that a good logistic system is essential in vertically linked SMEs. Compared with large scale meat processing SMEs, the small scale meat processor SMEs could reduce travel distance, time, and emission and could improve animal welfare, meat quality and safety, and customer satisfaction.

The integration of logistics managements along with clustering, coordination, and optimisation techniques, could reduce the transport distance, time, trips, and emission, and improve the vehicle capacity utilisation in the local food enterprises. As a consequence of reduced transport distance, number of vehicles and improved vehicle capacity utilisation, food quality management in terms of customer satisfaction, product and process quality would be enhanced. The results of the 1635 beef SMEs interviewed revealed that the integrated logistics network has implications for improving food traceability, logistics efficiency, food quality and safety, the potential marketing channels, economic benefits, and competitiveness of suppliers. Study by Hanf and Gagalyuk, (2009) on supply chain quality and managerial challenges from Ukrainian

agri-food business sought to find out the relationship between vertical coordination and chain quality management in the Ukrainian agri-food business. The results of the in-depth interviews affirmed that, to increase food safety and quality, to reduce costs and waste, to build customer and stakeholder value requires the whole food chain to act jointly. Depending on relative transaction costs and costs of physical product flows, vertical coordination becomes apparent in the form of vertically cooperating hybrids. Consumers value food quality as more important such that it can no longer be in sole responsibility of a single firm but has to be a key issue of all entrepreneurs in the whole food chain meaning that any visible link of the chain has to guarantee "correctness" of the total food quality.

Sila and Ebrahimpour (2003) analysed and compared 76 empirically validated TQM factors and their impact on various performance measures across 23 countries. The findings showed that top management commitment and leadership, customer focus, information and analysis, training, supplier management, strategic planning, employee involvement, human resource management, process management, teamwork, product and service design, process control, benchmarking, continuous improvement, employee empowerment, quality assurance, social responsibility, and employee satisfaction were the most commonly extracted factors across these 76 studies.

José, Karim and Fabrício (2014) analyzed quality management strategies of the fruit SMEs. The interviews conducted with 19 fruit exporters in Brazil and 15 fruit importers in the UK confirmed that the quality management strategies used in the international fruit trade were; detailed product specifications, quality control during the production processes; production environment monitoring, integrated logistics management; and strategic alliances with trade partners. The study also realized that, quality management can help to overcome the small-number condition. It is not difficult to find unbalanced

business relations where one side has excessive ascendancy over the other side. The problem typically results in the prominent side using its power to obtain excessive gains from the weak side. This unbalanced situation can lead to the deterioration of the trade relationship. When the quality management approach is adopted both sides are committed to obtaining gains not from each other but from the improvement of the quality of products and processes. The efficiency gains obtained can then be divided between the partners. Study by Raynaud, Sauvee and Valceschini (2010) on governance of the Agri-food chains and quality signalization in Europe realized a relationship between product quality and vertical coordination. Based on the findings of 42 case studies in three sectors (processed meat, cheese, fruit and vegetable sectors), for many products, the quality of the final product sold under the quality signal greatly depends on different stages of the vertical chain. Several quality attributes signaled to the consumers depend on prior stages, from processors to, sometimes, producers or input suppliers. The choice by entrepreneurs between spot and vertical alignment is dependent on which one guarantees quality to the final consumer. Entrepreneurs adopt certain governance structures in the vertical chain that offer greater control over agents who strongly influence final quality.

2.6 Critique of Existing Literature

A number of studies have been done on SMEs in the food industry focusing on strategic innovative alignments from production through to the customer in a bid to capture market opportunities. Trienekens, Omta & Han (2007) in their study on joint impact of supply chain integration and quality management on the performance of pork processing firms in China concluded that firms wishing to improve their performance should invest in quality management and that to improve the quality of the products and reduce risks and uncertainty in the pork supply chain, SMEs should develop more vertically integrated chains. The unit of analysis in this study was the dyadic relationship between

the pork processors (the buyers) and their suppliers, managers of purchasing, supply management and operations functions. The construct of quality management was studied as a mediating variable for the relationship between vertical integration and enterprise performance. Study by Bhaskaran (2009) on developing and sustaining joint enterprises in a transitional of the former Yugoslavia republic of Macedonia on sheep and lamb cheese established that demand chain strategy based on customer orientation and seamless integration of all actors in the value chain through a joint enterprise fosters relationship bonding, structural cohesion and transaction efficiencies. The case study addressed issues arising from differences in the values, norms, behaviours, cultures and organisational structures of all actors in the chain thus adopting a relational rather than a transactional perspective to study the vertical linkages between SMEs in the sheep supply chain.

The study by Riveros and Santacoloma (2004) on alternatives to improve market access capabilities of rural SMEs in Latin America's crop and livestock established that Stronger linkages between producers and processors and between producers and buyers of crops and livestock enhance strong, trusting relationships that foster a 'win-win' situations through risk reduction for both processors and farmers, or cost savings by better production planning and cash flow management. However the study focused on quality management by producers, processors and buyers of products to improve access to market. Quality management construct was studied as an independent variable.

Study by Maumbe and Brown (2013) on entrepreneurial and Buyer-Driven Local Wine Supply Chains in Kentucky found out that Entrepreneurial approaches of ability to exploit new market opportunities, provision of innovative customer centric products, enterprise diversification, and risk reduction, health and safety, and the need for better market coordination and sustainability motivate SMEs to vertical linkages. However, the

study focused on the change from a commodity-based to a customer-focused operation, market competitive and coordination strategies and challenges facing the development of small and medium wineries. The study emphasized vertically integrated to enhance both competitive and risk management strategies.

Research undertaken by Hornibrook and Fearne (2003) on managing perceived risks as a marketing strategy for the UK food service industry focusing exclusively on the retail sector showed that, perceived risks associated with the production, processing, distribution and consumption of fresh beef have been effectively managed through vertically coordinated supply chains. Study adopted a case study research design constructs of perceived risk were financial and time loss. Canever, Trijp and Beers (2008). The emergent demand chain management: key features and illustration from the beef business. The Demand Chain Management concept is examined empirically through a case study with retailers involved in the beef chain in the state of Rio Grande do Sul (Brazil).

The study concluded that the increased complexity, diversity and dynamics in consumer demand has forced the whole business system to be more complex, more flexible, and more innovative which is motivated by differentiated consumer preferences. The case study was a comparative analysis on the supply and demand chain management in terms of logistics and marketing objectives between the traditional and differentiated retailers. Constructs of transaction ucertainty, sustainability of markets were not addressed. Study by Hanf and Pieniadz (2007) on Polish dairy enterprises in Poland showed that agro-food SMEs systems are organized as vertical networks to address food safety and risk issues as well as efficiency issues and to achieve a qualitative competitive advantage.

However, the study focused on constructs of operational efficiency and effectiveness, especially reducing transaction costs information sharing on price, quantity, and quality

as well as reducing risks of quality output. Constructs of entrepreneurial practices was not covered in the study. Vukina (2001) studied vertical integration and the emergence of vertical alignments with independent poultry producers in the US. The study established that risk sharing; technological progress and innovation dissemination, consumer demand for product reputation and uniform quality, and access to capital are the drivers to vertical linkages. Though the constructs of vertical integration were defined, information sharing construct did not form part of the study. Singh and Mishra (2014) studied supply chain management through vertical coordination in vegetable industry in India and established that enterprises adopt vertical linkages in order curb demand and supply uncertainties associated with perishability, wastage, yield, non-seasonal availability assurance, control price fluctuation, quality control, risk reduction, grade standard improvement, and support technology.

Autora (2012) in a study on Governance Structure Choices in Supply Chain Management on the Spanish and Chinese Pork enterprises realized that, vertical linkage reduces risks of epidemic diseases and input prices to the Pig producers. Accurate and reliable Information is shared regarding new market opportunities, quality management system, technological innovations and market prices. The study used a case study design and emphasized transaction costs and collaboration advantages to the choice of governance. Collaborative advantages of Quality management, information sharing and risk reduction were studied as independent variables and supply chain management was the dependent variable.

Study by Cook (2005) on the meat enterprises in Nigeria affirms that vertical linkages enhance marketing efficiency leading to improved product competitiveness and quality assurance. Increasing profitability is a major incentive for enterprises to promote and maintain quality standards, presently the major force driving value-added improvements

in agricultural product supply chains. The study focused on quality management for all the actors from the input suppliers to the consumers to increase competitiveness. Study by Abatekassa and Peterson (2011) on market access for local food through the conventional food supply chain in Southeast Michigan found out that the "quality" dimension (differentiated and niche products - organic, natural) is the factor in creating economic benefits. The study dwelt on the relationships between the wholesaler, retailers and the customers to assess the customer value for local food. A case study design was adopted limiting generalization of the findings.

Uddin (2010) in his study on Inter-firm Relationships and Performance Factors in the Australian beef supply chain: Implications for the Stakeholders focused on input suppliers, beef-cattle producers, processors, retailers/exporters, and wholesalers. The data were analysed using the partial least square based structural equation modelling. Results indicated a more formalized vertical interactions and information exchanges with relation specific asset, long term contract, and higher level of coordination on production, sales, and delivery times have significant positive effect on the performance.

2.7 Research gaps

This study sought to investigate the effects of vertical linkage on food quality management in the small and medium enterprises in the beef sector in Kenya. Studies on supply chain collaborations and specifically vertical linkages have until now mainly focused on large multinational companies (Autora, 2012; Wever et al., 2010; Trienekens *et al*., 2007). However, there are inadequate studies on involvement of SMEs in vertical collaborations (Hornibrook & Fearne (2003). Customer value creation is a prerequisite for a competitive advantage, and it is created when the benefits to the customer associated with a product or service exceed the offering's costs to the customer (Abatekassa & Peterson, 2010).Empirical literature indicates product quality and market

services as two of the numerous sources of customer value (Khoi, 2007).The relationship between vertical linkages and customer value in form of quality is inadequately addressed. While research shows a positive relationship between vertical linkage and enterprises' competitiveness and performance through quality management, majority of studies have adopted the case study approach which limits generalizability of the study findings to other enterprises such as the beef sector (Loc, 2010; Autora, 2012; Ellebrestch, 2012 ; Trung, 2013). Diverse food enterprises have been covered such as poultry (Vukina, 2001) vegetables (Thongrattana, 2012; Singh &Mishra, 2014), wine (Maumbe & Brown, 2013), lamb and cheese (Bhaskaran, 2009), Pork (Autora, 2012) sea food (Wever, 2010; Khoi, 2007; Loc, 2010), livestock (Cook, 2005).

However, inadequate studies have covered the beef sector (Hornibrook & Fearne, 2003; Canever *et al*., 2008; Uddin, 2010). Worse still, the beef studies are mainly in the UK (Canever *et al*., 2008), Chinese (Autora, 2012) Australian (Uddin, 2010) with scanty study in the Kenyan context. To address the research gaps, this study seeks to adopt the Economic transaction cost theory, inter-organization communication theory, transaction value theory and total quality management concept to examine the relationship between vertical linkage and food quality management in the beef SMEs in Kenya.

2.8 Summary

Reviewed empirical studies seem to point to a need for a more vertically aligned approach to food quality management especially in the meat sector for safety and quality (Uddin, 2010; Han, Trienekens & Omta ,2011;Autora, 2012). Studies have also reviewed that quality is a chain-wide concept affecting every stage of the supply chain from production to consumer and hence the need for entrepreneurial strategies of working in close collaboration among the SMEs (Wever, Wognum, Trienekens & Omta, 2010). Empirical review has brought to the light the various motivations to vertical

linkage among the food and especially the beef SMEs. The need to manage quality for enterprise performance (Cook, 2005; Vukina, 2008, Uddin, 2010), the need to access and share accurate and relevant information regarding market price and opportunities (Bhaskaran, 2009), the need to mitigate on transaction uncertainties (Riveros & Santacoloma,2004; Hornibrook & Fearne,2003), innovativeness (Maumbe & Brown, 2013), logistical advantage and technology (Abatekassa & Peterson, 2011). The shift from firm to chain-wide competitiveness has been triggered by the forces on stringent global quality assurance systems as well as the need to incorporate the SMEs in the food supply chain who would otherwise not access markets (Hobb, 2001; Canver, Hans, Trijp & Beers, 2008).

Study by Hanf and Pieniadz (2007) reveals operative chain quality approaches to address food safety and risk issues as well as efficiency issues, thus strategic chain quality system is used to achieve a qualitative competitive advantage. Empirical studies have dwelt more on the governance choices and enterprises performance (Trinekens, 2011; Gereffi, Lee and Christian, 2008) or governance structure and its effect on management practices (Junqueira, 2010; Khoi, 2011) with the results revealing an inclination to hybrid governance choice to spot market. Other studies have shown that vertical linkages enable small and medium poultry meat entrepreneurs to access customer-oriented market promoting economies of scale (Vukina, 2008). Study by Singh and Mishra (2014) points out the need to reduce wastage due to perishability, yield increase, demand security, non-seasonal availability assurance, quality control, risk reduction, system transparency, grade standard improvement, support technology and open information sharing. Efficiency along the food supply chain from production to the consumer seems to be the focus in some studies (Hanf & Pieniadz, 2007).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology and research design used in the study. It describes the study population, sampling and data collection methods. The chapter also presents and describes the procedure, methodology and the techniques used to gather, process, analyze and test the hypothesis formulated.

3.1.1 Research Philosophy

The research considered different research paradigms, matters of ontology and epistemology which relate to the development of knowledge, nature of the knowledge and assumptions about sthe way researchers view and examine it (Bryman,2012). Research paradigms are perceptions, beliefs, assumptions, nature of reality, truth and influence the way in which research is undertaken, from design to conclusions and they ensure that the research biases are understood, exposed and minimized (Bordens & Abbott, 2008). Epistemological issues concern the question of what is (or should be) regarded as acceptable knowledge in a discipline (Bryman, 2012; Autora, 2012).

It is described as the theory or grounds of knowledge expanding into claims or assumptions about possible ways to gain knowledge of reality, how, what exists, what may be known, what can be known, and what criteria must be satisfied in order to be described as knowledge (Cohen, 2010). The research paradigms for creating management knowledge (epistemology) can be divided into three philosophies that is, positivism, post positivism also described as interpretivism and critical theory (Cohen, 2010). Positivism advocates the application of the methods of the natural sciences to

study social reality and beyond. It entails the principle of deductivism, whereby the purpose of theory is to generate hypotheses relating to an organizational context that can be tested to allow explanations of laws to be assessed. The positivism principle of inductivism holds that knowledge is arrived at through the gathering of facts on what truly happens in organisations and is discovered through categorisation and scientific measurement of the behaviour of people and systems (Eriksson & Kovalainen, 2008). The current study research question aimed to test a hypothesis and therefore positivism with a deductive approach was adopted. The positivist paradigm produces knowledge that is based on the experience of senses and comes from collecting verifiable empirical evidence in support of theories or hypotheses (Denzin & Lincoln, 2005).

The positivist paradigm has been selected with the suggested use of four criteria for maintaining efficient research: internal validity, external validity, reliability and objectivity. The research seeks to adopt objectivism ontology as data collection will be based on active involvement of the people within an organizational set up. Among the various research approaches, the qualitative research method is useful for comprehending the problem setting and focusing on culture, meaning or subjectivity. The objective method by contrast is useful for establishing reliability and validity by focusing on objectivity, measurement and statistics (Cooper & Schindler, 2008).

The positivist paradigm defines a quantitative research approach that can be applied to investigation. Thus quantitative approach was employed to collect data from a large representative sample of respondents. The data was collected from beef cattle producers and processors in Kenya. A survey method using a self- administered questionnaire is employed to cover the wide geographic area and save cost. The type of investigation this research undertakes is a correlation study to determine the extent to which the dependent variable is affected by independent variables. By using a questionnaire, the extent of researcher interference is minimal and the study setting is not unnatural, as the

respondents answered the questions in their normal environment of their organization. The time horizon of this study was cross-sectional, also called a 'one-shot study' (Bryman, 2012) and empirical context of this study was the beef SMEs in Kenya.

3.2 Research Design

Research design is the process the investigator follows from the inception to completion of the study which entails description of all concepts, variables and categories, the relational propositions and the methods of data collection and analysis (Mugenda, 2003). A research design provides a framework for the collection and analysis of data and the choice of the research design reflects decisions about the priority being given to a range of dimensions of the research process such as; expressing connections between variables (Khoi, 2011; Bryman, 2012). Research design describes a flexible set of guidelines that connect theoretical paradigms first to strategies of enquiry and second to methods for collecting empirical material. Additionally, a research design situates researchers in the empirical world and connects them to specific sites, persons, groups, institutions, and bodies of relevant interpretive materials, including documents and archives (Ab Wahid, 2010).

Descriptive research studies describe the characteristics of a particular individual, or of a group (Kothari, 2009). Bordens and Abbott (2008), argue that descriptive surveys can be used when collecting information about people's attitude, opinions, habits or any of the variety of education or social issues. Mugenda (2003) describes descriptive research as a process of collecting data in order to test hypothesis or to answer questions concerning the current status of the subjects in the study. Correlational studies are used to determine whether there is a relationship between two or more variables, as well as determine the nature, degree and direction of this relationship (Cooper & Schindler, 2008). There are three possible results of a correlational study: a positive correlation, a negative

correlation or no correlation. This study identified a positive correlation as evidenced by the increase of both independent and the dependent variable (Food Quality Management).The study used the null hypotheses to make predictions about the variables.

The cross-section survey was chosen because it enables replicability, generalizability and greater external reliability (Mugenda, 2003). Whereas, previous studies have adopted multiple case study design (Wever, 2010; Ellebrecht, 2012; Sanchez, 2010, Loc, 2006; Trung, 2013; Junqueira, 2010), study by Otieno, Hubbard and Ruto (2012) on technical efficiency in beef production and Luig (2011) on phytosanitary risks along the Kenyan beef value chain have adopted a cross section survey. Inadequate studies have used cross section survey design particularly on the vertical linkages and food quality management in the beef sector SMEs in Kenya. It is therefore on this premise that the study adopts the cross-sectional survey. This study adopted a descriptive and correlational research designs using a cross-sectional survey.

3.3 Population

A Population comprises of the entire group of individuals, objects, items, cases, articles or things with common attributes (Mugenda, 2003). Bryman and Bell (2011) define population as the universe of units from which a sample is to be selected. It is the total collection of elements about which a researcher wishes to make inferences (Cooper & Schindler, 2008). The target population for the study was comprised of food small and medium enterprises owners specializing in beef products located in Kajiado central (producer SMEs) and beef processor SMEs in Kenya and these comprised the unit of analysis for this study. The total number of licensed beef SMEs in Kenya is 186 SMES processing and retailing meat (RoK, 2014). Out of these, 15 beef SMEs are licensed as export and local beef processors and have formed linkages with 145 beef producers in

Kajiado central. Using a purposive sampling technique, Kajiado Central was selected. Using this technique one is able to capture a wide range of perspectives relating what one is interested in studying (Mugenda,2003). In this case the study was interested in an area with a total representation of vertical linkages. Kajiado Central has a population of 145 beef SMEs supplying beef animals to the 15 beef processors.

3.4 Sampling Frame

A sampling frame is the source material or device from which a sample is drawn. It includes the actual list of individuals included in the population (Mugenda,2003) which, in this study was composed of all the 160 owners of the beef enterprises. The sampling frame was a list of all licensed beef processors obtained from the Public Health and Meat Hygiene office, state department of Livestock. A list of beef producer SMEs was provided by the procurement departments of the beef processing SMEs. These lists provided the names and addresses of the beef producer SMES and this enabled easy access to the respondents.

3.5 Sample size and Sampling Technique

Cooper and Schindler (2008) refer to a sample as a portion of the target population which if well selected represent that population. A sample is also defined as a part of the total population (Mugenda , 2011). Sampling is the act, process or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population, is done to some elements of a population so that conclusions about the entire population can be drawn (Kombo & Tromp, 2006). Determination of sample size requires consideration of both quantitative and qualitative factors. Quantitative determination of sample size involves calculations based on a number of factors: the precision required, level of statistical

significance desired and the number of variables. Each of these factors is directly proportional to the required sample size. In addition, the statistical techniques which will be employed to analyze the data will themselves dictate the sample size (Mohammad, 2008). Sophisticated multivariate analysis necessitates the use of a large number of responses (Hair, Joe, Tomas, & Marko, 2013). From a qualitative viewpoint, deriving conclusions requires high precision and large amounts of information, which can be achieved by increasing the sample size (Mugenda,2003). Other important qualitative considerations with respect to sample size are the nature of the research and the desired outcomes, the literature precedent for similar studies, the expected completion rate and the availability of resources to conduct the study (Zikmund, Babin, Carr, & Griffin, 2012).

To perform statistical analyses such as Structural Equation Modeling (SEM), a sufficient sample size is important. Hair, Ringle and Sarstedt (2011) recommend a minimum number of one hundred respondents to conduct SEM. Tabachnick and Fidell (2006) concluded that sample sizes of greater than three hundred are ideal, samples of one hundred and fifty are generally sufficient if some of the variables have high loadings. Increasing the sample size allows weaker relationships to be detected and enables generalizability of results, therefore, the ratio of responses to independent variables should always be greater than 5:1, and ideally should be 15: 1 (Sekaran & Bougie, 2010).

Kombo and Tromp (2006) posit that, a census is attractive for small populations, for instance, 200 or less. Since the accessible population was 160 beef enterprise owner managers of the small and medium-sized enterprises, this study adopted a census of the entire population. Study by Syed (2012) on supply chain management as a model for SMEs implementation adopted a census. Kombo and Tromp (2006) further state that a census eliminates sampling error and provides data on all the individuals in the

population. The number of respondents was the 160 beef SMEs managers, assuming one beef SMEs manager per small and medium-sized enterprise. The study therefore adopted a census of the 160 beef SMEs. The summary of respondents' sectors was as indicated in Table 3.1.

Table 3.1: Sample Size of the Study

Small and Medium Enterprises Category	Number of SMEs
Processors	15
Producers	145
Total	**160**

3.6 Data Collection Instruments

Bordens and Abbott (2008) state that data collection instruments are a means by which primary data are collected in social research. Bryman (2012) recommends two alternative primary quantitative data- collection methods: observation and survey. Observation involves information being collected personally and directly by watching the setting and the behavior of people and then assigning categories to each element of behavior (Mugenda, 2003). The current research study focused on data from the past; therefore observation method was not appropriate. Survey methods involve structured interviews and questionnaires. The interview method involves posing questions to the respondent and recording the answers. Although this method is the most accurate, has a high response rate and provides more complete answers (Thangrattana, 2012), it has a limitation of possible bias by the interviewer and it is time consuming. The questionnaire covers a wide geographical area though its response rate may be low or some questions may be left unanswered resulting in on-response bias. The main research

instrument in this study was a questionnaire. A questionnaire was preferred because of its ability to collect data from a large group within a short period (Cooper & Schindler, 2008). Target questions comprised of structured and unstructured questions). The inclusion of open-ended questions allowed respondents to answer on their own terms, enabling the study to discover unexpected things about the way people see a topic. Questionnaires are popular within the various studies on quality management initiatives like TQM, ISO and Good Hygiene practices (GHP) because they are consistent and stable and provide less opportunity for bias or error than interviews (Mugenda,2003). The questionnaires have been used to study quality management in different value chain in different countries and regions, such as Pangasius fish in Vietnam (Khoi, 2007; Khoi, 2011) and shrimp supply chain quality in Vietnam (Loc, 2010; Fotopoulos, *et al*, 2013).

3.7 Data Collection Procedure

Data collection is the gathering of information to serve or prove some facts (Mugenda,2003). The questionnaire was self-administered to the respondents.This technique involves interviewer meeting the respondents physically and asking questions face to face as either the respondents or the interviewer fills in the questionnaire (Cooper & Schindler, 2008). Self-administered questionnaire was adopted to enable clarity of information required considering that the respondents educational background is relatively low (Otieno, 2013). The method has also a higher response rate and saves on time (Mugenda,2003). However the method faces a risk of interviewer interference as the situation is contrived. To obtain a high response rate and accurate data from the questionnaires, Mugenda (2011) suggests a number of effective techniques several of which have been used in this study; the questionnaire was simple, short, logical sequence, avoiding technical terms and vague expressions and avoiding requests for personal data. Clear directions for filling out the questionnaire were also provided.

A cover letter addressed to the managers and owners of the enterprises was used to introduce the owner of the research and the objective of the study. Secondary sources included; research journal, textbooks, Annual reports from the state Department of Livestock, relevant past studies and Livestock Magazines. This was largely desk review of published literature on quality management within a vertical linkage of a food Value Chain. Mbwika and Farmer (2012) have used a desk study on the study on "End market analysis of Kenyan Livestock and meat. This questionnaire has been used to study marketing management of traditional food producers in the EU (Gellynck, Banterle, Kuhne, Carraresi & Stranieri, 2012).

3.7.1 Measurement of Variables

The measurement of the characteristics of the respondents was done using open-ended and structured questions to derive descriptive statistics regarding the age, education background,gender and the nuber of years the SMEs have be in business. Various indicators were used to measure the study variables for the independent, dependent and moderating variables. To develop the measurement of the independent variable, the ambitions of the vertical linkages were considered. The prompting factors and benefits realized by the beef SMEs determine the nature of the relationships among the interdependent beef SMEs. The benefits that beef SMEs associate with being vertically aligned in the beef value chain, and which the study sought to address include handling the uncertainties in transactions, information sharing, minimizing transaction costs and having a collaboration advantage in terms of technology and innovation**.**

Various studies of food quality management have been discussed in section 2.5 and it is noted that indicators of food quality can be different because they focus on what is important to customers. This study adopted the principles of TQM quality management standard which entails customer focus, employee involvement, product and process

quality since quality goals is a collective activity for all employees in an enterprise. The study was guided by Enterprise quality policy as the moderating variable. Beef SMEs can be persuaded to implement Quality management when it is a legal requirement, and importantly when it is properly enforced. The presence of a legal requirement can be considered part of a framework to promote quality management. Enterprise quality policy was measured as; Quality objective policy, stakeholder collaboration policy, beef security policy and beef safety policy.

The variables were measured on a five- point Likert scale ranging from "Strongly agree" to "Strongly disagree" where point 1 was assigned to strongly disagree showing respondents' disagreement with the statement while point 5 was assigned to strongly agree indicating that the respondent was in agreement with the stated factor. The Likert scale was adopted because data from Likert scale is ordinal and of equal weight (Bryman, 2012). It can be analyzed as interval data (Thongrattana, 2012; Cooper & Schindler, 2008) allowing data statistical techniques at two levels of measurement: Ordinal and interval data (Ab Wahid, 2010). Bryman (2012) elucidated that Likert scale is applicable in nearly all fields of scholarly and business research. It is used in a wide variety of circumstances such as when the value sought is a belief, opinion or effect; when the value sought cannot be asked or answered definitely and with precision; and when the value sought is considered to be of such a sensitive nature that respondents would not answer except categorically in large ranges. The nature of the data that was collected in this study exhibited majority of these features and so the Likert scale was the most suitable. A Likert scale can be evaluated easily through standard techniques like, factor analysis and logistic regression analysis (Sanders, 2008).

All the hypotheses to test the relationship between vertical linkages and food quality management were measured by a linear regression model.The Likert scale has been adopted for the study on "Seafood Supply Chain Quality Management" (Loc, 2010) and

"maintenance of ISO 9000 in Malaysian service organizations" by Ab Wahid (2010). The Likert scale is the most widely used approach to scaling responses in survey research (Bryman & Bell, 2011; Talib *et al*., 2012) and it is appropriate for this study in order to minimize variability of response but increase response rate.

3.8 Pilot Test Study

To ensure the validity and reliability of the research instruments, a pre-test and pilot survey was conducted (Mugenda,2003). Pilot study is a small-scale version of a study used to establish procedures, materials, and parameters to be used in the full study (Abbott & Bordens, 2008). The pilot study helps clarify instructions, determine appropriate levels of independent variables, determine reliability and validity of data collection methods and streamline study procedures. If well conducted, pilot studies minimize the mistakes a study makes when eventually the real work is done (Cooper & Schindler, 2008).

The pilot study should not be carried out on people who might have been members of the sample that would be employed in the full study (Cooper & Schindler, 2008) but the respondents should be comparable to members of the population from which the sample for the full study will be taken (Bryman & Bell, 2011). The pretest sample is between 1% and 10% (Mugenda & Mugenda, 2003). The questionnaires were pre-tested to a selected fifteen respondents (10%) consisting of five beef SMEs retailers, six beef producers and four beef SMEs slaughter house owners. The results of the pre-test were used to make corrections to avoid errors or bias in the data collection exercise.

3.8.1 Reliability and Validity of Data Collection Instruments

Reliability of measure concerns its ability to produce similar results when repeated measurements are made under identical conditions (Abbot & Bordens, 2008). It is the

degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions (Cooper & Schindler, 2008). A measuring instrument is reliable if it provides consistent results. Once the quality of reliability is satisfied by an instrument, then while using it the researcher can be confident that the transient and situational factors are not interfering (Kothari, 2009).

Cooper and Schindler (2008) have classified reliability into three types, that is, test-retest, internal consistency and inter-item correlation. The study adopted the internal consistency and inter-item correlation reliability since they provide good reliability estimation on a construct. Confirmatory Factor Analysis was used to assess both internal and external consistency. R^2 was applied to estimate the reliability of the measurement items where R^2 less than 0.5 implied that the item is deleted. Construct reliability (CR) value and average variance extracted (AVE) value were computed. Studies that have used Cronbach's α include Ab Wahib (2010) on maintenance of ISO 9000 on service organizations in Malaysia, Ellebrecht (2012) on combined preventive quality management methods in inter-enterprise health management in pork chains. In general, reliabilities less than 0.60 are considered to be poor, those in the 0.70 range, acceptable, and those over 0.80 good (Sakaran, 2009). Validity is the ability of a construct's indicators to measure accurately the concept under study. It is also defined as the ability of the research instrument to measure what the researcher intends to measure (Cooper & Schindler, 2008). This study assessed the content validity by pre-testing the instruments and by a comprehensive review of the literature concerning the scale items that represent the study's constructs. Construct validity applies when a test is designed to measure a construct which is a variable not directly observable that has been developed to explain the behaviour on the basis of some theory (Abott & Bordens, 2008). It measures whether a scale is an appropriate operational definition of a construct. Construct validity tell how well the results obtained from the use of a measure fit the theories in which the test is

designed (Sekaran, 2003).Two forms of construct validity exist; discriminant and convergent validity. Though both discriminant and convergent validity give evidence for construct validity neither one alone is sufficient for establishing validity conclusively (Thongrattana, 2012). Convergent validity is indicated when there is a high correlation between measurement scores attained using two distinct instruments measuring the same concept (Sekaran, 2003). Discriminant validity is assessed when two constructs measured by two sets of indicators are uncorrelated. Measurement items of one construct should not correlate with the items on the other construct.

Exploratory Factor Analysis (EFA) identified tentative dimensions by evaluating whether all measurement items within a single summated scale loaded on the same construct or on different constructs. Second, Confirmatory Factor Analysis (CFA) was used to assess construct validity on an already developed measurement scale to determine whether the number of dimensions and the specified indicators loaded on those dimensions. Factor loading and communalities of the construct items was used to assess composite reliability or item validity. Convergent validity was also assessed by CFA where the factor loading of each indicator should be relatively high as evidence for convergent validity (Bryman, 2012).The discriminant validity was assessed by the correlation coefficient between constructs which should not exceed 0.85 (Byrne, 2010).

Based on the Fornell-Larcker criterion the root squared of AVE should be greater than the variable correlation to indicate discriminant validity. Discriminant validity which is the average variance extracted (AVE) from the constructs by each of the items represents how well an item measure relates to its hypothesized constructs in relation to other constructs in the model (Mugenda,2003). The test is an indication of the extent to which a given construct is different from other constructs and addresses the potential problem of having measures for one construct overlap the conceptual territory of another construct.

For adequate discriminant validity Analysis of Moment Structures (AMOS) requires that a construct should share more variance with its measures than it shares with other construct in the model (Persson, 2013). In AMOS, it is tested using the procedure of Fornell and Larcker (1981) which is comparing the square root of AVE (Average Variance Extracted) with the correlation of that construct with all other constructs. AVE is the average variance shared between the construct and its measures. In other words, it is the amount of variance captured by the construct in relation to the variance attributable to measurement error. For adequate discriminant validity square root of AVE should be significantly greater than the off-diagonal elements in the corresponding rows and columns (Santosa, Wei & Chan, 2005).

3.9 Data Analysis and Presentation

The data collected was edited, coded, and summarized. Descriptive and inferential statistical techniques were then used to analyze the data.

3.9.1: Sample Size Adequacy Test

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were employed to assess suitability to conduct factor analysis by confirming whether there was a significant correlation among the variables. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicates the proportion of variance in the study variables that might be caused by underlying factors. The KMO statistics vary between 0 and 1. A value of zero indicates that the sum of partial correlation is large relative to the sum of correlations indicating diffusions in the patterns of correlations, and hence that factor analysis is likely to be inappropriate ((Byrne, 2010). A value close to 1 indicates that the patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors (Cooper & Schindler, 2008). Bartlett's Test of Sphericity

tests the hypothesis that one's correlation matrix is an identity matrix, which would indicate that the variables are unrelated and therefore unsuitable for structure detection. Small values ($p < 0.05$) of the significance level indicate that a factor analysis may be useful with one's data (Pallant, 2010).

3.9.2 Factor Loadings

The study conducted factor analysis for the computation of factor loading matrix, Principal Components Analysis (PCA) and communalities. EFA is often used at the early stages of research in order to identify the variables that cluster together and it provides information about the number of factors that best represent the data ((Tabachnick & Fidell, 2007; Bordens & Abbot, 2008). The study construct measures were subjected to Exploratory Factor Analysis (EFA) to describe the variables in a simpler term, to help identify the variables that cluster together into the most effective number of factors, to assess construct unidimensional scales and identify the structure of the measurement for the items. Factor extraction was used to find the number of factors that can adequately explain the observed correlation among the observed variables (Byrne, 2010).

Though a number of techniques for extracting factors exist, such as principal component analysis, principal axes factor analysis and maximum likelihood this study performed a principal component analysis varimax rotation which is an orthogonal rotation to extract the factors because it assumed that the scores on measured variables have perfect reliability. Varimax rotation yields results which make it easy to identify each variable with a single factor (Bryman, 2012). Principal component analysis also establishes which linear components exist within the data and are less complex in terms of theory (Alolayan, 2014). A factor loading of ±0.3 means the item is of minimal significance, ±0.4 indicates it is more important, and ±0.5 indicates the factor is significant (Byrne,

2010). The criterion for extracting factors was the Kaiser's criterion, which considers factors with an Eigen value greater than one as common factors (Bryman, 2012). This study adopted a threshold factor loading of ±0.4. Communality values to measure the variability of each observed variable that could be explained by the extracted factors were checked. A low value for communality less than 0.3 could indicate that the variable does not fit well with other variables in its component, and is undesirable (Khoi, 2007). Initial communalities are, for correlation analyses, the proportion of variance accounted for in each variable by the rest of the variables.

Extraction communalities, on the other hand, are estimates of the variance in each variable accounted for by the factors in the factor solution. Small values indicate variables that do not fit well with the factor solution, and should possibly be dropped from the analysis. The confirmatory factor analysis (CFA) was conducted on each construct to assess the extent to which the observed data fits the pre-specified theoretically driven model. The proposed variable items were tested for significant factor loading to ensure that the most appropriate model was selected for analysis (Abidin, 2013).

3.9.3 Descriptive Statistics

Descriptive statistics was used in this research study to analyze qualitative data. The purpose of descriptive statistics is to enable the study to meaningfully describe a distribution of scores or measurements using a few indices or statistics (Mugenda & Mugenda, 2003), with the types of statistics or indices used being dependent on the type of variables in the study and the scale of measurement used: nominal, ordinal, interval or ratio. The percentage frequency and the mean, which is the average score, and a measure of central tendency was used to gather information on how each construct of the vertical linkages affects food quality management in beef enterprises in Kenya. Central tendency

measurement indicates where the middle point of a bunch of data lies at and it is particularly valuable for the comparison of two data sets. (Mugenda, 2011). Standard deviation measures the dispersion of data, and in particular, the variability about the mean. A lower standard deviation suggests that data is clustered around the average value.

3.9.4 Test of Assumption on the Variables

Bordens and Abbott (2008) state that before data analysis is done, it is important to assess a number of assumptions about the distribution of the variables to be used in the analysis. When these assumptions are not met the results may not be valid and may result in either Type I or Type II error, or over-or under-estimation of significance (Bryman, 2012). Each model variable in this study was tested for assumptions of no normality of the criterion variable, linearity among independent variables and multi-collinearity. This was an exploratory data analysis (EDA) to understand the structure of the variable before further data analyses was undertaken. This was done to ensure that appropriate analytical data analysis techniques were applied to avoid violation of key assumptions in modelling processes.

Normality is important in knowing the shape of the distribution and helps to predict dependent variable scores. Normality can be measured in a number of ways both graphically and non-graphically (Stevens, 1992). Stevens (1992) stated that non-graphical measures are more convincing in terms of interpreting data normality, such as the combination of Kolmogorov-Smirnov and Shapiro-Wilk tests that are often treated as the most powerful in detecting data normality. Data normality can also be tested by observing the skewness or conducting a kurtosis test. The Kolmogorov-Smirnov statistic with a Lilliefors significance level for testing normality is often produced with the normal probability (Coakes et al., 2010). Data is recognized as normally distributed

when the significance level is greater than 0.05, and they are acceptable if it approaches 0.5. Normality for this study was therefore tested using the skewness or conducting a kurtosis test, Kolmogorov-Sminov and Shapiro-Wilk Test and the Q-Q probability test. Linearity is the amount of change or rate of change, between scores on two sets of variables and it is constant for the entire range of scores for the variables (Bai & Perron, 2008). It is therefore the consistent slope of change that represents the relationship between an independent variable and a dependent variable (Granger & Tera, 2007). Linearity in this study was measured by linear regression models and illustrated graphically using scatter plots.

Multicollinearity results when variables in the analysis are highly correlated which implies that the correlated variables are measuring the same thing (Bordens & Abbott, 2008). Test of multicollinearity among study variables was conducted using Tolerance and Variance Inflation Factor (VIF) statistics of predictor variables. Tolerance of a respective independent variable is calculated from $1 - R^2$. A tolerance with a value close to 1 means there is little multicollinearity, whereas a value close to 0 suggests a possible multicollinearity (Mugenda, 2003). Variance Inflation Factor is the reciprocal of Tolerance, while Tolerance is part of the denominator in the formula for calculating the confidence limits on the partial regression coefficient.

Variance inflation factor of more than 4 indicates a high multicollinearity. The cut-off value is a tolerance value of 0.10, which corresponds to a VIF of 10. Large values, usually more than 10.0 suggest collinearity or multicollinearity (Cooper & Schindler, 2008).This study used the VIF and Tolerance values to test for multicollinearity. The correlation between the pairs of variables was done using the Pearson product-moment correlation coefficient *'r'*. This test provides an index of the direction, magnitude and significant of the relationship between two scores (Bordens & Abbott, 2008). The value of the Pearson *r* can range from +1 through 0 to -1. Both +1 and -1 indicate a perfect

linear relationship. All variables (Transaction Uncertainty, information Sharing, Transaction Costs, and Collaboration Advantage should display statistically significant positive correlation with Food Quality Management.

3.9.5 Regression Analysis

This study used structural equation modeling (SEM) and multiple regression to test the hypothesis developed in Chapter one. Structural Equation Modelling (SEM) is a multivariate technique that estimates the linear and causal relationships between multiple exogenous or independent and endogenous or dependent constructs through the simultaneous multiple equation estimation process (Babin & Svensson, 2012). It is important in theory testing (Hair, Ringle & Sarstedt, 2011). Hypothesized model is tested statistically in a simultaneous analysis of the entire SEM (Byrne, 2010). The general SEM consists of the measurement model which links the observed variables to a construct and a structural model constructs to each other.

Two types of SEM include, the covariance based SEM and component-based SEM (PLS). This study adopted the covariance-based SEM because it aims to test a theory and assumes a multivariable normal distribution. The procedure enables the modeling of constructs and gives more accurate estimates of interaction effects between constructs, as it takes the measuring errors in the underlying indicators into account (Kaplan, 2009). SEM–covariance regression uses a two stage procedure to test predictive models. The initial step is the evaluation of the measurement model to determine the validity and reliability of the construct used to measure the variables in the study.

The next step is the assessment of the structural model which specifies the direct and indirect relations among the latent variables and describes the extent of explained and unexplained variances in the model (Abbot & Bordens, 2008). Analysis of Moment Structures (AMOS) software makes SEM easy as AMOS also implements analysis of

covariance structures, or causal modeling (Byrne, 2010). This study used AMOS to construct a conceptual model linking the variables under study.

3.9.7 Structural Model and the Testing of Hypotheses

The second stage of SEM was the specification of the structural model and evaluation of the relationships proposed and testing of hypothesis. The structural model relates to the path model with its hypothesised relationships between latent variables, which describe the nature and magnitude of the relationships between them. The quality of the model links among the latent variables was assessed by squared Multiple Correlations - R-square (R^2), Goodness-of-Fit and path coefficients of its structural model (Vinzi, Chin, Henseler & Wang, 2010). The R^2 with its similar function to a multiple regression model shows the prediction of the structure model together with the impact of the independent variables on the dependent variables. The explanatory power is examined by looking at the R^2 of the dependent latent variable (i.e. innovation practices).

The R^2 value should be between 1 and 0 where 1 means a perfect prediction R^2 values higher than the cut-offs of 0.67, 0.33, or 0.19 levels indicate substantial, moderate, and weak correlations (Vinzi, Trinchera, Squillacciotti, & Tenenhaus, 2008). Regression weights were used to test the contribution of each indicator to their relevant constructs (convergent validity) and to explain the nature of the relationship. Path coefficients were used to determine the direction and strength of the factor and C.R/t-values ($p < 0.05$) were calculated. The hypotheses were tested by examining the magnitude of the standardised parameter estimates between latent variables together with the corresponding t-values (> 1.96, $p < 0.05$). A Multiple Linear Regression Model was developed from the conceptual framework to examine the validity of the research and existing relationship of the independent and dependent variables using the Statistical Packages of Social Sciences (SPSS). Analysis of Variance (ANOVA) was used to

analyze the degree of relationship to confirm the hypothesis. In this case: Food Quality Management being the dependent variable took the variable [y].The effects of vertical linkages on food quality management were independent variables and they included:

(a) Transaction uncertainty (X_1)

(b) Information sharing (X_2)

(c) Transaction cost (X_3)

(d) Collaboration Advantage (X_4)

The model was held as:

$$Y= \beta_0+ \beta_1X1+ \beta_2X2+ \beta_3X3+ \beta_4X4+e$$

The model was essential in making important inferences on the relationship between the dependent and independent variables. Multiple regression analysis was conducted to test the overall effect on the study model. The coefficients of the independent variables x_1, $x_2 \ldots x_5$ were significant in showing the rate of how the independent variables affected the dependent variable. This model conclusively showed that the vertical linkage had a positive effect on food quality management in the beef SMEs in Kenya.

3.9.8 Test of Moderating Variable

Objective five sought to determine the moderating effect of enterprise quality policy on the relationship between Vertical Linkages and Food Quality Management. To test this hypothesis, hierarchical regression analysis was adopted. Hierarchical multivariate regression is used to evaluate the relationships between a set of independent variables and the dependent variable, controlling for the impact of a different set of independent variables on the dependent variable (Bryman, 2012). The rationale was to determine whether the addition of the new set of proposed independent variables has increased the predictive power of the model beyond that afforded by the first or previous set. The hierarchical approach works by removing the effect of the first block of independent

variables to check whether the next block is able to contribute in explaining the remaining variance in the dependent variable (Pallant, 2006, Tabachnik & Fidell, 2006). This approach is appropriate for the purpose of this study where the aim is to test if policy support services can predict some of the variance in the four vertical linkages constructs (Transaction Uncertainty, Information Sharing, Transaction Cost and Collaboration Advantage). In the regression function or model, the dependent and independent variable must be a continuous variable (Mugenda, 2003).

Estimating interaction effects using moderated multiple regression usually consists of creating an ordinary least squares (OLS) model and a moderated multiple regression (MMR) model equations involving scores for a continuous predictor variable Y, scores for a predictor variable X, and scores for a second predictor variable Z hypothesized to be a moderator (Abbort &, 2008). The moderating effect was then determined by comparing the OLS and MMR models. In his study on suppliers versus lead users and collaborations in mass customization Al-zuri (2008) used Hierarchical multiple regression. The first equation which showed the ordinary least squares (OLS) regression equation for a model predicting y scores from the first-order effects of X and Z observed scores was: $Y_1 = y = \beta_0 + \beta_1 X + \beta_2 Z + \varepsilon$ Where

β_0 = Constant,

β_1 = regression coefficient for X observed scores,

β_2 = regression coefficient for Z observed scores,

ε = error term.

The second equation, the moderated multiple regression model was formed by creating a new set of scores for the predictors X and Z, and including it as a third term in the equation, which yielded the following model: $y = \beta_0 + \beta_1 X + \beta_2 Z + \beta_3 X*Z + \varepsilon$

Where;

Y is the Enterprise Quality Policy.

X is the effect of Vertical linkages on food quality management

Z is hypothesized moderating variable assumed to have linear relationship with the Enterprise Quality policy.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

The main objective of this chapter is to provide statistical analyses of the results, interpretation of the results and findings. Several steps were undertaken to guide the building of a quantitative model. A descriptive analysis of the data was performed followed by a univariate analysis. First, variable screening involving investigation of missing data and inconsistency response were done. This was followed by exploratory factor analysis (EFA) where iteration was carried out until the required model was realized with reasonable pattern matrix, parameter adequacy, convergent validity, discriminant validity and reliability tests. Next was Confirmatory factor analysis (CFA) involving obtaining a model fit, common bias and optionally imputing composites. The last step involved Structural Equation Modeling (SEM) and moderation.

4.2 Response Rate

A total of 139 out of the 160 questionnaires administered were returned. 21 firms did not return their questionnaires. The firms' executives stated that their organisations operated on tight schedules and could not participate at that time. This resulted in a response rate of 87%. Moreover, on examination of the completeness of the questionnaires there were five questionnaires that had at least 10% of the overall questionnaire incomplete. These cases were omitted from the preliminary analysis. 10 questionnaires with less than five missing data (4% of overall questionnaires) were imputed. A maximum likelihood function was used to replace those missing values as affirmed by (Bryman, 2012). Therefore upon removal of five cases, a total of 134 questionnaires were usable,

resulting in an adjusted effective response rate of 84%.One hundred and thirty four questionnaires were accepted on the basis of the selection criteria described in Chapter three. This was considered sufficient to run the main statistical tests of the study; factor analysis requires at least one hundred respondents (Tabachnik & Fidell, 2006). Mugenda (2011) affirms that a response rate of 50% is adequate, 60% and above is good, and above 70% very good. Hair et al. (2006) has suggested that the ratio of responses to independent variables should exceed 15:1. For this study, in which there are four independent variables, this ratio is more than 34:1. This provides further support for the suitability of data that was to be used in multivariate regression analysis as statistically significant where R^2 values as small as 5% with a significance level of 0.01 or 4% with significance of 0.05 would be detected (Al-zub,2008). Response rate is important due to its implications regarding the generalisability of the findings. In this study, of the one hundred and sixty questionnaires sent, one hundred and thirty nine were returned, of which one hundred and thirty four questionnaires were accepted for analysis as shown in table 4.1. This corresponds to a response rate of 84% which the study considers adequate.

Several studies have adopted different response rates. Study by Neneh (2011) on the impact of entrepreneurial characteristics on SMEs survival realized a response rate of 56.7% attributed to non-return of the questionnaires. Al-Ansari (2014) in his study on innovative practices as a path to business growth performance realized a response rate of 33.83%. The study by, Hornibrook and Fearne (2003) on managing perceived risk as a marketing strategy for beef in the United Kingdom (UK) food service industry had usable questionnaires resulting in a response rate of 10.2% due to severe non response.

Table 4.1: Response Rate

Response	Frequency	Percent (%)
Initial Population	160	100
Firms not Participating	21	13
Returned questionnaires (14 incomplete response) usable responses	139	87
Adjusted effective response rate	134	84

4.3 Sample Description

Before analysis of responses, it is important to gain an understanding of the sample population as a whole. In order to achieve this, descriptive statistics can be used to summarize the characteristics of the respondents. Such analysis includes determination of the frequency, percentage frequency Kothari (2009).The questionnaires in this study were directed to the managers of the beef producing and processing enterprises. These enterprises varied in age, gender, collaborations and motivation to quality.

4.3.1 Gender Distribution

In terms of gender, the sample comprised both males and females whereby, majority (78%) of the respondents were males while females constituted 22% as shown on table 4.2. The study concluded that the beef sub-sector in Kenya is dominated by male SMEs. The results concur with Stevenson and St-Onge (2005) who found out that socio cultural norms restrict women's mobility making it difficult for women to participate fully in entrepreneurship. The ILO (2008) study on Women Entrepreneurs in Kenya found out that women -owned businesses account for over 48% of all SMEs most of which are

associated with traditional women's roles. Women tend to concentrate in areas of economic activity that are compatible with their productive roles, particularly those which are an extension of domestic labor and household production (Sahran, Zeinalnezhad, & Mukhtar (2011). Moreover, the prevalence of women in the retail sector is also attributable to lack of necessary education and skills required in other sectors. Study by Menyah (2009) on the informal sector in Botswana's informal sector found out that 60% of the SMEs were females.

4.3.2 Age Distribution

Majority of the respondents were aged 46 years and above (72 %). 18% of the respondents were aged between 36 and 45 years whereas only 10% were aged between 18 and 35 years as indicated on table 4.2. The study therefore found out that majority of beef SMEs are mature (36 years) and the enterprise is not popular with the youths. Study by Luig (2011) on phytosanitary standards among the beef SMEs in Kajiado County noted that the beef enterprises are owned by male SMEs above 40 years, as is the culture of the Maasai community. The young men lack resources especially land and cannot therefore participate in agripreneurship. Muthee (2008) on the survey of Kenyan livestock sector reported that the beef enterprise is operated by elderly males in the Arid and Semi-arid land (ASAL) of Kenya.

4.3.3 Education Background

The study sought to find out the education background of the beef SMEs by asking the respondents to select from a list of educational level categories (Primary, Secondary, Diploma, Bachelors and above, none). 27% of the respondents had primary level education, 20% had secondary school education, 5% had attained diploma education 5% had attained a bachelor's degree and above and 44% of the respondents lacked basic

education. The study therefore concluded that majority of the beef SMEs either lacked basic Education or had inadequate exposure to education having gone up to primary school level education. The sessional paper (2005) emphasizes on the need for entrepreneurial and managerial skills in operating an enterprise. SMEs with basic formal education are able to pass information, communicate innovations and promote their enterprises (Pooe, 2007).

4.3.4 Number of Years in Business

Company age ranged from six to over 20 years. The distribution of companies according to age is shown in Figure 4.2, with majority (31%) of the respondents indicating that they have been in business between 16 and 20 years. 26% of the respondents have been in operation for a period of 6-10 years while 22 % have been in business for above 20 years. Only 3% have operated their businesses for five years and below. The study therefore concludes that most beef SMEs have run the enterprise long enough and have gained enough experience to articulate issues addressed by the measurement variables. Moreover, the main economic activity in the arid and semi-arid areas is beef enterprises (Mbwika & Farmer, 2012).

Table 4.2: Demographic Characteristics of the Respondents

Characteristic	Values	Frequency	Percentage
Gender	Female	30	22
	Male	104	78
Age of Respondent	18-35 years	13	10
	36-45 years	24	18
	46-55 years	58	43
	Above 56 years	39	29
Education level of respondent	Primary	36	27
	Secondary	27	20
	Diploma	7	5
	Bachelor's Degree and above	7	5
	None	58	43
Years in business	1-5	4	3
	6-10	35	26
	11-15	23	17
	16-20	42	31
	Above 20	30	22

4.3.5 Motivation towards Production of Quality Products

The study sought to find out what prompted the SMEs to observe quality management procedures in their enterprises. Results indicated that majority (40%) observed quality production as a condition to do business with their partners. This was followed by 30% who said that it was a public health requirement for the business, 20% were prompted by the need to satisfy customers and minority (10%) used quality as a marketing tool as shown on table 4.3. The findings showed that collaborations had some influence on the way the SMEs designed their production processes and product designs. The few that used quality as a marketing tool or to satisfy customers were likely to be the processor

SMEs closest to the consumers. Majority SMEs who followed set conditions were the producers or agent SMEs. The study therefore concludes that, vertical linkage among beef SMEs enhances awareness regarding quality in the production process. The findings agree with the study by Canever *et al.*, (2008) on the emergent demand chain management key features and illustration from the beef business Supply Chain Management in the beef business in the Rio Grande do Sul who found out that vertical linkages enable SMEs to understand customers and then responding to their requirements especially regarding the food safety attribute of food quality. Hornibrook and Fearne (2005) on beef supply chain in the UK affirmed that quality perceived risks associated with the production, processing, distribution and consumption of fresh beef have been effectively managed through vertically coordinated supply chains. Through vertical coordination, entrepreneurial innovations and buying goals are aligned, and perceived quality risks managed through the use of process controls such as Total Quality Management and numerous assurance schemes.

Most good business opportunities result from an entrepreneur's alertness to possibilities or the establishment of mechanisms that identify potential opportunities. The entrepreneur looks for a need and an opportunity to create a better product. In a vertical linkage, the entrepreneur identifies opportunities from business associates and consumers as well as other SMEs in the distribution system, and the technical personnel (Hisrich, Peters & Shepherd, 2008). By being alert to the changing customer quality needs, entrepreneurs and other channel members in close contact to the end users collaborate to create new quality products.

Table 4.3: Motivation towards production of quality products

Motivation	Frequency	Percentage
Condition by business partners	54	40
A marketing tool	13	10
Satisfy customers	27	20
Requirement to do business	40	30

4.3.6 Collaborations among the beef SMEs

The study sought to establish the involvement of vertical collaborations among the beef SMEs. Results of figure 4.1 indicate that, majority of the beef SMEs collaborate with the beef producers (45%), followed by the beef suppliers at 40%, beef processing firms at 20% and some SMEs collaborated with other firms. The findings reveal the various entrepreneurial networks among the beef enterprises, indicating the interdependent nature of the beef SMEs. Study by Storer *et al* (2010) on how Small Business Impact on Utilization of Industry-Led Supply Chain Innovation Capacity in the Autralian beef supply chain revealed that, for small business in Australian beef supply chains, being agile and able to adapt and align their business practices with supply chain partners is integral to ensuring these SMEs remain relevant and competitive in this market. This alludes to study by Trienekens (2011) on pork SMEs in China whose study found out that supply chain success is aligned to intra- and inter-organizational coordination such as formal and informal partnerships and collaborations between upstream and downstream members and improved quality management.

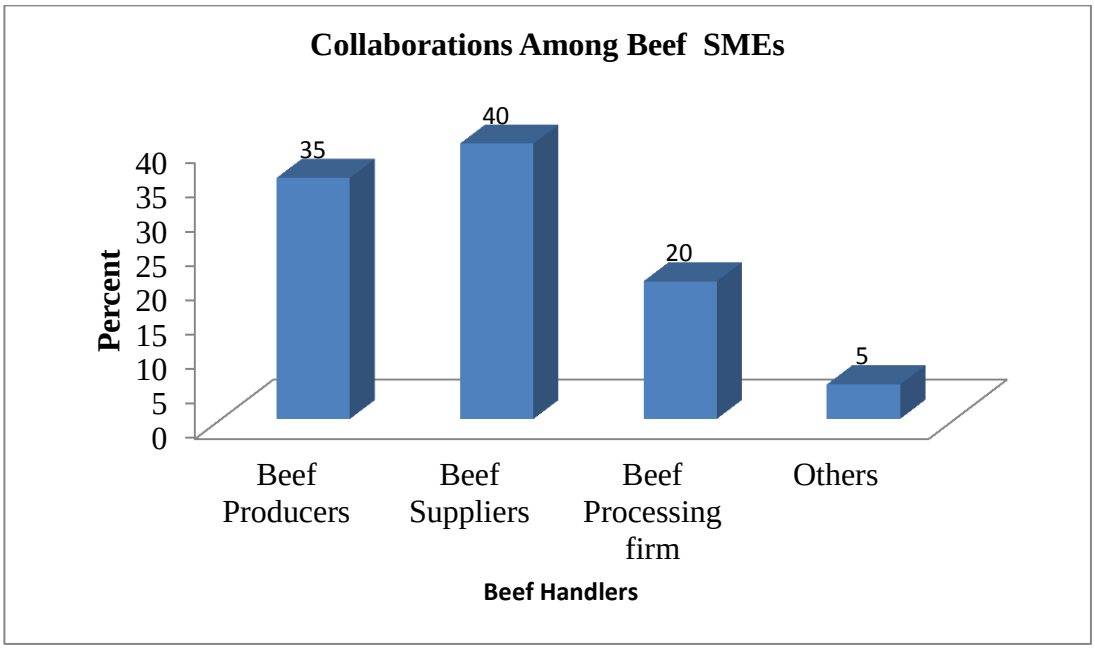

Figure 4.1: Collaborations among Beef SMEs

The respondents were asked whether collaborating with upstream enterprise partners positively affects a beef enterprises' Quality Management. Majority (101) were in agreement while 26 respondents were in disagreement as shown on Figure 4.2. The high number affirming to positive effects upon alignment of the enterprises' quality management to the quality management of the entire beef sector portrays the entrepreneurial virtual of confidence of quality production process to capture local and global market opportunities. Entrepreneurs constantly engage in a new entry, either by offering a new product to an established or new market or creating a new organization in order to provide the firm with a sustainable competitive advantage (Hisrich *et al*.,). Vertical collaboration advantages enable the entrepreneur to access financial capital, skilled employees in areas of innovativeness and logistics as well as machinery. An entrepreneurial workforce in an entire beef chain represents an important resource and it impact on performance such as improved quality management is vivid when it is

combined with an entrepreneurial organizational culture that enhances communication, teamwork, and innovativeness (Martinez & Poole, 2004). A vertically aligned beef chain forms a bundle of resources that is valuable and enables the firm to pursue opportunities with quality products, neutralizes threats by offering products that are of value to customers and inimitable because the resources are difficult or costly for competitors (Wever, Wognum, Trienekens and Omta, 2010). Mohanty (2007) posits that the ability to obtain and then recombine resources into a bundle that is valuable, rare, and inimitable represents an important entrepreneurial resource, where knowledge that resides in the mind of the entrepreneur mind is its basis. The full exploitation of opportunities presented by conventional and niche market channels in Kenya will require development of innovative market linkages and addressing specific consumer demands (I-DEV, 2014). Therefore the study concludes that vertical linkages would enhance food quality management in the beef sector in Kenya.

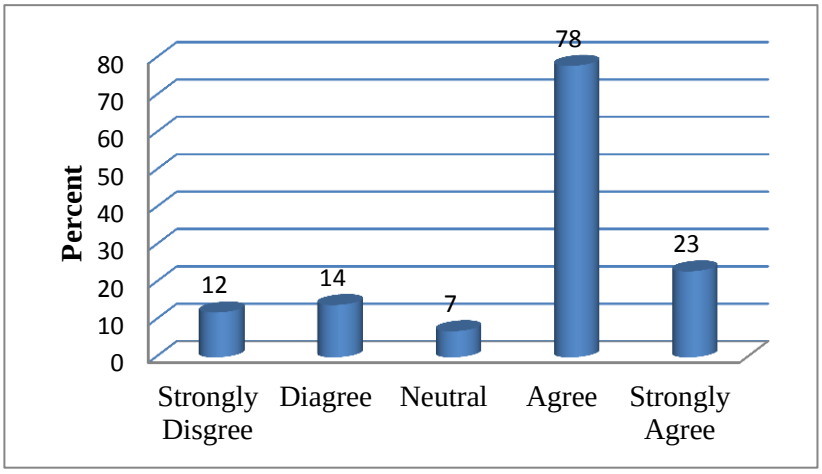

Figure 4.2: Vertically linked Enterprises and effect on Quality management

On being asked whether a beef enterprise quality management should be a subset of the beef sector quality management system, majority (82%) of the respondents answered in

the affirmative while a few (18%) responded in the negative, as shown in table 4.4. The high number of respondents who answered in the affirmative shows that majority of the beef small and Medium sized Enterprises in Kenya have realized the importance of implementing quality management in their enterprises. This is a demonstration of a positive entrepreneurial leadership, whereby the top management realizes the need for aligning their enterprises' quality management with the beef sector' quality system to forge an organizational unit that is constantly repositioning to capture opportunistic rents. Also, the willingness to align the enterprises' quality management is indicative of an entrepreneurial mindset of the managers and employees and their determination to better position their enterprises in the food quality-oriented competitive landscape. The performance of a firm depends on the fit between its internal resources and the external environment. If there is a good fit, the firm is rewarded with superior performance, which is a superior quality product.

To obtain a good fit with the external environment the entrepreneur must determine the key success factor of an industry such as superior quality products, processes or having one's technology adapted as the industry standard (Hisrich *et al*, .2008). SMEs that have their quality specifications aligned to the industry's quality systems have the opportunity to select and develop strong relationships with the most important suppliers and processors in the chain forcing competitors to use inferior suppliers. Additionally the entrepreneurs are better positioned to satisfy customers by being able to position themselves at the center of the market, providing an ability to recognize and adapt to changes in the market and also establishing their product as the industry standard (Ferry *et al*., 2007). Therefore, beef SMEs whose quality management practices are a sub-set of the beef sector quality management systems enhance food quality management.

Table 4.4:Quality Management as a subset of Beef sector Quality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	24	18	18	18
	Yes	110	82	82	100
	Total	**134**	**100**	**100**	

When the respondents were asked what factors inform the choice of collaborating partners, it was established that 25% was influenced by provision of quality products and a stable supply from suppliers. Respondents vertically linked for production scale and low cost of supply comprised 19% and 17% respectively, while the minority considered producing experience (9%) and credit (7%) as shown on figure 4.3. The findings demonstrated the range of factors and obstacles faced by small and medium enterprises, which could be solved through innovative business strategies such as vertical linkages (Phelps, 2011).

The entrepreneurial firm lack in resources which culminate into uncertainties in supply, non-compliance with quality standards and also high costs associated with ensuring quality standards. These firm weaknesses should be made up for by taking calculated risks through specialized expertise, personalized attention and innovation to deal with the resource constraints that the firm faces (Hortovanyi, 2010). Thus, the essence of entrepreneurship is the capability of a firm's management to profit from the uncertainty, and creating and pursuing opportunities without concern to the resources under the firm's control at that moment in time (Thongattana, 2012).

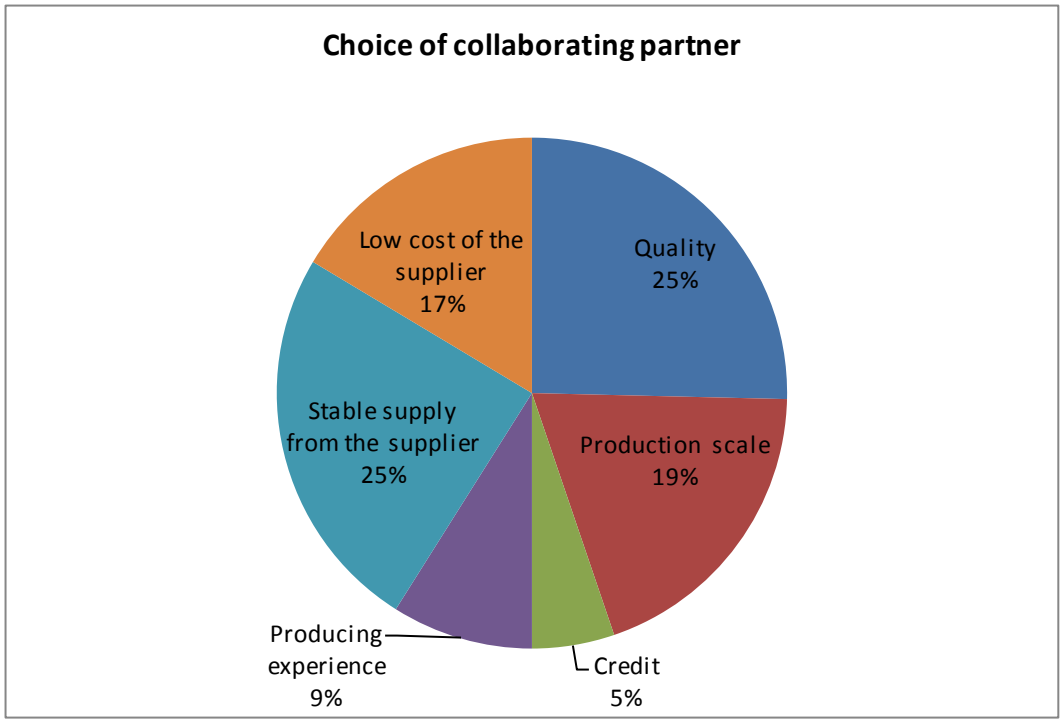

Figure 4.3: Factors Informing Choice of Collaborating Partners

4.4. Reliability and Validity

The assessment of the effectiveness of measures was done to determine their consistency and accuracy. The measures were assessed in terms of their reliability, validity and unidimensionality. Reliability relates to how measures are made and involves getting consistent results for measures over repeated trials (Mugenda,2003). This test was therefore used to determine the accuracy of the measuring instrument used to assess the construct being studied.

Validity on the other hand relates to what should be measured and is concerned with the relevance and soundness of a proposed interpretation (Hair et al. 2010).The validity test was used to determine how successfully the research measured what it intended to measure. The technique selected for examining reliability of the measurement model in

this study was internal consistency reliability which is used to assess the consistency of results across items within a test. Internal consistency and average item to total correlation measures were used although there are other measures available such as average inter-item correlation, and split half reliability (Bordens &Abbot, 2008). Fornell and Larcker (1981) posit a cut-off point of 0.7, which indicates high reliability. Results of table 4.5 show that the constructs have acceptable internal consistencies above 0.7 and range from 0.761 to 0.905.

These values support the reliability of the constructs. Internal consistency reliability test was used by Nguyen (2012) who surveyed the adoption of Quality assurance systems in dairy processing firms in Vietnam. Similarly Uddin (2010) used the reliability test on the study of inter-firm relationships and performance factors in the Australian beef supply chain. Alolayan (2014) used construct reliability in his study that assessed quality management system indicators for the ISO 9001: 2008 certified work organizations in Kuwait.

Table 4.5 Construct Reliability

Item	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Overall Cronbach's Alpha
UT1-UT4	0.611- 0.726	0.775 - 0.825	0.841
ISC1- ISC7	0.635- 0.788	0.888 - 0.907	0.901
TC1- TC7	0.252 - 0.826	0.811- 0.872	0.859
CA1-CA5	0.457 - 0.649	0.695- 0.787	0.761
QM1- QM6	0.633- 0.830	0.875- 0.915	0.905

Construct validity refers to the extent to which a measure represents the theoretical construct of interest and can be tested by examining the extent to which the measure correlates with other measures designed to measure the same thing and whether the measure behaves as expected (Bordens & Abbot, 2008). The study adopted two of the most widely used validities to verify construct validity namely convergent validity and discriminant validity. Both convergent and discriminant validity are considered sub-categories or subtypes of construct validity (Byrne, 2010). They work together such that if evidence for both convergent and discriminant validity can be demonstrated, then there is evidence for construct validity. But, neither one alone is sufficient for establishing construct validity.

Convergent validity refers to how well the item measures relate to each other with respect to common concept. In this study, individual item reliability was assessed by examining the loading or simple correlations of the measures with their respective construct (Uddin, 2010). A minimum value of 0.6 is used to accept the reliability of

individual items (Darley, 2009; Persson, 2013). Factor loadings of 0.7 and above guarantee that the construct has convergent validity (Abbot & Borden, 2008). The results of Appendix V indicate that, the items had a loading above 0.6 except for items TC2, and CA4, CA5 which had a loading of less than 0.6 and were removed from further analysis to improve the item reliability. 33 observed variables had average loadings value of 0.7 and above, implying that they are high enough to be convergent. Discriminant validity which is the average variance extracted (AVE) from the constructs by each of the items represents how well an item measure relates to its hypothesized constructs in relation to other constructs in the model (Mugenda,2003). The test is an indication of the extent to which a given construct is different from other constructs and addresses the potential problem of having measures for one construct overlap the conceptual territory of another construct.

For adequate discriminant validity AMOS requires that a construct should share more variance with its measures than it shares with other construct in the model (Persson, 2013). Results of table 4.6 indicate that, the square root of AVE is significantly greater than the off-diagonal elements in the corresponding rows and columns. The coefficient of determination (R^2) should be the square root of the construct AVE (Byrne, 2010). The R^2 values of Transaction Uncertainty (UT), Enterprise quality Policy (PS), Information Sharing (ISC), Quality Management (QM), Transaction Costs (TC) and Collaboration Advantage (CA) were 0.832, 0.916, 0.764, 0.802, 0.876 and 0.699 respectively and their respective AVE met the threshold of above 0.5 except for CA which was slightly lower than 0.5. As indicated in table 4.6, all the constructs in the model indicate that the items, on average, share at least half of their variance with the construct hence discriminant validity is proven.

Table 4.6:Correlation Matrix for Discriminant Validity check for Constructs

Component	R^2	AVE	UT	PS	ISC	QM	TC	CA
Transaction uncertainty (UT)	0.832	0.692	**0.832**					
Enterprise Quality policy (PS)	0.916	0.839	-0.070	**0.916**				
Information Sharing (ISC)	0.764	0.584	-0.067	0.072	**0.764**			
Quality Management (QM)	0.802	0.644	0.286	-0.245	0.280	**0.802**		
Transaction Cost (TC)	0.876	0.768	-0.033	-0.131	-0.016	0.218	**0.876**	
Collaboration Advantage(CA)	0.699	0.489	-0.041	-0.025	0.147	0.238	-0.126	**0.699**

4.4.1 Sample Size Adequacy Test

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were employed to assess whether data were suitable to conduct factor analysis. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy indicates the proportion of variance in the study variables that might be caused by underlying factors (Bordens & Abbott, 2008). Study by Thongrattana (2012) obtained a KMO statistic of 0.7809 indicating that, KMO statistic values ranging between 0.7 and 0.8 are good. Results indicated that KMO measure of sampling adequacy was close to 1 at 0.842 and the Bartlett's test for sphericity was highly significant ($\chi 2$ = 5088.524, p =0.000) as shown on table 4.7 implying that factor analysis was suitable and that data was suitable for structure detection.

Table 4.7: Results of KMO and Bartlett's Test for Suitability of Structure

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.842
Bartlett's Test of Sphericity	Approx. Chi-Square	5088.524
	Df	528
	Sig.	0.000

4.5 Factor Loadings

In this study, data was analyzed by use of a two-phase process comprising confirmatory measurement model and confirmatory structural model as suggested by Bordens and Abbort (2008). The confirmatory measurement model was used to represents the measurement equations, which relates the observable measures (Manifest Variables) to their underlying constructs, while the structural model described the relationship between the constructs. The two-phase process was adopted by Han, Omta and Trienekens (2011) in their study on the impact of supply chain integration and quality management on the performance of pork processing firms in China.

A study on the Influence of Employee-Based Brand Equity on the Health Supportive Environment and Culture by Kwon (2013) conducted a statistical structural modelling using the two-phase process of confirmatory measurement and confirmatory structural model. This study conducted factor analysis for the computation of factor loading matrix, Principal Components Analysis (PCA) and communalities. Exploratory Factor Analysis (EFA) is often used at the early stages of research in order to identify the variables that cluster together and it provides information about the number of factors that best represent the data ((Tabachnick & Fidell, 2007; Bordens & Abbot, 2008).

The study construct measures were subjected to Exploratory Factor Analysis (EFA) to describe the variables in a simpler term, to help identify the variables that cluster together into the most effective number of factors, to assess construct unidimensional

scales and identify the structure of the measurement for the items. Factor extraction was used to find the number of factors that can adequately explain the observed correlation among the observed variables (Byrne, 2010). Though a number of techniques for extracting factors exist, such as, principal component analysis, principal axes factor analysis and maximum likelihood this study performed a principal component analysis Varimax rotation which is an orthogonal rotation to extract the factors because it assumed that the scores on measured variables have perfect reliability. Varimax rotation yields results which make it easy to identify each variable with a single factor (Bryman, 2012). Principal component analysis also establishes which linear components exist within the data and are less complex in terms of theory (Alolayan, 2014).

A factor loading of ±0.3 means the item is of minimal significance, ±0.4 indicates it is more important, and ±0.5 indicates the factor is significant (Byrne, 2010). The criterion for extracting factors was the Kaiser's criterion, which considers factors with an eigen value greater than one as common factors (Bryman, 2012). This study adopted a threshold factor loading of ±0.4. The findings of the study indicate that 6 extracted factors in the initial solution had eigen values greater than 0.4 and ranged between 7.996 and 1.725. This indicates that the items were important and variance explained by the factors ranging from 24.229 to 5.227 being greater than the suggested Average Variance Extracted (AVE) of greater than 0.5 (Appendix V). The six factors so extracted [Policy support services (1), information sharing (2), risk reduction (3), customer quality preference (4), Entrepreneurial managerial practices (5) and quality management (6), respectively] explained 79.199% of variance (Appendix V). The scale reliability for extracted factors was also appreciable and lay above 0.6 in the range between, 0.761 to 0.910. These entire coefficients validated the factor analysis results. Results indicate that Enterprise Quality policy (PS) factor was by far the most important explaining 24.229% of the total variance and with an Eigen value of 7.996. The factor loadings ranged from 0.976 to 0.998 and no item was dropped due to cross or poor

loading. Transaction Cost (TC) was the second most important explaining 16.858% of the total variance and Eigen value of 5.563.The factor loadings ranged from 0.923 to 0.858 but TC2 was dropped due to poor loading. Information sharing was the third most important explaining 14.023% of the total variance and Eigen value of 4.628.

Factor loading ranged 0.872 to 0.697 and no item was dropped. Food Quality management explained 11.809% with an eigen value of 3.897 and factor loadings ranging from 0.885 to 0.624.The construct Transaction Uncertainty explained 7.052% of the total variance, eigen value of 2.327 and factor loading ranging from 0.905 to 0.833.Collaboration Advantage explained 5.227% of the total variance, Eigen value of 1.725 and a factor loading ranging from 0.829 to 0.771 however items CA4 and CA5 were dropped due to poor loading. A total of 33 items of the six constructs were used to develop the structural model as shown on figure 4.5. Communality values to measure the variability of each observed variable that could be explained by the extracted factors were checked.

A low value for communality less than 0.3 could indicate that the variable does not fit well with other variables in its component, and is undesirable (Khoi, 2007). Initial communalities are, for correlation analyses, the proportion of variance accounted for in each variable by the rest of the variables. Extraction communalities as shown in Appendix VI are estimates of the variance in each variable accounted for by the factors in the factor solution. Small values indicate variables that do not fit well with the factor solution, and should possibly be dropped from the analysis. The extraction communalities for this solution were all greater than 0.7 and are acceptable as this means that the variables fitted well with other variables in their factor (Kline, 2007). Ab Wahid, (2010) in her study on the maintenance of ISO 9000 in Malaysian service organizations checked for communality values to measure the variability of each observed variable. The confirmatory factor analysis (CFA) was conducted on each construct to assess the

extent to which the observed data fits the pre-specified theoretically driven model. The proposed variable items were tested for significant factor loading to ensure that the most appropriate model was selected for analysis (Abidin, 2013). Due to low factor loading of less than 0.5 threshhold, one item (TC2) of Transaction Cost and two items (CA4, CA5) of Collaboration Advantage were dropped. Therefore the study adopted three items of Collaboration Advantage, four items on Transaction Uncertainty, five items on Transaction Costs, seven items on information sharing, six items on quality management and eight items on policy support services as shown in Appendix IV.

4.6. Descriptive Statistics

The percentage frequency and the mean, which is the average score, and is a measure of central tendency was used to gather information on how each construct of the vertical linkages affects food quality management in beef enterprises in Kenya. Central tendency measurement tells us where the middle point of a bunch of data lies at and it is particularly valuable for the comparison of two data sets. (Mugenda,2003). Standard deviation measures the dispersion of data, and in particular, the variability about the mean. A lower standard deviation suggests that data is clustered around the average value. The constructs of the independent variable are Transaction Uncertainty, information sharing, Transaction Costs and Collaboration Advantage while the independent variable is food quality management.

4.6.1 Measurement of Transaction Uncertainty among Small and Medium Enterprises

In measuring Transaction Uncertainty, the respondents were asked four questions regarding demand, grade / quality supply and uncertainties and whether these uncertainties are a reason to forming vertical linkages. These were measured on a five

point likert scale with “1” indicating “strongly disagree” on one extreme and a “5” indicating “strongly agree” on the other extreme. Percentage, frequencies, the means and the standard deviations of the responses are presented in table 4.8 below. The study sought to find out whether the volume of customer demand is difficult to predict (UT1). A total of 88% agreed that customer demand is difficult to predict while only 9% disagreed.

The mean value was 2.85 implying that more respondents agreed to demand uncertainty. When asked whether beef quantities supplied from producers are unpredictable (UT2), 86% agreed, 44% agreed that the supplies were regular while 8% strongly disagreed. The mean was 3.09 inclining to the agreed response. A majority 85% agreed that beef quality and specifications were unpredictable and a few respondents (13%) disagreed. The mean was 3.14 indicating that most respondents agreed to the uncertainties in quality of beef materials supplied (UT3). Respondents were asked about the certainties in delivery time (UT4). Majority 73% agreed, 9% disagreed and the mean was 3.11 confirming uncertainties in delivery time. This scenario could be explained by the fact that beef producer SMES are mainly concentrated in the arid and semi-arid parts of Kenya, a region faced with inadequate infrastructure, feed, water and holding grounds. Ensuring the sustainability of supplies is complicated by the increasing frequency of droughts, which often decimate livestock herds (AGRITRADE, 2013).

Demand uncertainty has an implication for new venture performance as both overestimation and underestimation of demand can negatively impact performance. By overestimating demand or supply, the entrepreneur will suffer the costs associated with overcapacity in a market so small to sustain the entrepreneur’s business (Hisrich *et al*.,,2008). Underestimation results in costs of under capacity, such as not able to satisfy existing and new customers, sometimes even losing the customers to the competitors.

Grade uncertainty may be associated with a new technology which is likely to leapfrog the current technology resulting to unnecessary costs of loss of reputation by the entrepreneur (Fritz, Rickert, Schiefer, 2010). Mohanty (2007) suggests that entrepreneurs aiming at reducing risks of downside loss could adopt a risk reduction strategy such as a narrow scope or broad scope strategy depending on the type of risk the entrepreneur believes is more important to reduce. The beef entrepreneur in Kenya, by adopting vertical linkages may be adopting a narrow scope strategy of focusing a market that is quality conscious.

Table 4.8: Response to Transaction Uncertainty (UT)

		Percent (%)						
Factors		**SD**	**D**	**N**	**A**	**SA**	**Mean**	**Std. Dev.**
Demand difficult to predict	(UT1)	2	7	3	76	12	2.85	1.015
Producer beef quality	(UT2)	8	5	1	68	18	3.09	0. 072
Quality of supplied materials	(UT3)	7	6	2	67	18	3.14	1.020
Uncertain delivery time	(UT4)	2	7	9	53	20	3.11	1.142

SD- Strongly Disagree; D- Disagree; N- Neutral; A- Agree; SA- Strongly Agree

4.6.2 Measurement of Information Sharing Amongst Small Medium and Enterprises

The second objective of the study was to determine whether information sharing affects food quality management in the beef enterprises in Kenya. The construct information sharing was operationalized by the following items; communications quality (Items; ISC1, ISC2, ISC3), communication behavior (Items; ISC4, ISC5) and norms of information communication (Items; ISC6, ISC7). The respondents were asked whether collaborations with the enterprise partners ensured that quality related information was honestly shared promptly. It was shown that 64% of the respondents were for the idea of

sharing information regarding quality promptly, 30% did not share promptly while 6% was not sure as shown in figure 4.4. A basic enabler for closer vertical linkage is inter-organizational information exchange (Fawcett *et al*. 2010) which affirms the entrepreneurial trait of networking for competitiveness by the SMEs.

A firm that is keen to establish an entrepreneurial environment ought to develop a procedure for it. This can only be achieved by sharing honest information with other likeminded entrepreneurs in the chain by ensuring that informational items about collective entrepreneurship and about the specifics of a company's activities regarding quality marketable products is well published (Han, Jiqin, Trienekens, & Omta, 2009). Entrepreneur managers encourage open discussions in order to develop a good team for creating something new (Reinsch 2001). This stands true especially for the beef SMEs given the specific characteristics of perishable foods, such as shelf life constraints and food safety (Trienekens, 2011).

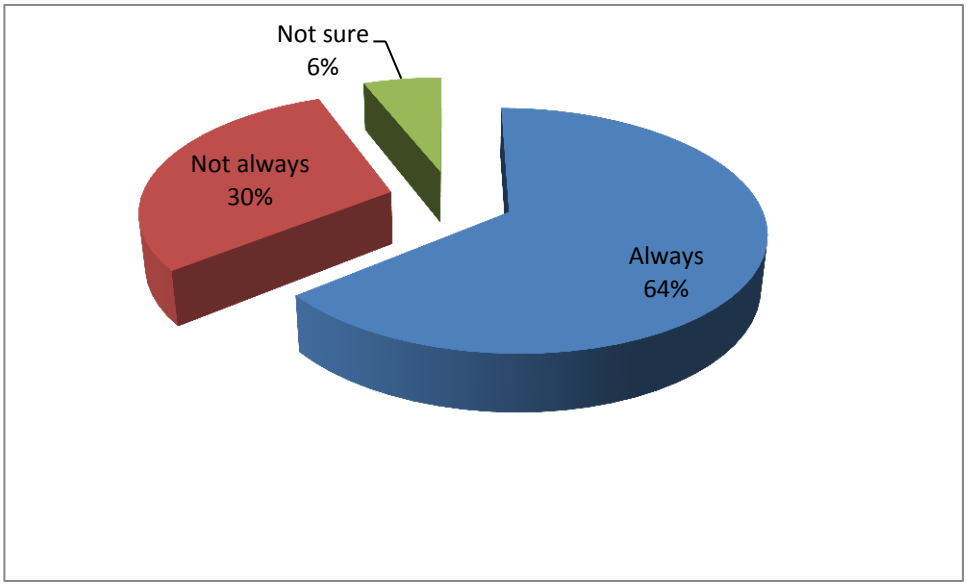

Figure 4.4:Information sharing by collaborating Partners on quality improvement

The respondents were asked what information they shared with their collaborating partners. Most respondents were for the option of quality and quantity (68%), 32% shared information relating to product safety, 20% shared information regarding cost and only 14% shared on price as indicated on figure 4.5. It is evident from the high levels of information shared regarding quality and quantity (68) that beef SMEs in Kenya vertical linkages share information regarding quality. The need to share information for the beef SMEs is attributed to the fact that the producer SMEs and processor SMEs as well as the consumers are all located far from each other, necessitating vertical linkages for better re-alignment to address market needs. Entrepreneurs as the leaders should provide the necessary spark of motivation by guiding, and directing the members of the team for achievement of unity of action such as quality management.

Thus, entrepreneur, as the leader of the group, can ensure high performance by creating a well- to- do environment among others in order to achieve the group objectives (Theuvsen & Deimel, 2011). The function of choosing a particular course of action out of several alternatives for the purpose of achieving a specified goal reflects the quality and competence of the entrepreneur (Spinelli & Timmons, 2009).

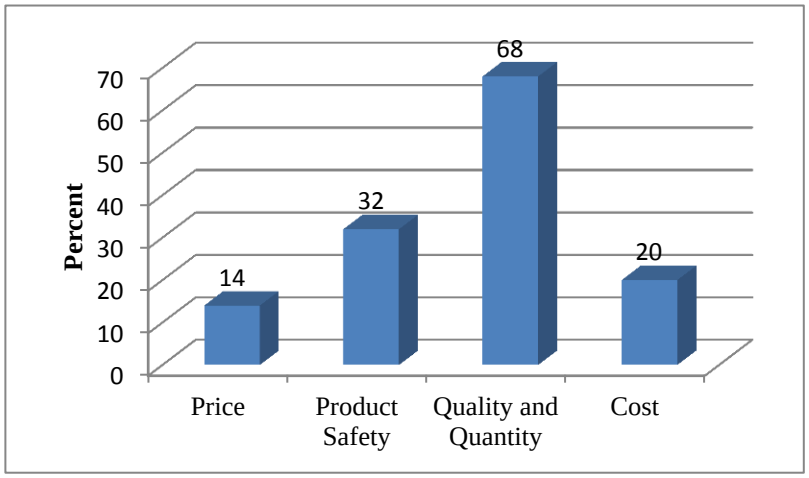

Figure 4.5:Factors that prompt sharing of Information on Quality

The study also sought to find out whether information quality, communication behavior and the norms of communication had an influence on food quality management of the beef SMEs in Kenya. The results on table 4.9 indicate that 79% of the beef entrepreneurs agree that information shared regarding quality to partners beef SMES is timely while 15% disagreed. Regarding the accuracy of the information shared, 84% were in agreement that the information is accurate while 9% disagreed. The beef entrepreneurs were in agreement that the information shared to address quality was relevant with 72% of the SMEs agreeing and only 15% disagreeing. The results indicate that information quality (timeliness, accuracy, and relevant) is enhanced when SMEs engage in a vertical linkage with partner beef SMEs.

Regarding Communication behavior, 78% agreed that beef SMEs organize for special meetings to communicate important information regarding quality with partner SMEs with 13% disagreeing. Feedback from suppliers and customers regarding quality is frequently communicated to all departments as indicated by a majority 85% and only 7% disagreeing. A majority 86% beef SMEs agreed that the entrepreneurs trusted each other with information regarding quality, however, 11% disagreed. The SMEs were honest with the information they shared with partner beef SMEs (87%) while 10% disagreed.

The findings on information sharing indicate that the information quality, communication behaviour and information communication norms have an effect on food quality management in the beef SMEs in Kenya. Autora (2012) in his study on governance structure choices in supply chain management affirmed that SMEs act entrepreneurially by seeking information on client's or supplier's needs. By the use of his personal contacts or information networks, the entrepreneur is able to obtain useful information for appropriate decision making in the enterprise. Peters and Charlie (2010) in their study on vertical communication and its effect on the alignment of beef industry segments shows that sharing information among the SMEs is an innovation which

enhances marketing power to the consumer by guaranteeing source, specific production and management practices, food safety and eating quality.

Table 4.9: Response to Information Sharing

Information Sharing Factors	Percent (%) SD	D	N	A	SA	Mean	Std. Dev.
Information is time %	4	11	5	64	15	3.11	1.081
Information is accurate %	5	4	6	74	10	2.90	0. 998
Information is relevant %	5	10	12	65	7	3.00	1.033
Meetings on Quality %	4	9	8	66	12	2.94	1.102
Feedback is communicated %	2	5	7	70	15	3.12	1.062
Partners portray trust %	5	6	6	59	27	2.99	1.051
Full information shared %	3	7	3	72	15	3.14	0.982

SD- Strongly Disagree; D- Disagree; N- Neutral; A- Agree; SA- Strongly Agree

4.6.3: Measurement of Transaction Cost Construct Amongst Small and Medium Enterprises

The third objective sought to establish whether Transaction costs affect food quality management. The respondents were asked whether it was less costly to purchase (sell) beef from their most important partners. It was realized that 76.1% felt that it was less expensive to purchase beef from their most important suppliers while 23.9% felt it was not, as shown on table 4.10. The high number of respondent (76%) affirming that they paid less to work with partners indicates that SMEs managers were willing to take some calculated risks by using their firm resources in a more efficient manner.

There is need for Entrepreneurs to develop a customer and supplier relationship yet most firms have a destructive tendency to view suppliers and customers adversarily (Pearce & Robinson, 2011). The horizontal flow of a business- outside suppliers to internal suppliers/ customers to external customers suggests that suppliers are partners in meeting customer needs (Peng *et al.*, 2012). Pearce and Robinson (2011) also reveal that quality management cannot be the job of a few managers or of one department and customer value cannot be achieved unless all areas of the organization apply quality concepts simultaneously. Additionally the entrepreneurs incur less costs and it takes less time to receive supplies, realizing higher (external) efficiency in the transactions with their main suppliers and customers.

Table 4.10: Whether or not it is costly to transact with important partners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	32	23.9	23.9	23.9
	Yes	102	76.1	76.1	100.0
	Total	134	100.0	100.0	

Again, the construct Transaction Cost was measured using a five point Likert scale where "1" indicated 'strongly disagree' and "5" indicated 'strongly agree'. The Transaction Costs was represented by the items; Searching costs (TC1, TC2, TC3), bargaining costs (TC4, TC5) and monitoring costs (TC6, TC7). Results on table 4.11 indicate the responses to the questions regarding transaction cost and food quality management. A majority (71%) agreed that it is very difficult to find proper business partner while 12% disagreed. When asked on whether it is very difficult to know the information about business partner, 82% agreed that it was difficult and 13% disagreed. Still on searching costs, 65% agreed that it is very difficult to get on an agreement with would be collaborating partners though 19% disagreed. A majority 67% agreed that it

was very difficult to agree on the conditions of the agreement between beef SMEs, but 23% disagreed. A majority 74% were in agreement that it was costly in terms of effort (time, fund, labour) to ensure compliance to the agreed upon quality standards signed on the agreement but 20% were in disagreement, suggestion that they were able to establish vertical linkages with ease. When asked whether it was difficult and costly to monitor SMEs partners, 85% said it was difficult, however 12% disagreed. The findings on transaction costs on the Kenyan beef entrepreneurs can be attributed to the fact that the infrastructure in the arid and semi-arid parts of Kenya where the beef entrepreneurs are based is inadequate raising the costs of doing business.

The beef producer SMEs mainly the Maasai pastoralists are an important link in the trans-border trade and in 'turning' foreign cattle into local cattle before selling them to the beef processor SMEs, thus raising the searching and the monitoring costs for quality standards in the beef animals (Bergevoet & Engelen, 2014). Searching and monitoring costs are further aggravated by the varying beef animal numbers from year to year due to drought shocks, high mortality and destocking. Moreover, Kenyan beef producer entrepreneurs practice distress sale offering beef animals for sale when money is required which complicates monitoring costs.

Hisrich and Peters (2008) recognize various costs associated with demand, supply, technological and customer uncertainties. Costs of under capacity due to poor demand size estimation and overcapacity associated with oversupply of materials. An entrepreneur strives to get the facts first to make decisions as accurate measurement of every critical variable in a business will facilitate to trace problems to their roots and eliminate their causes. Offering a superior quality product is not sufficient enough to enable the entrepreneur to make sales, but the entrepreneur must reduce customer uncertainties associated by newness of the product by monitoring customer feedbacks as well as searching new market opportunities (Spinelli & Timmons, 2009)

Table 4.11: Response to Transaction Costs (TC)

	Percept (%)						
Factors	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**Std. Dev.**
Difficult to find business partner (TC1)	8	4	4	57	14	3.39	1.123
Difficult to know partner information (TC2)	1	12	5	69	13	3.60	0.918
Difficult to an agreement with partner (TC3)	11	8	5	54	11	3.20	1.243
Difficult to agree on contract conditions (TC4)	5	11	9	61	13	3.55	1.023
Difficult to decide to sign the contract (TC5)	6	17	9	60	7	3.26	1.025
Takes effort to ensure compliance (TC6)	6	14	2	64	10	3.33	1.122
Difficult to monitor partner (TC 7)	5	7	2	72	13	3.61	0.988

SD- Strongly Disagree; D- Disagree; N- Neutral; A- Agree; SA- Strongly Agree

4.6.4 Measurement of Collaboration Advantage among Small and Medium Enterprises

The fourth objective sought to establish whether Collaboration Advantage affects food quality management. The respondents were asked whether they consulted on quality management related matters. The results of figure 4.6 reveal a willingness by the entrepreneurs to collaborate with 61% confirming that they consult always, 24% consulted sometimes, and 9% and 6% was not sure and never consulted respectively. Study by Pitt (2007) on innovations on the Autralian red meat also observed the need to move towards closer collaborations for the SMEs as this would enhance an innovation culture within the firm. SMEs firms will need different people with different skills and mindset at all levels, they will need to find ways to overcome their 'try-fail-back off' mentality and will need to build learning into their normal ways of operating.

Kusumawardhani (2013) affirms that SMEs would benefit from building relationships with a range of external partners who would assist in generating ideas, providing technical support, reducing risk, and commercialising Research and development outcomes. Additionally, innovation success depends on firms being able to attract, retain and develop a range of new skills and capabilities in their people through collaborative strategies for scenario planning, technology scanning and a detailed analysis of consumer and competitor trends.

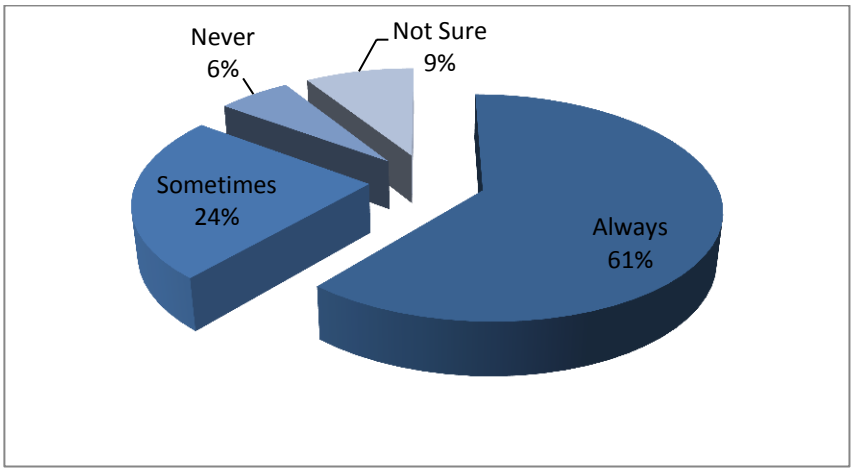

Figure 4.6: Response to whether SMEs collaborated for quality management

A five point Likert scale was used to determine the influence of collaboration advantage an food quality management where "1" indicated 'strongly disagree' and "5" indicated 'strongly agree'. The construct Collaboration Advantage was represented by the items; logistics system advantage (CA1, CA2), innovation advantage (CA3,) and technological advantage (CA4, CA5). Regarding logistics advantage, respondents were asked if logistics between them and their collaborating partner ensured food quality management. Results of table 4.12 indicate that a majority (91%) agreed to the statement that vertical linkage enhanced co-innovation between them and their partners but 4% disagreed. A majority 91% were in agreement that their enterprise and that of their partner SMEs

benefitted from co-innovation, while only 2% disagreed. As regards technology advantage, 85% of the respondents agreed to the statement that they could adopt new technology of the beef industry quickly, 14% disagreed. A majority (71%) agreed to the statement that both SMEs and their partners could change and improve technology adjusting the demand from their cooperative partner but 14% disagreed. This scenario could be explained by the fact that the beef producer SMEs in Kenya have inadequate knowledge about consumer demand for beef and are lacking in entrepreneurial competencies unlike the beef processors.

Co-innovation through vertical linkages would enhance access by producer beef SMEs to quality-oriented high end market comprising tourist and affluent consumers in cities who are willing to spend on well branded, differentiated beef cuts and processed, pre-packaged meats (I-Dev, 2014). The producer beef entrepreneurs are located far from the beef processor SMEs necessitating a well-organized logistic system if quality management is to be achieved. Additionally, the beef entrepreneurs at the production level lack technological skills as well as the resources to innovate (Bergevoet& Engelen, 2014). Vertical linkages with the beef processor entrepreneurs would boost technological innovativeness for quality in order to create better value for both the beef producer and processors.

The findings affirm that beef SMEs are market driven and they are concerned with its sustainability (Kusumawardhani, 2013). Empirical research has revealed that innovativeness is essential among the beef SMEs in order to align their production to customer needs. The findings are in agreement with the results of the study conducted by Hua (2006) whose survey data on fish processing SMEs in Malaysia showed that the SMEs top management should align their logistics and technological innovations to create value. Likewise, in his report on quality and productivity Ueda (2009) remarked

that, the workforces, even workers, need to participate in producing small but frequent technological innovative changes by contributing new ideas for improvement in both process and product.

Table 4.12:Response to collaboration Advantage (CA)

Factor	Percent (%)						
	SD	D	N	A	SA	Mean	Std. Dev.
Logistics ensure quality management (CA1)	1	1	4	74	20	4.09	0.628
You collaborate to co-innovate (CA2)	1	3	5	71	20	3.84	0.764
You benefit from co-innovation (CA3)	1	1	7	67	24	4.10	0.697
You adopt Technology quickly (CA4)	4	10	0	66	19	4.01	0.688
Your firm can adjusts technology (CA5)	8	6	9	53	18	3.38	1.149

SD- Strongly Disagree; D- Disagree; N- Neutral; A- Agree; SA- Strongly Agree

4.6.5 Measurement of Food Quality Management amongst Small and Medium Enterprises

The study sought to investigate the opinions of the respondents regarding food quality management in the beef enterprises in Kenya. Response to the question on whether there were collaborations between their enterprises and those of partners for new changes in quality management, a majority 73 respondents collaborated on new quality management changes extensively, 40 of the respondents had limited collaboration while 6 of the respondents were had neither limited nor extensive collaboration as shown on figure 4.7.

Though beef Entrepreneurs in the beef sector in Kenya moderately collaborated for quality management, Mohanty (2007) notes that, entrepreneurs cannot work single-handed. Entrepreneurial activity is the product of experience and exposure of the individual as a member of a group or a team as a reflection of general values. Mohanty (2007) further says that the solidarity of entrepreneurial teams educes a complex of economic problems through recombination of factors related to the production, higher quality standards of labour, search for new resources, technology and markets. Entrepreneurs build confidence which he derives from the concept of solidarity in a pragmatic manner y the solution of economic and social problem.

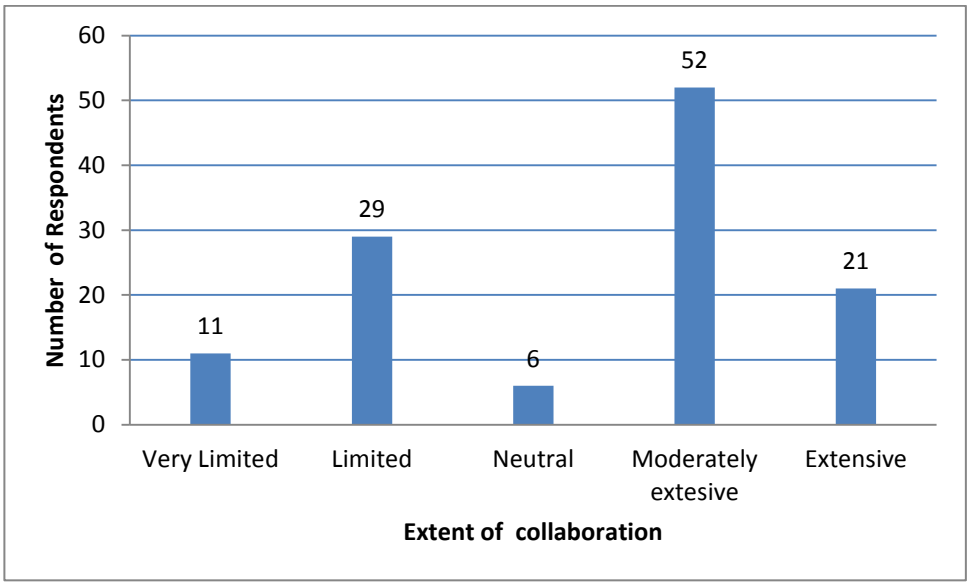

Figure 4.7: Response to collaboration for new changes in Quality Management

The study sought to determine the views of respondents regarding the influence of quality management in a vertical linked relationship.The study focused on the principles of total quality management (TQM) comprising customer focus, Employee involvement, product quality and process quality. The study sought to find out whether the beef SMEs

and their partners review customer requirements, prior to commitment and supply of the product. A majority (91%) were in agreement while 4% disagreed as shown in table 4.13. When whether customer feedbacks are collected, communicated and coordinated to every level of the enterprises, 89% agreed and only a minority (8%) disagreed.

The study also sought to find out if vertical linkage has affected employee empowerment and commitment to quality, 93% agreed and only 5% disagreed. Regarding the product quality respondents were asked whether collaboration with beef partner improved the designs of the beef products. 83% agreed that vertical collaboration improved product design and 9% disagreed and only 8% remained neutral. Respondents were asked if collaborations led to more differentiated products and a majority 81% agreed while 8 disagreed. A majority 81% were in agreement that vertical linkage led to the development of comprehensive quality plans and procedures and 8% disagreed.The results indicate that Kenyan beef SMEs that are vertically linked are keen to observe quality management practices.

This can be explained by the fact that the beef SMEs seek to develop competitive advantage on the basis of collective resources in quality management process and developing differentiated products as well as expertise in quality practices. Quality management emphasizes incremental innovation via the new organizational culture of continuous improvement programs. It is built around an intense focus on customer satisfaction, accurate measurement of critical variables in business operations, quality products and processes and work relations based on trust and teamwork. Entrepreneurs are able to achieve incremental innovations by defining quality and customer value and entrepreneurial firm managers ensuring a clear definition of what quality means in the job and throughout the chain membership (Pearce & Robinson, 2011).

Vertical linkages enable entrepreneurs to collectively develop a customer orientation view. Giving customer value entails the enterprise managers break down every minute step in the process of providing the firm's product and looking for ways to improve it rather than focusing on the finished product. Each process contributes value in some way, which can be improved or adapted to help other processes. In the beef sector this cannot be achieved in a better way than by adopting a vertical linkage (Cao & Zhang, 2011).To address the market requirements with respect to quality, beef SMEs take up vertical linkages in the supply chain (Tilburg *et al*., 2007). Moreover, the final customer can be reached in an optimal way through vertical linkages considering that beef producers are far from the beef retailers and customers (Bergevoet & Engelen, 2014).

Table 4.13: Response to Food Quality Management

Food Quality management	**Percent (%)**						
Factors	**SD**	**D**	**N**	**A**	**SA**	**Mean**	**Std. Dev.**
Customer requirements reviewed	1	3	5	74	17	3.55	0.985
Customer feedback communicated	2	6	5	69	20	3.54	0. 978
Employees committed to quality	3	2	2	69	24	3.59	0.975
Suppliers provide quality products	1	8	8	67	16	3.71	0.883
Satisfied with product quality	2	3	3	78	13	3.57	0.961
Enterprise has quality plan	1	7	1	64	17	3.30	1.321

SD- Strongly Disagree; D- Disagree; N- Neutral; A- Agree; SA- Strongly Agree

4.6.6 Measurement of Enterprise quality policy among Beef SMEs.

Objective five sought to investigate the influence of enterprise quality policy on the relationship between vertical linkage and food quality management of the beef enterprises in Kenya. The respondents were asked in their opinion which of the quality policies collaboration with other beef SMEs helped to comply with. It was established as indicated on figure 4.8, that 45% of the respondents were able to comply with the Public Health policies, 30% complied to the beef enterprise quality policies, 19% complied with National safety policies and lastly 6% for the global food policies.

The results reveal that the beef SMEs operate under the guidance of certain quality standards to achieve food quality management standards. In the study on innovation policy in Canada's agri-food system, Hodgins (2011) argues that policies must aim at "finding ways to make the lagging sectors more progressive and competitive. Policy and an enforceable regulatory environment enable an innovative environment such as intellectual property (IP) enforcement.

Activities critical to an entrepreneurial success include, exchange relationships, technology and administrative policies (Barling & Lang, 2005). The benefits of an exchange relationship to the entrepreneur are, obtaining control of scarce resources, marketing the product and responding to competition. A good enterprise quality policy therefore enhances management of customer-supplier relationship management and control. The enterprise quality policy defines what technology would upgrade the product and product quality (Mohanty, 2007). A firm can achieve a competitive comparative advantage by designing firm specific quality policies regarding quality performance targets, defining quality practices as well as by empowering employees to conduct quality without direct intervention by the top management.

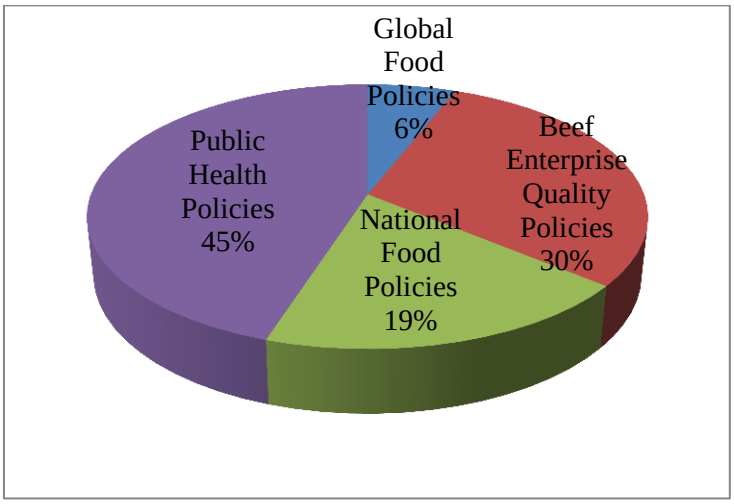

Figure 4.8: Response to the Quality Policies that guide Beef SME

Enterprise quality Policy and its influence on the relationship between vertical linkage and food quality management was also measured using the 5-point Likert scale and the results expressed as percentages, as shown in table 4.14. The results showed that 71% of the respondents agreed and 12% disagreed that their enterprises have well defined quality policy, consistent with enterprises' objectives. Regarding availability of a clear quality collaboration policy with other beef SMEs a majority 82% agreed and only 13% disagreed. On whether quality policy is well understood and implemented at all levels by collaborating enterprises, 67% agreed while 17% disagreed.

The study sought to find out whether their enterprise has an effective policy of stakeholder participation in quality improvement efforts and 74 % and only 16 % disagreed. A majority 67% agreed that they have a formal commitment with other beef SMEs to provide the same quality of products while 23 respondents disagreed. The SMEs were asked if they have a clear food safety and security policy. A majority 74% agreed to food safety policy, and 85% of the respondents agreed to food security. However, 20% disagreed to having food safety policy and 12% disagreed to having a

food security policy in place. The findings indicate that a beef SMEs quality policy has an effect on quality management within an enterprise. The beef SMEs in Kenya can achieve quality for products, processes if they define quality policy on selection of collaborating partners and quality attributes of products each SMEs should comply to. The findings affirm that entrepreneurs in food enterprises are willing to comply with the quality policies but they are not able to do so for a lack of resources, technology, and a premium for quality in the market (Khoi, 2011). Study by Talib *et al* (2013) affirms that financial costs associated with quality management represent a significant barrier for food SMEs but vertical linkage offers an alternative to quality management.

The function of an entrepreneur is to decide the form of the enterprise based upon the nature of the product, nature of activities, types of product, quality of products, quality of human resources and the demand size for the products. Determination of ownership rights is essential for the entrepreneur to define the legal aspects of the enterprise. Therefore, this responsibility prompts the entrepreneur to set up an enterprise quality policy for smooth and clear collaboration practices with other entrepreneurs in the chain (Pearce & Robinson, 2011).

Table 4.14: Respondents agreement to Enterprise quality Policy Statements

Enterprise Quality Policy		Percent (%)						
Factors		**SD**	**D**	**N**	**A**	**SA**	**Mean**	**Std. Dev.**
PS1	%	8	4	4	57	14	3.39	1.123
PS2	%	1	12	5	69	13	3.60	0. 918
PS3	%	9	8	15	56	11	3.20	1.243
PS4	%	5	11	9	61	13	3.55	1.023
PS5	%	6	17	9	60	7	3.26	1.025
PS6	%	6	14	2	64	10	3.33	1.122
PS7	%	5	7	2	72	13	3.61	0.988

SD- Strongly Disagree; D- Disagree; N- Neutral; A- Agree; SA- Strongly Agree

The composite mean and standard deviation for all the variables was calculated. Results indicated that the mean ranged between 3.4966 and 2.8860, showing that most respondents agreed with the item statements. The independent variables therefore had a significant relationship with the dependent variable as indicated on table 4:15.

Table 4.15 : Composite mean and Standard Deviation for Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Transaction Uncertainty	134	1.36	4.24	3.0913	.50541
Information Sharing	133	1.72	4.56	2.8860	.54473
Transaction Costs	134	1.62	4.92	3.4966	.70195
Collaboration Advantage	134	2.00	5.00	3.7146	.53348
Enterprise quality Policy	134	1.00	5.00	3.4151	.97376
Food Quality Management	134	1.25	4.92	3.5118	.80362

4.7 Statistical Modelling

The main objective of the study was to examine the effect of all four independent variables namely; Transaction Uncertainty, information sharing, Transaction Costs and Collaboration advantage on food quality management in beef Enterprises in Kenya. The aim was to allow the study explain the role that the multiple independent variables play in accounting for the variance in food quality management in the beef enterprises in Kenya.

4.7.1 Test of Normality

Data normality is one of the major assumptions for most statistical analyses. Normality can be measured in a number of ways both graphically and non-graphically (Stevens, 1992). Stevens (1992) stated that non-graphical measures are more convincing in terms of interpreting data normality, such as the combination of Kolmogorov-Smirnov and Shapiro-Wilk tests that are often treated as the most powerful in detecting data

normality. Alternatively, data normality can also be tested by observing the skewness or conducting a kurtosis test. The Kolmogorov-Smirnov statistic with a Lilliefors significance level for testing normality is often produced with the normal probability (Coakes et al., 2010). Data is recognized as normally distributed when the significance level is greater than 0.05, and they are acceptable if it approaches 0.5. Normality for this study was therefore tested using the skewness or conducting a kurtosis test, Kolmogorov-Sminov and Shapiro-Wilk Test and the Q-Q probability test.

Skewness and Kurtosis Test

Data normality can be tested by observing the skewness or conducting a kurtosis test. To test the normality of each item, skewness values for each variable was analysed, where skewness is acceptable when it falls between -1 and 1, and kurtosis falls between -2 and 2 (Coakes et al., 2010). Results of table 4.16 and appendix III indicated Skewness and Kurtosis in the range of -1 and +1 which suggested that the assumption of normality was satisfied.

Table 4.16: Results of Skewness and Kurtosis for variables

	Transaction Uncertainty	**Information Sharing**	**Transaction Cost**	**Collaboration Advantage**	**Quality Management**
Skewness Statistic	.143	0.16	0.112	0.041	0.080
Kurtosis Statistic	-.0.04	0.168	-0.110	-0.746	0.072

Kolmogorov-Smirnov and Shapiro-Wilk Test

A further test for normality, Shapiro-Wilk was conducted. The Shapiro–Wilk test, tests the null hypothesis that a sample $x_1 ... x_n$ came from a normally distributed population where $P < 0.05$.The Shapiro-Wilk test shows that the Standardized residuals are significantly normally distributed with a significance 0.514(UT), 0.907(ISC), 0.330(TC), 0.139(CA) and 0.054(QM) which are greater than 0.05. The findings show that the independent variables, influence food quality management in the small and medium beef enterprises (Table 4.17). Results of Kolmogorov-Smirnov test indicated computed values higher than 0.05 which were insignificant. The p-values were 0.064(UT), 0.064(ISC), 0.078(TC), 0.082(CA) and 0.098(QM), an indication of normal distribution of food quality management. On the basis of the computed insignificant test statistics for the Kolmogorov-Smirnov and Shapiro-Wilk tests, normality of the dependent variable was maintained implying that the significance tests conducted on the data were fairly accurate (Borden & Abbott, 2008; Bryman, 2012).

Table 4.17: Results of Normality for Independent and Dependent Variables

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Transaction Uncertainty	.064	134	.200*	.987	134	.514
Information Sharing	.064	134	.200*	.993	134	.907
Transaction Cost	.078	134	.200*	.984	134	.330
Collaboration Advantage	.082	134	.166	.979	134	.139
Quality Management	.098	134	.060	.965	134	.054

*. This is a lower bound of the true significance. a. Lilliefors Significance Correction

The Q-Q Plot

The graphical analysis results showed the line representing the actual data distribution closely follows the diagonal in the normal Q-Q plot or the normal probability plot as shown in figures 4.9 to 4.12, suggesting normal distribution. In Q-Q plot, or the normal probability plot, the observed value for each score is plotted against the expected value from the normal distribution, where, the straight line suggests a normal distribution (Zhang, 2013).

The results of table 4.9 on the relationship between Transaction Uncertainty portray normal distribution of the data.

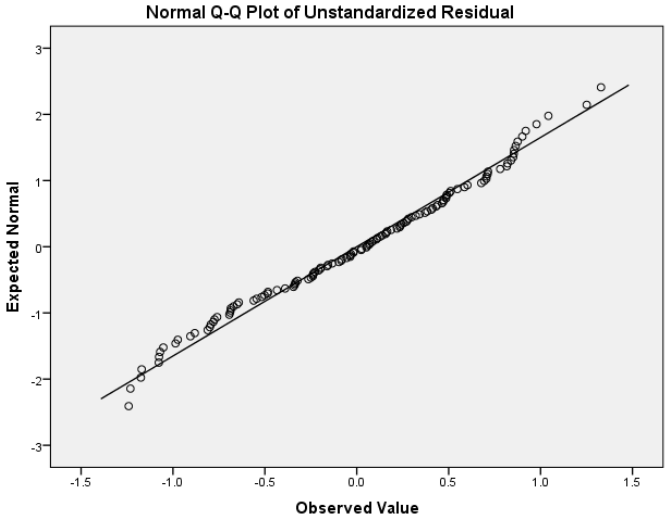

Figure 4.9: Normal Q-Q Plot of Uncertainty in Transaction

The results of table 4.10 on the relationship between Information Sharing portray normal distribution of the data as the points are aligned croo to the line of best fit.

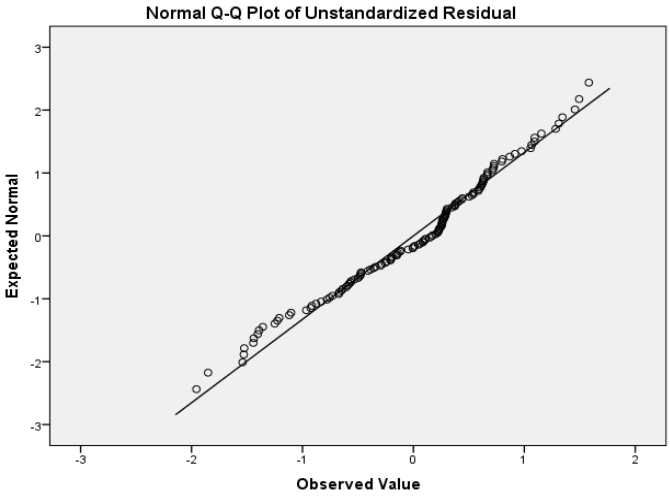

Figure 4.10: Normal Q-Q Plot of Information Sharing

The results of table 4.11 on the relationship between Transaction Costs portray normal distribution of the data.

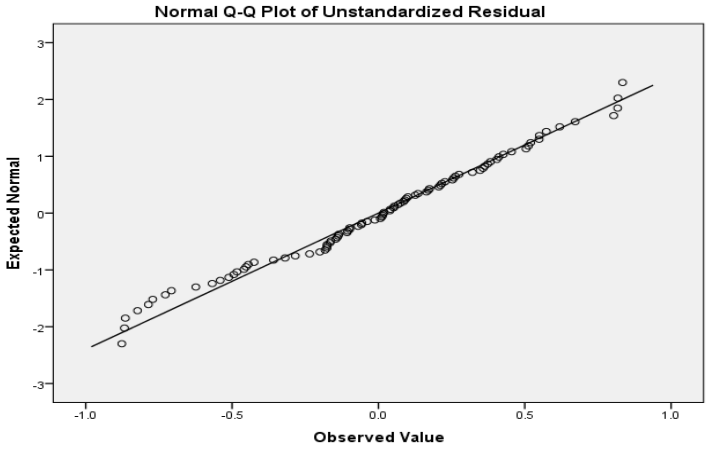

Figure 4.11: Normal Q-Q Plot of Transaction Costs

The results of figure 4.12 on the relationship between Transaction Costs portray normal distribution of the data.

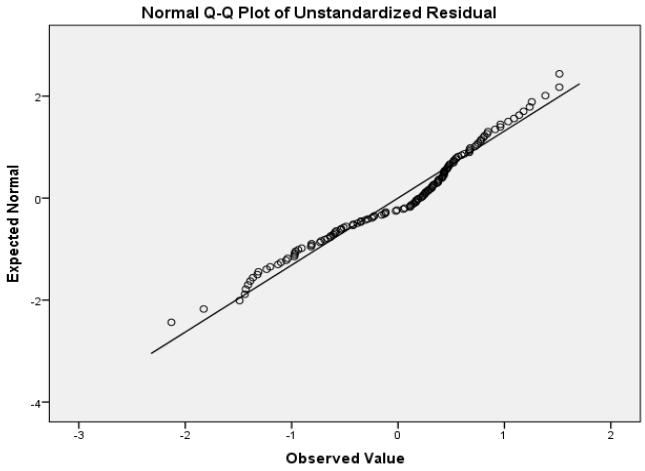

Figure 4.12: Normal Q-Q Plot of Collaboration Advantage

4.7.2 Test of Linearity

Linearity was tested using the scatter plots and linear regression analysis. The linear regression results of the individual core constructs did not suggest any nonlinear relationship between the dependent variables (Food Quality Management) and the independent variables (Transaction Uncertainty, information sharing, Transaction Costs and Collaborative Advantage). Table 4.18 shows that the linear regression model for Transaction Uncertainty (UT) and Quality management (QM) shows an R=0.823, R^2 of 0.677 and an adjusted R^2 of 0.674. Thus 67.7% of the corresponding change in food quality management can be explained by a unit change in Transaction Uncertainty. The linear regression model for Information Sharing (ISC) and Quality management shows an R=0.750, R^2 of 0.562 and an adjusted R^2 of 0.557. Thus 56.2% of the corresponding change in food quality management can be explained by a unit change in Information Sharing.The linear regression model for Transaction Cost (TC) and Quality management

shows an R=0.759, R^2 of 0.575 and an adjusted R^2 of 0.571. Thus 57.5% of the corresponding change in food quality management can be explained by a unit change in Transaction Cost. The linear regression model for Collaboration Advantage (CA) and Quality management shows an R=0.682, R^2 of 0.466 and an adjusted R^2 of 0.460. Thus 46.6% of the corresponding change in food quality management can be explained by a unit change in Collaboration Advantage.

Table 4.18: Linear Regression Model Results for Independent Variables

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Transaction uncertainty	.823[a]	.677	.674	.25212
Information sharing	.750[a]	.562	.557	.29366
Transaction costs	.759[a]	.575	.571	.28919
Collaboration advantage	.682[a]	.466	.460	.32442

a. Predictors: (Constant),Transaction Uncertainty, Information Sharing, Transaction Cost, Collaboration Advantage

A further test on the beta coefficient of the resulting model, the coefficient β = 0.285(UT), β =0.226 (ISC), β = 0.140(TC), β = 0.285(CA), is significantly different from 0, p=0.000 which is less than p=0.05 as shown in table 4.19. Therefore, the model $Y= \beta_0 + \beta_1 X_1 + e$, is significantly fit. R squared (R^2) co-efficient of determination in linear regression relationship, shows how well the regression line fits the data. It is an important indicator of the predictive accuracy of the equation.

The linear models are;

y=0.966+ 0.285 Transaction Uncertainty;

y=1.294+ 0.311 Information Sharing;

y=1.618+ 0.218 Transaction Costs;

y=1.566+.238 Collaboration Advantage

Table 4.19: Regression Coefficient Results for Independent Variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.966	.213		4.544	.000
	Transaction uncertainty	.285	.017	.823	13.743	.000
2	(Constant)	1.294	.241		5.367	.000
	Information sharing	.311	.021	.750	10.749	.000
3	(Constant)	1.618	.206		7.868	.000
	Transaction costs	.218	.013	.759	11.043	.000
4	(Constant)	1.566	.262		5.981	.000
	Collaboration advantage	.238	.018	.682	8.855	.000

a. Dependent Variable: QM

A visual examination of the scatter plots suggests that there is a strong positive linear relationship between Transaction Uncertainty, Information sharing, Transaction Costs and Collaboration Advantage and food quality management. The regression models are graphically illustrated by the scatter plots as shown by figures 4.13, 4.14, 4.15 and 4.16.The scatter plots have the line of best fit superimposed, indicating a positive correlation between the independent and the dependent variables as the line has a positive gradient. The points are fairly clustered close to the line of fit indicating a strong correlation between the two variables.

Figure 4.13 shows the scatter plot and the line of best fit for transaction Uncertainty, where results indicate that the estimate line positively increases. A positive linear relationship therefore exists between Transaction Uncertainty and Food quality management, thus transaction Uncertainty influences food quality management.

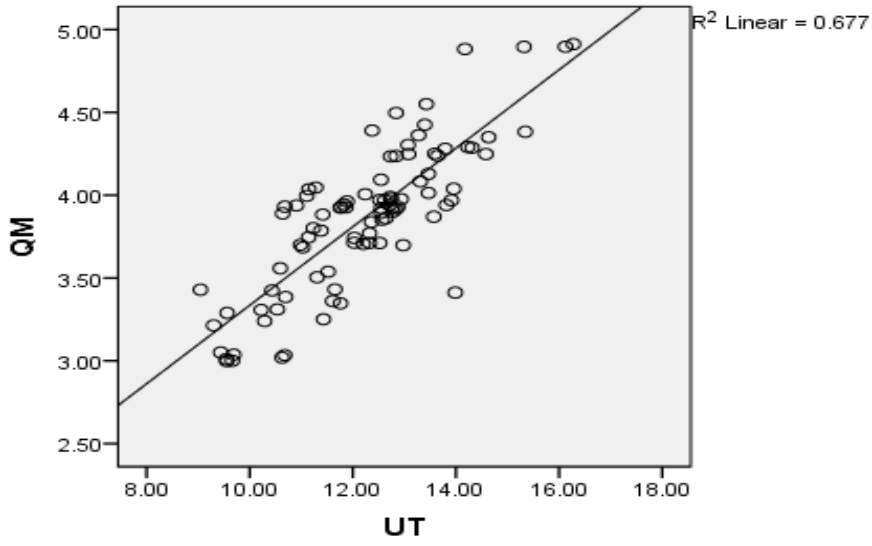

Figure 4.13: Scatter diagram for Transaction Uncertainty

The results of figure 4.14 indicate a strong positive correlation between Information Sharing and Food Quality Management since the line of fit has a positive gradient and the points are very close to the line

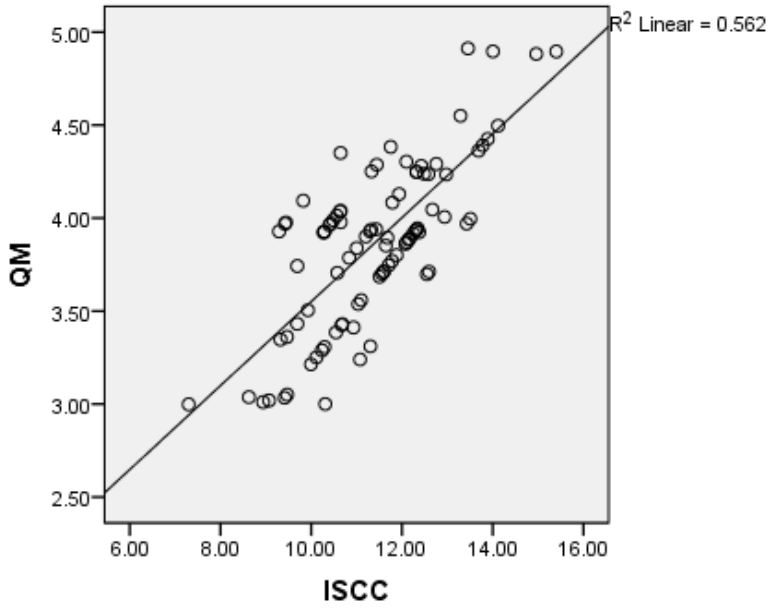

Figure 4.14: Scatter plot for Information Sharing

The visual examination of the scatter plots for 4.11 suggest that there is a strong positive linear relationship between Transaction Costs and Food Quality Management as the points are clustered close to the line of fit. This indicates a strong correlation between the two variables.

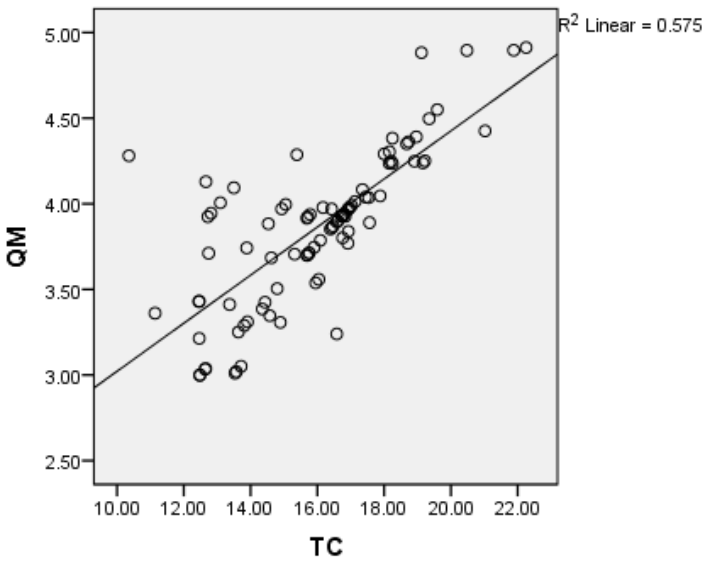

Figure 4.15: Scatter plot for Transaction Costs

The scatter plots of figure 4.16 has the line of best fit superimposed indicating a positive correlation between Collaboration Advantage and Food Quality Management

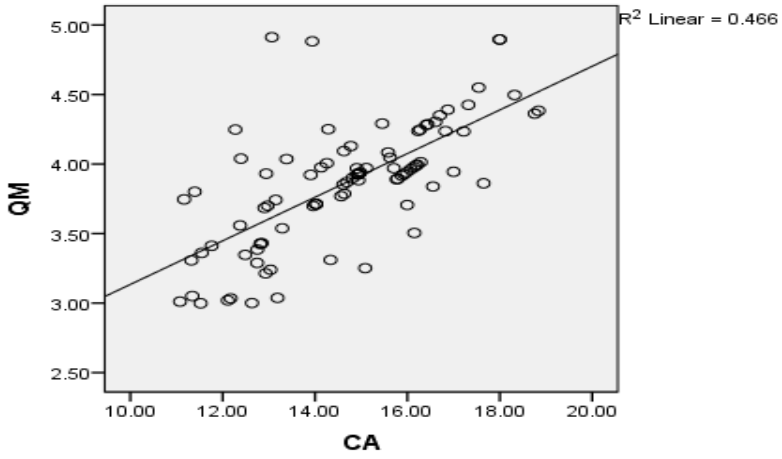

Figure 4.16: Scatter plot for Collaboration Advantage

4.7.3 Test for Multicollinearity

Multicollinearity results when variables in the analysis are highly correlated which implies that the correlated variables are measuring the same thing (Bordens & Abbott, 2008).

Tolerance and Variance Inflation Factor (VIF) statistics

Test of multicollinearity among study variables was conducted using Tolerance and Variance Inflation Factor (VIF) statistics of predictor variables. Tolerance of a respective independent variable is calculated from $1 - R^2$. A tolerance with a value close to 1 means there is little multicollinearity, whereas a value close to 0 suggests a possible multicollinearity (Mugenda,2003).Variance Inflation Factor is the reciprocal of Tolerance, while Tolerance is part of the denominator in the formula for calculating the confidence limits on the partial regression coefficient. A Variance inflation factor of more than 4 indicates a high multicollinearity.

Result findings in table 4.20 show that the study independent variables; Transaction Uncertainty, information sharing, Transaction Costs and Collaboration Advantage have a high tolerance which is close to 1. The variance inflation factor (VIF) values for the variables range between 1.010 (information sharing) and 1.272 (Collaboration Advantage). This indicates that the beta values of the regression equation of the four variables would be stable with low standard errors. The cut-off value is a tolerance value of 0.10, which corresponds to a VIF of 10. Large values, usually more than 10.0 suggest collinearity or multicollinearity (Cooper & Schindler, 2008). The two sets of results confirm that multicollinearity among the independent variables is unlikely to affect the data analysis. In order to test for autocorrelation, the Durbin-Watson statistic was determined, and found to be 2.085 (Transaction Uncertainty), 2.109 (Information Sharing), 1.664 (Transaction Costs) and 1.516 (Collaboration Advantage). This falls

well within the required range of 1.5 to 2.5, and demonstrates that there was no autocorrelation which might affect the predictive power of the model.

Table 4.20: Coefficients for Tolerance and Variance Inflation Factor Tests

Model	Durbin-Watson	Collinearity Statistics Tolerance($1-R^2$)	VIF ($1/1-R^2$)
Transaction Uncertainty (UT)	2.085	.821	1.259
Information sharing (ISC)	2.109	.990	1.010
Transaction Costs (TC)	1.664	.791	1.264
Collaboration Advantage (CA)	1.516	.786	1.272

a. Dependent Variable: Food Quality Management

Correlation Matrix

The correlation between the pairs of variables was done using the Pearson product-moment correlation coefficient *'r'.* This test provides an index of the direction, magnitude and significant of the relationship between two scores (Bordens & Abbott, 2008). The value of the Pearson *r* can range from +1 through 0 to -1. Both +1 and -1 indicate a perfect linear relationship. The raw inter-correlation among the core constructs are presented in table 4.21. All variables (Transaction Uncertainty, information Sharing, Transaction Costs, and Collaboration Advantage displayed statistically significant positive correlation with food quality management. Transaction Costs had a moderate positive correlation with Transaction Uncertainty (r=0.624), Collaboration advantage has a moderate positive correlation with Transaction Costs (r=0.514) while information Sharing had a positive correlation with Collaboration Advantage (0.549), Collaboration Advantage (0.056) and Transaction Uncertainty

(0.583). These results show that there is significant relationship among variables; Transaction Uncertainty, information Sharing, Transaction Costs, and Collaboration Advantage. Therefore, Transaction Uncertainty, Transaction Costs and Collaboration Advantage control significantly and correlate with one another in the model and there were no multi-collinearity among them allowing for further regression Analysis.

Table 4.21: Correlation Matrix

		Transaction Uncertainty	Information Sharing	Transaction Costs	Collaboration Advantage
Transaction Uncertainty	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	134			
Information Sharing	Pearson Correlation	.517**	1		
	Sig. (2-tailed)	.000			
	N	134	134		
Transaction Costs	Pearson Correlation	.624**	.572**	1	
	Sig. (2-tailed)	.000	.000		
	N	134	134	134	
Collaboration Advantage	Pearson Correlation	.583**	.549**	.514**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	134	134	134	134

**. Correlation is significant at the 0.01 level (2-tailed).

4.8. Regression Analysis.

The study adopted Structural Equation Modelling (SEM) to test the hypothesized relationship and to fit the structural model in the second phase. SEM is defined as a class of multivariate analysis which seeks to represent hypotheses about summary statistics derived from an empirical measurement in terms of a smaller number of structural parameters defined by a hypothesized underlying model (Byrne, 2010). Hypothesized model is tested statistically in a simultaneous analysis of the entire SEM. The model adequate fit for the data was determined by both absolute fit indices and incremental fit indices (Thograttana, 2012). Regression weights were used to explain the nature of the relationship and to test the contribution of each item to their relevant constructs (convergent validity). Path coefficients estimates were used to determine the direction and strength of the factor. Analyses of Moment Structures (AMOS) software with a minimization of 6 iterations was used to tests and to confirm relationships between observed and latent (unobserved) variables, assess the model's fit, test hypotheses and confirm relationships. T-statistics value (C.R) was used to test whether the models were significant, with the conventional critical value of -1.96 or 1.96 at 0.05 significance level (i.e. $p<0.05$).

4.8.1 Effects of Transaction Uncertainty on Food Quality Management

The first objective of the study was to determine the effect of Transaction Uncertainty on Food Quality Management in Kenya. The hypothesis used to test this objective was;

$H_{o1:}$ *Transaction Uncertainty has no effect on the food quality management of small and Medium enterprises in the beef sector in Kenya (*$H_o : \beta=0$)

$H_{o2:}$ *Transaction Uncertainty is positively related to food quality management of small and Medium enterprises in the beef sector in Kenya (*$H_a : \beta\neq0$)

The study used a regressions model $Y = \beta_0 + \beta_1 X_1 + e$ to determine the effect of Transaction Uncertainty on Food Quality Management. The model summary Table 4.22 shows the value for R-Squared as 0.677. The regression analysis also shows there is a positive joint relationship R=0.823 between the dependent variable Food Quality Management and the independent variables in the model. R^2=0.677 from this study shows that 67.7% of the variations in food quality management can be accounted for by transaction uncertainty.

Table 4.22: Regression Model for Transaction Uncertainty

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.823[a]	.677	.674	.25212	2.085

a. Predictors: (Constant), Transaction Uncertainty b. Dependent Variable: Quality Management

The regression coefficients of the regression model $Y = \beta_0 + \beta_1 X_1 + e$, were β_1= .285 and β_0= .966 thus; Y=.966 +. 285 UT as indicated in table 4.22. β_1 is the slope of the regression line and it represents the amount that food quality management (Y) will change for each unit change in the capital (X). The ANOVA test shows a significant F-statistic of 84.547at 0.05 level of significance (p=0.000). This implies that the model in use was significantly fit and can be used to make predictions. The results of table 4.24 show that all the estimated coefficients are significant with t-statistics with p-values less than zero implying that the transaction uncertainty has a positive effect on food quality management. The null hypothesis H0: $\beta_0 = \beta_1 = 0$ is therefore rejected and the alternative hypothesis H_1: $\beta_0 = \beta_1 \neq 0$ adopted.

Table 4.23: Model Coefficients[a] for Transaction Uncertainty

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.966	.213		4.544	.000		
	UT	.285	.017	.823	13.743	.000	1.000	1.000

a. Dependent Variable: QM

The Results of ANOVA test in table 24 shows a significant F-statistic of 84.547at 0.05 level of significance (p=0.000). This implies that the model in use was significantly fit and can be used to make predictions.

Table 4.24: ANOVAa test for Transaction Uncertainty

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	9.765	1	9.765	84.547	.000[b]
	Residual	8.961	133	0.0673		
	Total	17.726	134			

a. Predictors: (Constant), Transaction Uncertainty b. Dependent Variable: Quality Management

The Path coefficient was positive and significant at 0.05 level (β=0.285, P<0.05) implying that one unit increase in transaction Uncertainty is predicted to increase food quality management by 0.285 units (Table 4.24). The t-statistics value was 13.743 and

significant at 0.05 level. The structural equation modeling (Analysis of Moment software, version 21) was used to show the regression weights of each item to their relevant constructs and the path coefficients indicated the direction and strengths of the factor. Figure 4.19 confirms positive path coefficients significant at 0.05 level (β=0.285, p< 0.05).The Regression weights used to test the contribution of each of the Transaction Uncertainty items to the construct variable and to explain the nature of the relationship showed that supply uncertainty (UT3;β=0.871 and UT4; β=.841) contributed the most to the construct. Grade uncertainty and demand uncertainty contributed 0.824 and 0.79 respectively.

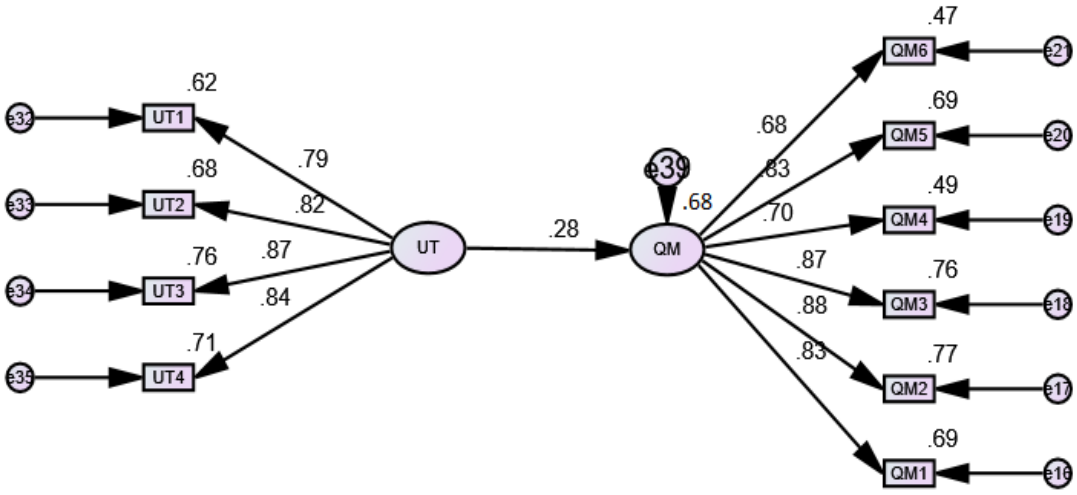

Figure 4.17: Model for Transaction Uncertainty and Food Quality Management

Table 4.25 shows the t-calc values (Critical Ratio - C.R) for all the Transaction Uncertainty items were higher than 1.96 (Critical Ratio > -1.96 or 1.96 at 0.05 significance level (p<0.05). This implies that the items were significantly related to transaction uncertainties, confirming convergent validity of the construct. The results

indicate that a unit increase in Food Quality Management is associated with 0.285 increases in transaction uncertainty. In conclusion, there was a significant positive relationship between transaction uncertainty and Food Quality Management (Estimate =.285, CR=13.743, p-value =0.003) in the beef enterprises in Kenya.

Table 4.25: Regression Weight and CR Values for Transaction Uncertainty

			Estimate	standardized Regression(β)	S.E.	C.R. (t)	P-value
QM	<---	UT	.966	.285	.079	13.743	0.003
UT1	<---	UT	1.000	.791			
UT2	<---	UT	.920	.824	.090	10.231	***
UT3	<---	UT	.932	.871	.086	10.901	***
UT4	<---	UT	1.010	.840	.097	10.464	***

The model depicted by the variable Transaction Uncertainty therefore is;

QM= 0.966+ 0.285UT

A CR =13.743 as shown in figure 4.18 indicates that, the model was statistically significant at 95 % significance level. The null hypothesis is therefore rejected and the alternative Hypothesis H_{o2} that stated that transaction uncertainty is positively related to food quality management of small and medium enterprises in the beef sector in Kenya beef is supported.

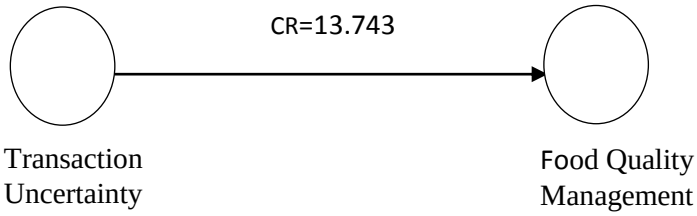

Figure 4.18: T- Statistics for Transaction Uncertainty

Uncertainty and risk taking as dimensions of entrepreneurial practices and indicators to vertical linkages are considered as major attributes of entrepreneurship (Kasumawardhani, 2013). Transaction Cost Economics (TCE) contends that uncertainty is a key factor in making a choice between spot and vertical linkages by entrepreneurs (Williamson, 1985). The theory appears to signal that high levels of uncertainty can render vertical linkages hazardous by entrepreneurs, as it can discourage exchange in the absence of safeguards. Carey and Lawson (2011) in their study on governance and social capital formation in buyer-supplier relationships proposed that forming closer vertical linkages fosters social capital under conditions of supply uncertainty though subject to opportunism when customer product demand is uncertain. In conditions of high demand uncertainty, entrepreneurs opt for vertical linkages because they are more effective in creating value for partner enterprises; flexibility and speed of joint responses to quality-oriented market or customers.

The findings of this study concur with study by Ying (2012) on supply chain quality uncertainty on firm performance that found out that SMEs that are vertically coordinated have better strategies to manage uncertainties supply and grade uncertainties. The study further realized that enterprises are able to improve product quality, process quality and ultimately firm performance. Quality uncertainty is a major concern in food enterprise due to various food crises especially in the meat industry. Therefore, it is often argued that information externalities, arising from uncertainty concerning the nature of food

quality and problems in detecting quality, may be reasons why vertical coordination is being used to circumvent the marketplace (Schulze *et al*., 2006).

Study by Tang and Musa (2010) identified demand uncertainty, disruption or supply uncertainty, grade uncertainty and technological uncertainty as drivers to vertical linkages in the Agro-food enterprises. Grade or quality uncertainty is associated with an entrepreneurs' failure to comply with good manufacturing practices at either the production stage, or raw material quality problem from the supplier SMEs or a component quality problem from the suppliers. Risk and uncertainty however can never be completely eliminated, and a 'zero risk' cannot be proved, so vertical linkages options are aimed at minimizing uncertainties (Ying, 2012).

4.8.2 Effects of Information Sharing on Food Quality Management

The second objective of the study was to determine the effect of information sharing on food quality management of small and medium enterprises of the beef sector in Kenya. The hypothesis used to test this objective was;

$H_{o1:}$ *Information sharing has no effect on the food quality management of small and medium enterprises in the beef sector in Kenya* (*(*$H_o : \beta=0$)

$H_{o2:}$ *Information sharing is positively related to food quality management of small and medium enterprises in the beef sector in Kenya* (*(*$H_a : \beta\neq0$)

The regressions model $Y = \beta_0 + \beta_1 X_1 + e$ for Information Sharing on Food Quality Management shown in table 4.26 shows the value for R-Squared as 0.562. The regression analysis also shows there is a positive joint relationship R=0.750 between the dependent variable Food Quality Management and the independent variables in the model. R^2=0.562 from this study shows that 56.2% of the variations in food quality management can be accounted for by Information Sharing.

Table 4.26: Regression Model for Information Sharing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.750[a]	.562	.557	.29366	2.109

a. Predictors: (Constant), ISC b. Dependent Variable: QM

The regression coefficients of the regression model ($Y = \beta_0 + \beta_1 X_1 + e$) were $\beta_1 = .311$ and $\beta_0 = 1.294$ thus $Y=1.294 +.311$ as shown on table 4.27. β_1 is the slope of the regression line and it represents the amount that food quality management (Y) will change for each unit change in the capital (X).

Table 4.27: Regression Coefficients[a] for Information Sharing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.294	.241		5.367	.000		
	ISC	.311	.021	.750	10.749	.000	1.000	1.000

a. Dependent Variable: QM

The ANOVA test shows a significant F-statistic of 115.547 at 0.05 level of significance (p=0.000). This implies that the model in use was significantly fit and can be used to make predictions. The results of table 4.28 show that all the estimated coefficients are significant with t-statistics with p-values less than zero implying that the Information Sharing has a positive effect on food quality management. The null hypothesis H0: $\beta_0 = \beta_1 = 0$ is therefore rejected and the alternative hypothesis H_1: $\beta_0 = \beta_1 \neq 0$ adopted.

Table 4.28: ANOVA[a] test for Information Sharing

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	9.965	1	9.965	115.547	.000[b]
1	Residual	7.761	133	.086		
	Total	17.726	134			

a. Dependent Variable: QM b. Predictors: (Constant), ISC

The results of the SEM analysis figure 4.19 confirm that, the path coefficient was positive and significant at 0.05 level (β=0.311, p< 0.001). This implies that for every 1 unit increase in information sharing, food quality management is predicted to increase by 0.311 units.

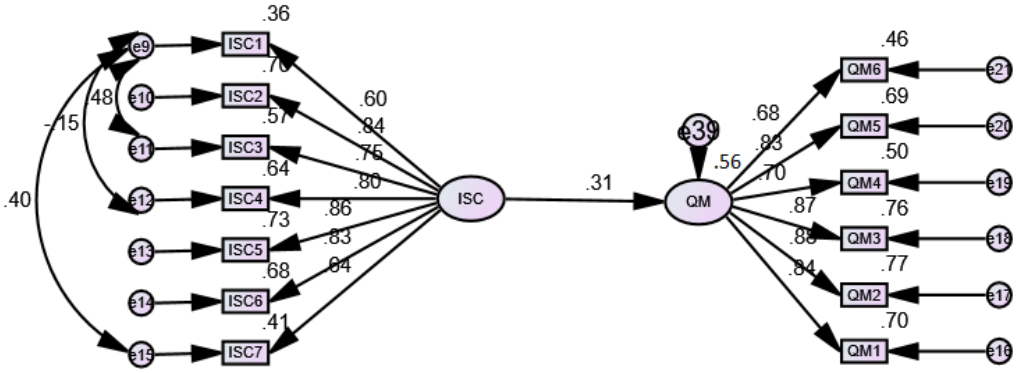

Figure 4.19: Hypothesis Model for information Sharing and Food Quality Management

Table 4.29 shows that all the regression weights were higher than the acceptable level. The t-calc values (Critical Ratio- C.R) for all the information sharing indicators were higher than 1.96 (Critical Ratio > -1.96 or 1.96 at 0.05 significance level ($p<0.05$). This implies that the items were significantly related to information sharing confirming convergent validity of information sharing construct. The results indicate that a unit increase in food quality management is associated with 0.311 increases in information sharing. In conclusion, there was a significant positive relationship between information sharing and food quality management (Estimate =1.294, CR=10.749, P-value =0.002). Therefore, Quality management= 1.294_{+} 0.311 Information Sharing .

Table 4.29: Regression Weight and CR Values for Information Sharing

			Estimate	Standardized Regression(β)	R2	SE	CR	P-Value
QM	<---	ISC	1.294	0.311	0.562	0.133	10.749	0.002
ISC1	<---	ISC	1	0.597	0.357			
ISC2	<---	ISC	1.356	0.835	0.698	0.187	7.247	***
ISC3	<---	ISC	1.265	0.752	0.566	0.14	9.038	***
ISC4	<---	ISC	1.438	0.802	0.643	0.216	6.671	***
ISC5	<---	ISC	1.478	0.856	0.732	0.201	7.35	***
ISC6	<---	ISC	1.414	0.827	0.698	0.196	7.202	***
ISC7	<---	ISC	1.027	0.643	0.414	0.131	7.831	***

T=statistics provided information on the significance to the relationship. T-statistics value (CR) was used to test whether the relationship between information sharing and food quality management was significant. Critical value should be greater than 1.96 at 0.05 significant level. Figure 4.20 shows a t-calc of 10.749. These results show that there was a significant positive relationship between cost recovery and financing of water investment since the CR of 10.749 is greater than the conventional critical value of 1.96 at 0.05 significance level ($p<0.05$). Therefore, with CR =10.749, this model was statistically significant at 95 % significance level.

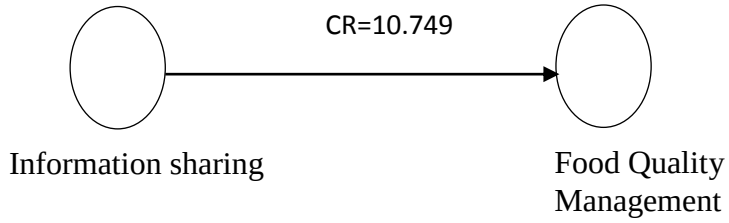

Figure 4.20: T- Statistics for information sharing

The results of table 4.27 indicate a positive correlation and an R^2 of 0.562. The standardized regression weight (β) is 0.311which is significant (p-value=0.002). Figure 4.20 indicates a CR-value of 10.749.The study therefore concludes that the null hypothesis is rejected and the alternative Hypothesis H_{02} that stated that information sharing is positively related to food quality management of small and medium beef enterprises is supported.

The current study realized that information sharing contributes greatly (56.2%) to food quality management among the beef enterprises in Kenya. This crucial role of information sharing could be explained by the fact that most beef entrepreneurs in Kenya have not integrated the various functions of the beef sector. For example, the beef processors have to depend on beef producer SMEs for their suppliers in spite of the seasonality in production (Atieno, 2012; Farmer & Mbwika, 2012).The products' characteristics of perishability, seasonality in production and customer preference dependent have prompted the need for quality information (timely, accurate, relevant) by the beef entrepreneurs. In Kenya, the value of information sharing is derived by the beef entrepreneurs being able to minimize costs associated with supply and demand uncertainties especially for quality products (Kangethe, 2015).

Li *et al*., (2006) highlight three levels of information sharing between enterprises: transactional, operational and strategic. Transactional information shares information about order quantities, prices, sales, product specifications, quality and delivery specifications. Sharing operational information means exchanging data on inventory levels, costs and schedules, production and transportation capacities, lead times, and shipments. Strategic information concerns point-of-sale information, real-time demand, understanding of market trends, the things customers value most, and product designs. Enterprises at a stage far downstream of the supply chain have better understanding of

end consumer demand and should share this knowledge with upstream partners. On the other and, upstream partners can inform downstream partners about order status, capacity utilization, production schedules or inventory levels. The downstream partner can use this information to quote better due dates and to better organize inventory replenishment. Therefore, more common vertical information sharing (upstream and downstream) is essential for quality management among beef enterprises.The study findings concur with Kushwaha and Barman (2010) whose study showed that effective use of relevant and timely information by entrepreneurs can act as a key competitive and distinguishing factor. The study further reveals that partner SMEs who exchange information regularly are able to work as a single entity and therefore, they can understand the needs of the end customer better and hence can respond to market change quicker. Vertically - linked enterprises access information concerning the capabilities and the reliability of the partners thus the actors share sensitive information and work jointly on quality management activities (Daley, 2009).

However, entrepreneurs would deliberately distort information that can potentially reach not only their competitors, but also their own suppliers and customers. It appears that there is a built-in reluctance within SMEs organizations to give away more than just enough information, since information disclosure is perceived as a loss of power (Kushwaha & Barman, 2010). In the meat sector, transfer of information is difficult due to complex supply chain structures, resulting in numerous organizational interfaces along supply chains, each of which acts as a hurdle the information flow has to overcome (Arens, Plumeyerb,& Theuvsen, 2012). In the meat supply chain, the interface between agribusiness enterprises like slaughterhouses and farmers seems to be the most difficult relationship due to structural and organizational disparities.

4.8.3. Effects of Transaction Costs on Food Quality Management.

The third objective of the study was to determine the effect of Transaction Costs on Food Quality Management in Kenya. The hypothesis used to test this objective was;

$H_{01:}$ *Transaction Costs has no effect on the Food Quality Management of small and medium enterprises in the beef sector in Kenya* *(*$H_0 : \beta=0$)

$H_{02:}$ *Transaction Costs is positively related to food quality management of small and medium enterprises in the beef sector in Kenya.* *(*$H_a : \beta\neq0$)

The regressions model $Y = \beta_0 + \beta_1X_1+ e$ for Transaction Cost on Food Quality Management shown in Table 4.30shows the value for R-Squared as 0.575. The regression analysis also shows there is a positive joint relationship R=0.759 between the dependent variable Food Quality Management and the independent variable in the model. R^2=0.575 from this study shows that 57.5% of the variations in food quality management can be accounted for by Transaction Cost

Table 4.30: Regression Model for Transaction Costs

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.759[a]	.575	.571	.28919	1.664

a. Predictors: (Constant), TC b. Dependent Variable: QM

The regression coefficients of the regression model ($Y = \beta_0 + \beta_1X_1 + e$) were β_1= .218 and β_0= 1.618 thus Y=1.618 +.218 as shown on table 4.31. β_1 is the slope of the regression line and it represents the amount that food quality management (Y) will change for each unit change in the Transaction Cost (X).

Table 4.31: Regression Coefficientsa for Transaction Costs

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.618	.206		7.868	.000		
	TC	.218	.013	.759	11.043	.000	1.000	1.000

a. Dependent Variable: QM

The ANOVA test shows a significant F-statistic of 121.949 at 0.05 level of significance (p=0.000). This implies that the model in use was significantly fit and can be used to make predictions. The results of table 4.32 show that all the estimated coefficients are significant with t-statistics with p-values less than zero implying that the Transaction Cost has a positive effect on food quality management. The null hypothesis H0: $\beta_0 = \beta_1 = 0$ is therefore rejected and the alternative hypothesis H_1: $\beta_0 = \beta_1 \neq 0$ adopted.

Table 4.32:ANOVA[a] Test Results for Transaction Costs

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.199	1	10.199	121.949	.000[b]
	Residual	7.527	90	.084		
	Total	17.726	91			

a. Dependent Variable: QM b. Predictors: (Constant), TC

The Path coefficient was positive and significant at 0.05 level (β=0.218, P<0.05) implying that one unit increase in transaction Cost is predicted to increase food quality management by 0.218 units. The T-statistics value was 11.043 and significant at 0.05 level. Regression weights were used to test the contribution of each of the Transaction Costs items to the Transaction Cost construct to inform the nature of the relationship. Regression weights on figure 4.21 indicate that TC1 is associated with an estimate of 0.81. TC3 contributes 0.86, TC4 is associated with 0.91, TC5 and TC6 contribute an increase of 0.94 and 0.87 respectively to Transaction Costs.

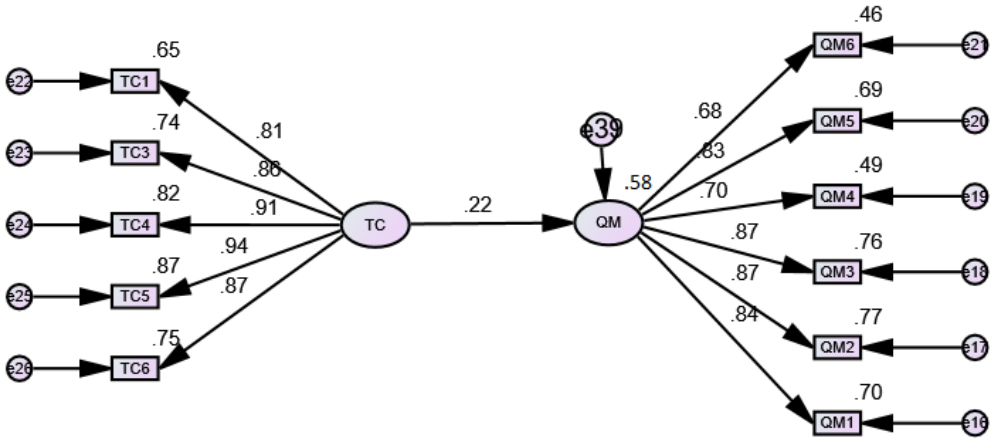

Figure 4.21: Hypothesis Model for Transaction Costs and Food Quality Management

The t-calc values (Critical Ratio- C.R) for all the Transaction Costs items were higher than 1.96 (Critical Ratio > -1.96 or 1.96 at 0.05 significance level p<0.05) as shown on table 4.33. The items were therefore significantly related to Transaction Costs, confirming convergent validity of Transaction Costs construct. From the results, a unit increase in Food Quality Management is associated with 0.218 increase in Transaction

Costs. The study concludes that, there was a significant positive relationship between Transaction Costs and Food Quality Management (Estimate =1.618, CR=11.043, p-value =0.018).

Table 4.33: Regression Weight and CR Values for Transaction Costs

	Estimate	standardized Regression(β)	R^2	S.E.	C.R. (t)	P-value
QM <--- TC	1 .618	.218	0.575	.118	11.043	0.018
TC1 <--- TC	1.000	.808	0.653			
TC3 <--- TC	1.098	.862	0.742	.092	11.906	***
TC4 <--- TC	1.158	.907	0.822	.090	12.871	***
TC5 <--- TC	1.106	.935	0.875	.082	13.491	***
TC6 <--- TC	1.096	.866	0.750	.091	12.001	

The regression model derived from the findings therefore is: Quality Management=1.618 + 0.218 Transaction Cost

T-statistics value (C.R) was used to test whether the relationship between Transaction Costs and Food Quality Management was significant. Figure 4.22 shows a t-calc of 11.043 (CR>1.96). Results show a significant positive relationship between Transaction Costs and Food Quality Preference since the CR of 11.043 is greater than the conventional critical value of 1.96 at 0.05 significance level (p=0.018).

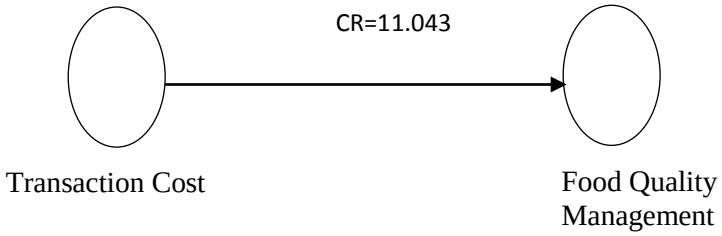

Figure 4.22: T-statistic for Transaction Costs

Based on the findings of figure 4.21 showing a positive correlation, R^2 of 0.575, P-value=0.018 shown on table 4.33 and figure 4.22 showing t-value of 11.043 the study concludes that H_{01} was rejected and alternate Hypothesis was adopted.The findings of the study indicate that transaction cost is a key factor to enhancing food quality management in the beef SMEs in Kenya. This could be attributed to the beef producer SMEs in Kenya, like other smallholder-based agro-food SMEs are scattered and are marked with large irregularities in supply because production is subject to weather and climate conditions. The beef animals and beef products have high variability in quality attributes increasing the searching and monitoring costs. Beef producers are situated far from the beef processors and the long distances between producers and consumers and problems with the quality of the infrastructure affect searching and bargaining costs.

Additionally, the Maasai beef entrepreneurs exhibit a nomadic culture where collective action in production, pricing and customer focus as well as investment in required quality improvements is limited. This factor affects negatively the monitoring and searching costs in the beef enterprises. The findings concur with Tilburg, Trienekens, Ruben and Boekel (2007), who showed that reduction of transaction costs, creation of trust in networks and sharing of risk and uncertainties among food SMEs offer substantial options for overcoming bottlenecks in the supply chain and especially finding techno-managerial solutions for improving quality levels.

Han, Trienekens and Omta (2011) in their empirical studies on the relationship and quality management in the Chinese pork supply chain, provide incentives for vertical linkage by meat entrepreneurs. The authors argue that spot markets are only very limitedly able to transmit quality-related information in food enterprises. Therefore, producer SMEs as well as slaughterhouses or meat processors save transaction costs through vertical linkages. Producer SMEs may save transaction costs through long-term

contracts by settling a premium for higher quality with a one-time negotiation. For processor SMEs high quality of pork or beef and consistency of supply with adequate quantities are paramount which allows transaction cost savings compared to traditional marketing channels. Monitoring costs arising, for instance, from improved traceability due to changes in food safety legislation and consumer concerns about credence attributes such as animal welfare do not only influence the degree of vertical coordination in pork production but also in the beef marketing chain (Hobbs, 2001). Pork and beef packer surveys both reveal that securing higher and more consistent quality of pork and cattle are the most important reasons for increased vertical linkages with producers. The consistent quality allows transaction cost savings through reducing the number of buyers and the number of buying stations (Wever, Mognum, Trienekens and Omta, 2010).

4.8.4. Influence of Collaboration Advantage on Food Quality Preference

The fourth objective of the study was to determine the effect of Collaboration Advantage on Food Quality Management in Kenya. The hypothesis used to test this objective was;

$H_{01:}$ *Collaboration Advantage has no effect on the Food Quality Management of small and medium enterprises in the beef sector in Kenya.* *(*$H_0 : \beta=0$)

$H_{02:}$ *Collaboration Advantage is positively related to food quality management of small and medium enterprises in the beef sector in Kenya.* *(*$H_{a:}\ \beta\neq0$)

The SEM and multiple regression results showed a positive and statistically significant relationship between Collaboration Advantage and food quality management. Results of table 4.27 indicate a coefficient R^2 mean of 0.466 and an adjusted R^2 of 0.460 indicating that 46.6% of the variations in food quality management can be accounted for by Collaboration Advantage.

Table 4.34: Regression Model for Collaboration Advantage

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.682[a]	.466	.460	.32442	1.516

a. Predictors: (Constant), CA b. Dependent Variable: QM

The regression coefficient was positive and significant at 0.05 level (β=0.238, P<0.05) implying that one unit increase in Collaboration Advantage is predicted to increase food quality management by 0.238 units. The T-statistics value was 8.855 and significant at 0.05 level as shown in table 4.35.

Table 4.35: Regression Coefficientsa for Collaboration Advantage

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.566	.262		5.981	.000		
	CA	.238	.018	.682	8.855	.000	1.000	1.000

a. Dependent Variable: QM

The results of the ANOVA test, table 4.36, indicate that the relationship model is significant, P=.000 (P< 0.05).

Table 4.36: Results of ANOVA[a] test for Collaboration Advantage

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.253	1	8.253	78.416	.000[b]
	Residual	9.473	134	.105		
	Total	17.726	134			

a. Dependent Variable: QM b. Predictors: (Constant), CA

The structural equation modeling (Analysis of Moment software, version 21) was used to show the regression weights of each item to their relevant constructs and the path coefficients indicated the direction and strengths of the factor. Figure 4.23 confirms positive path coefficients significant at 0.05 level (β=0.238, $p< 0.05$).The Regression weights used to test the contribution of each of the Collaboration Advantage items to the construct variable and to explain the nature of the relationship showed that technological advantage (CA3; β=0.5) contributed the most to the construct Collaboration Advantage. Innovation Advantage was second (CA2; β=.74) while Logistics system advantage (CA1; β=0.61) contributed the least towards the construct. The path coefficient was positive and significant at 0.05 level (β=0.238, $p< 0.05$). This implies that for every 1 unit increase in Collaboration Advantage, Food Quality Management is predicted to increase by 0.238 units.

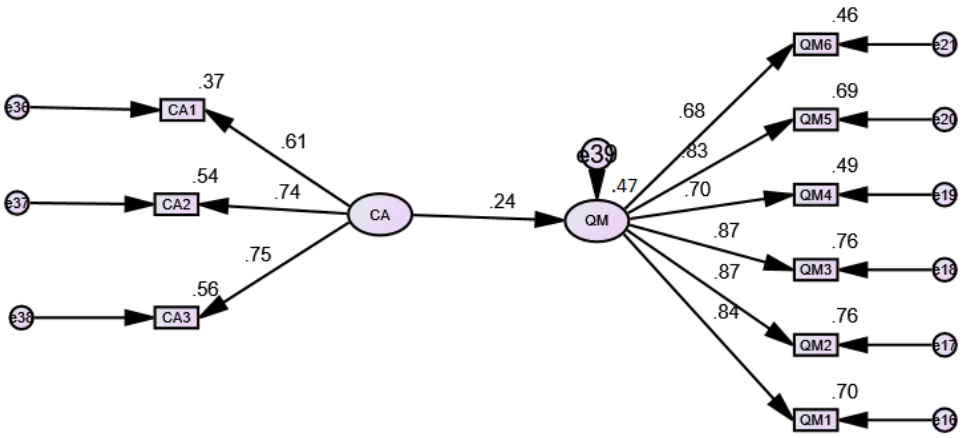

Figure 4.23: Hypothesis Model for Collaboration Advantage

The t-calc values (Critical Ratio- C.R) for all the collaboration advantage items were higher than 1.96 (Critical Ratio > -1.96 or 1.96 at 0.05 significance level $p<0.05$). The items were therefore significantly related to collaboration advantage, confirming convergent validity of collaboration advantage construct. From the results, a unit increase in Food Quality Management is associated with 0.238 (CR=8.855, p-value =0.027) increase in collaboration advantage. The study concludes that, there was a significant positive relationship between collaboration advantage and Food Quality Management. Therefore the model for the objective is;

Food Quality management=1.566 + 0.238(Collaboration Advantage).

Table 4.37: Regression Weight and CR Values for Collaboration Advantage

	Estimate	standardized Regression(β)	R^2	S.E.	C.R. (t)	P-value
QM <--- CA	1.566	.238	0.466	.169	8.855	0.027
CA1 <--- CA	1.000	.605	.366			
CA2 <--- CA	1.177	.735	.541	.216	5.435	***
CA3 <--- CA	1.280	.749	.560	.236	5.417	***

The result of test of significance for this model is shown in figure 4.24. Therefore this model was statistically significant at 95% significance level with CR=8.855.

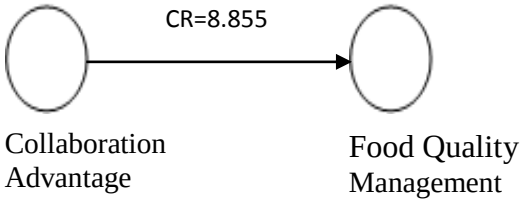

Figure 4.24: T-statistic for Collaboration Advantage

Based on the results of table 4.37 and figure 4.24 which indicate a positive correlation, an R^2 of 0.466, β value of 0.238 which is significant with a P-value of 0.027, and a t-value of 8.855, the study concluded that, H_{01} was rejected and alternate Hypothesis was adopted. The positive relationship between collaboration advantage and quality management in the beef sector SMEs can be explained by the fact that there is need to harmonize the logistics of procurement, deliveries from suppliers to the consumers as well as stock inventories. Co-innovation among the beef entrepreneurs is paramount to deliver greater value to customer given the inadequate entrepreneurial and managerial

skills among the Kenyan beef producer SMEs. Technological advantage helps to ensure that beef SME provide the special customer requests or inquiries, adjust order size, volume or composition during logistics operation and also product delivery time flexibility. The findings concur with Veerendrakumar, Narasalagi and Shivashankar (2014) who affirms that enterprises' innovation is imperative for SMEs to be competitive and create differential advantage over competitors. Sustainable competitive advantage requires its supply chain partners to innovate together to reach a new market potential.

Study by Pitt (2007) on the leading innovation and entrepreneurship in the Australian red meat industry found out that innovation advantage in vertically aligned enterprises positively influences its competitiveness strategies such as quality management. Martins (2012) in his study on Entrepreneurial and Innovative behavior in Spanish SMEs also found out that Entrepreneurial and innovative behavior enables firms to derive a competitive advantage by channeling resources into developing new products and processes responding to changes that occur in the market environment.

Firms, through innovativeness, develop a market niche with new products, differentiate themselves and /or substitute incumbents with other means that customers' value, increasing the likelihood that a firm will realize first mover advantage and generate extra ordinary outcomes (Wiklund & Shepherds, 2005). A firms'competitive advantage (defined as global competitiveness, profitability and sustainability) is the outcome of strategic firm entrepreneurship which in turn is the result of the effective mobilisation of specific firm innovation and entrepreneurial capabilities combined with strategic top leadership decisions applied to multiple innovation options (Pitt, 2007). Quality management in beef SMEs is strategic in positioning the firms as entrepreneurial. The level of innovation adoption and collaboration Advantage occurring within a sector will

determine the degree to which the sector transforms itself and achieves a desired level of competitiveness. However, this success is dependent on a variety of factors and interactions including: the level of Collaboration Advantage within firms; the innovation options developed as a result of the sector's innovation strategy; logistics management and the level collaborations between firms and value chains; and the patterns of adoption associated with individual firm entrepreneurship (Kusumawardhani, 2013).

4.8.5 Overall Structural Equation Modelling

The fifth objective of the study was to establish whether Enterprise quality Policy has a moderating effect on the relationship between Vertical Linkages (Independent Variable) and Food Quality Management of the SMEs of beef sector in Kenya. The hypotheses used to test this objective were:

H_{01} *Enterprise Quality Policy has no moderating effect on the relationship between Vertical Linkages and Food Quality Management of small and medium enterprises of the beef sector in Kenya*. *(H_o: $\beta=0$)*

H_{02} *Enterprise Quality Policy has a moderating effect on the relationship between Vertical Linkages and Food Quality Management of small and medium enterprises of the beef sector in Kenya*. *(H_a: $\beta\neq0$)*

The study adopted two structural models to assess the moderating effect of Enterprise policy on the relationship between the independent and dependent variables. While Model 1 illustrated the relationship without the moderator, model 2 represented moderated overall Structural model. A multiple linear regression model was also used to model the relationship among the four independent variables whereby, every value of the independent variable x is associated with a value of the dependent variable y. i.e.

$$Y=b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+e$$

The overall model fit was found to be 0.641as depicted on Table 4.39. This indicates that 64.1% of the variability in the food quality management can be explained by the independent variables namely; Transaction Uncertainty, Information sharing, Transaction Cost and Collaboration Advantage. The Adjusted R square of 0.621indicates that 62.1% of the variance in the food quality management was explained by the variations in the four independent variables in the regression model. The R value of 0.80062 is very strong and shows that the level of prediction of the linear regression model was very high.

The multiple linear regression results shown on table 4.39 predicted the dependent variable food quality management from the independent variable as; Transaction Uncertainty ($\beta = 0.320$, p-value < 0.000), Information Sharing ($\beta = 0.262$, p-value < 0.003), Transaction Costs ($\beta = 0.251$, p-value < 0.003) and Collaboration Advantage ($\beta = 0.243$, p-value < 0.000). The β values are significantly different from zero. Thus the four variables statistically significantly added to the prediction of food quality management. The multiple linear regression model is therefore:

$$Y = 12.596 + 0.0.320\ X_1 + 0.262\ X_2 + 0.\ 251\ X_3 + 0.243\ X_4$$

Where

X1 = Transaction Uncertainty

X2 = information Sharing

X3 = Transaction Cost

X4 = Collaboration Advantage

The F-statistics was used to test the fit of the multiple linear regression model. The ANOVA results show that the independent variables (Transaction Uncertainty, Information sharing, Transaction Cost and Collaboration Advantage) statistically significantly predict food quality management ($F(4,130) = 6.614$). This implies that the

multiple linear regression model is a good fit of this data and therefore, the null hypothesis H0: $\beta_1=0$ is rejected and the alternative bi $\neq 0$ is taken. This indicates that the model $Y=b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+e$ is a good fit.

Table 4.38: Summary Model without Moderator

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.8007[a]	.641	.621	.76387	.641	10.830	4	130	.001

Regression model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	12.596	1.377		6.887	.000
	UT	.320	.073	.269	3.329	.001
	ISC	.262	.098	.296	3.070	.003
	TC	.251	.107	.323	4.767	.000
	CA	.243	.154	.387	3.814	.000

ANOVA[a] test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.931	4	2.7327	17.67335	.000[b]
	Residual	20.101	130	.1546		
	Total	31.032	134			

a. Dependent Variable: Quality Management b. Predictors: (Constant), Transaction Uncertainty, Information Sharing, Transaction Costs, Collaboration Advantage

Path coefficients were used to determine the direction and strength of the factor. Results show that, the path coefficient beta value of β=.262 information sharing, β=.251 Transaction uncertainty, β=.320 Transaction uncertainty and β=.243 Collaboration

Advantage. R^2 was used to test how well the models fitted the data by indicating the proportion of variation in dependent variable explained by the SEM model. Figure 4.25 Model 1, shows a strong relationship between independent variables and Food Quality Management (R^2=.64).

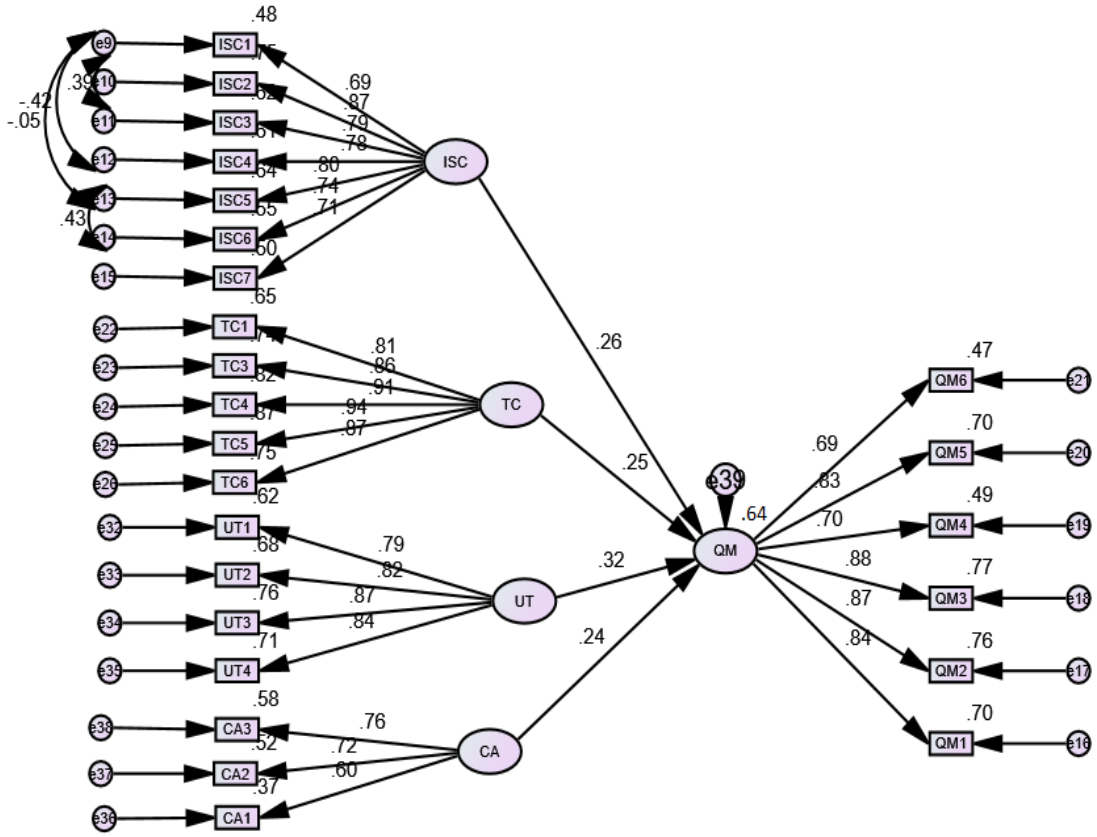

Figure 4.25: Combined effect of Independent variables on Dependent variables

Regression weights were used to determine the combined effect of independent variables on the dependent variable (Food quality management) and also to explain the nature of the relationship of the factor since all the variables were in the same measurement scale. Appendix VII shows that all the regression weights (t-calc values /C.R) were higher than

the acceptable range of -1.96 or 1.96 at 0.05 significance level ($p<0.05$) This implies that all the independent variables were significantly related to Food quality management.

The t-statistics value (C.R) was used to test whether the relationship between independent variables and food quality management was significant. Furthermore, Appendix VII shows that the t-calc values ranged between 2.505 to 3.680, which is greater than -1.96 or 1.96 (Critical Ratio >-1.96 or 1.96 at 0.05 significance level ($p<0.05$). The p-values for all the explanatory variables were significant ($p<0.05$) suggesting that the relationship between independent variables and food quality management was significant. Therefore the null hypothesis is rejected and alternate hypothesis adopted. The study concluded that there is a significant relationship between Vertical linkage and food quality management in the small and medium enterprises of the beef sector in Kenya. Results of the vertical linkage effect on food quality management as illustrated on Appendix VII present the following model;

The established combined multiple linear regression equation becomes:

$$Y = 12.596 + 0.0.320\ X_1 + 0.262\ X_2 + 0.\ 251\ X_3 + 0.243\ X_4$$

4.8.6 Overall Structural Equation Modelling With Moderator

Hypothesis five sought to find out whether enterprise quality policy has a moderating effect on the relationship between vertical linkages (Transaction Uncertainty, information sharing, transaction costs and collaboration Advantage) and food quality management. A regression analysis was done to determine the moderating effect of Enterprise quality policy on the relationship between vertical linkage and food quality management in the beef SMEs in Kenya. The study used the regression model $Y = \beta_0+\beta_1X_2+\beta_2X_2+\beta_3X_3+\beta_4X_4$.The moderating effect was tested by calculating the change in R^2 and the resulting P-value of the F-change. The p-value of change was 0.005 which

is less than p=0.05, which implies that the moderating effect of the Enterprise quality policy was significant at 0.05 level of significance. Results of table 4.40 show that for Model 2, R = .8554, R^2 = .732 and [F (1, 130) = 8.2080, p = .005]. R^2=0.732 from this study shows that the variations linear model variable explains 73% of the variations in food quality management. Therefore, after the interaction term (Vertical linkage*Enterprise quality policy) was included in the equations an R^2 change of .091was realized, confirming the presence of significant moderating effect. Thus the null hypothesis was rejected, meaning that, enterprise quality policy moderates the relationship between vertical linkages and Food Management.

The coefficients in table 4.39 show that all the estimated coefficients are significant since they have t-statistics with p-values which are all less than 0.05 implying that the variable enterprise quality management has a moderating effect on the relationship between vertical linkage and food quality management. The ANOVA test shows a significant F-statistic of 18.87417 at 0.05 level of significance since the significance 0.000 of the F-statistic is less than 0.05. This implies that the model in use was significantly fit and can be used to make predictions. Thus the null hypothesis H_0: $\beta_0=\beta_1=0$ is rejected and the alternative that at least one coefficient of the model is greater than zero is adopted.

Table 4.39: Summary Multiple Regression Model with Moderator

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
2	.8554[b]	.732	.674	.74383	.091	8.208	4	130	.005

Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	10.029	1.035		4.767	.000
UT*	.302	.071	.257	3.620	.001
PSISC*	.291	.096	.314	3.282	.003
PS	.230	.103	.285	2.756	.006
TC* PS	.233	.148	.363	2.448	.014
CA* PS					

Results of ANOVA[a] test

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.312	4	3.078	18.87417	.000[b]
	Residual	21.201	130	.16308		
	Total	33.513	134			

a. Dependent Variable: Quality Management b. Predictors: (Constant), Transaction Uncertainty* Enterprise quality policy, Information Sharing* Enterprise quality policy, Transaction Costs* Enterprise quality policy, Collaboration Advantage*Enterprise quality policy

Results of the structural equation modeling (SEM) are as shown in figure 4.26. The model results indicate that after interaction term (Enterprise quality policy) was introduced in the equation. The path coefficient beta value were positive; β=.291 information sharing, β=.230 Transaction Cost, β=.302 Transaction Uncertainty and β=.233 Collaboration Advantage and an R^2 value of .73.

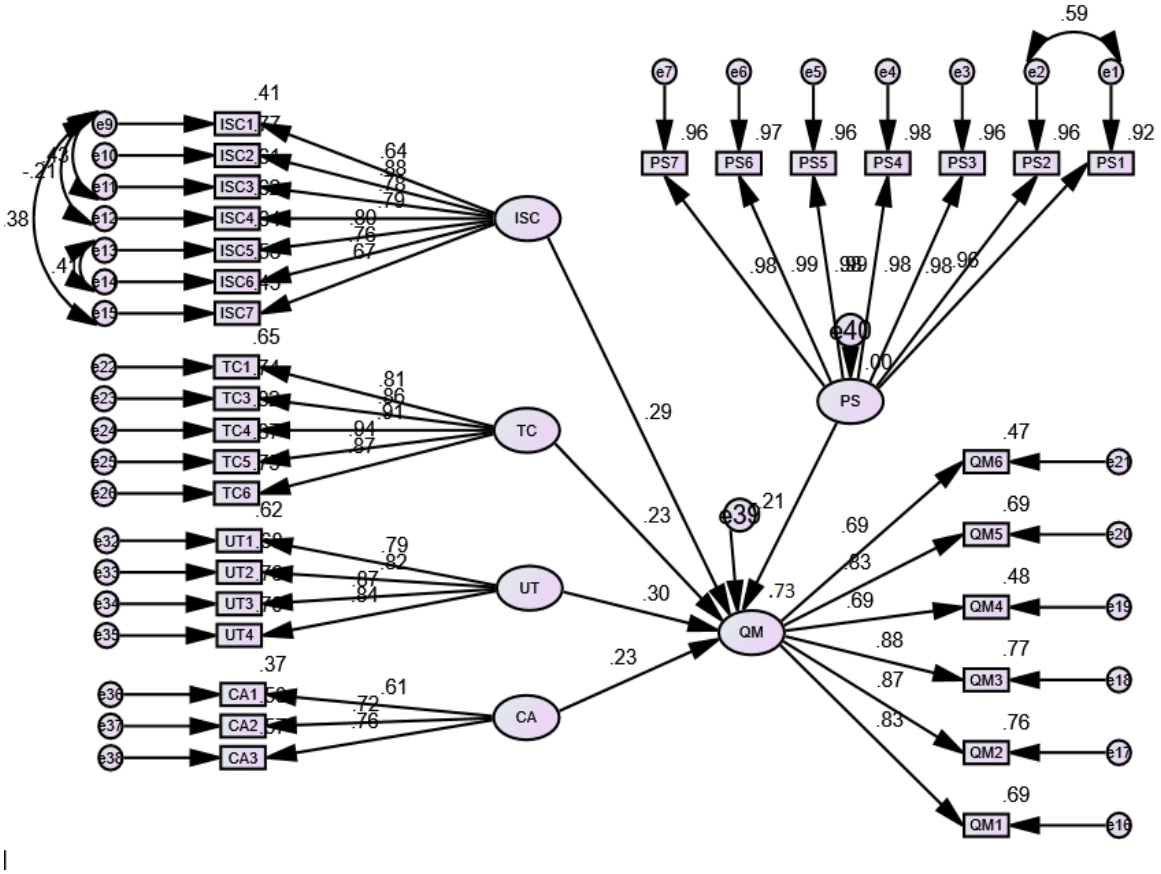

Figure 4.26: Overall Moderated Relationship between Vertical Linkage and food quality

The Critical ratio values for all the independent variables were between 2.448 and 3.282 higher than -1.96 or 1.96 (Critical Ratio > -1.96 0r 1.96 at 0.05 significance level ($p<0.05$). The p-values for all the explanatory variables were less than 0.05.

4.8.7 Model Fit Indices for the Effect of Moderation of policy support services.

The confirmatory factor analyses (CFA) maximum-likelihood estimates and goodness of fit results of the moderating effects of policy support services on the relationship between vertical linkages and food quality management are shown on table 4.40. The $\chi 2$

value of 594.49 with 269 degrees of freedom and a p-value of 0.000 indicate that the fit of data to the hypothesized model is not necessarily adequate. The ratio of chi-square to the degrees of freedom was 2.210 indicating a good fit. CFI is .932 is well above 0.9. GFI was .690; NFI is .854 which is close to 0.9. The RMSEA of 0.075 indicates an adequate fit. The findings indicate that the model is good and suitable for analysis.

Table 4.40: Model Fit Indices for the Effect of Moderation of Enterprise Quality Policy

Model	$\chi 2$	$\chi 2$/df	DF	NFI	GFI	CFI	RMSEA
First-order	594.49	2.210	269	.854	.690	.932	.075

Note: NFI=normed fit index; GFI=goodness of fit; CFI=comparative fit index; RMSEA=root mean square error of approximation; DF=Degree of freedom;

Therefore, the established combined moderated multiple linear regression equation becomes:

$Y = 10.029 + 0.291(ISC^{*} PS) + 0.230 (TC^{*} PS) + 0.302(UT^{*} PS) + 0.233(CA^{*} PS)$

The findings indicate a positive relationship between vertical linkage and food quality management in presence of the moderator Enterprise quality policy. Adoption of an Enterprises' quality policy links SMEs to global markets as well as shaping the strategic options available to SMEs on either to upgrade or exit. A quality policy can be a catalyst for upgrading or improving farming techniques and product quality to meet higher quality requirements which permits participation in high value added food chains (Lee, Gereffi & Beauveas, 2010). The fact that Enterprise quality policy enhances the relationship between vertical linkages and food quality management is very vital to the beef SMEs. Accordingly, these firms should strive to network, to be proactive and innovative to keep abreast with any quality policy change.

Moreover due to their disadvantage in economies of scale, the SMEs should embrace vertical linkage as a strategy to access more business opportunities with quality

differentiated products. The findings of this study validate the views of empirical research conducted in the food quality management regarding the importance of a guiding food quality policy and the need for its enforcement. A well-defined quality policy which is consistent with organizational objectives enhances quality management in the beef and other food enterprises. This quality policy should also be well understood by all employees and implemented and maintained at all levels of the enterprise and complied with by partners in the chain (Khoi, 2011; Autora, 2012).

A study by Cafaggi (2010) on private regulation, supply chain and contractual networks in food chains observed that vertical linkages enhance the regulation and monitoring of safety among food entrepreneurs. Private policy and regulations associated with process and product design requires specific contracted arrangements among supplier, producer and processor SMEs and retailers to implement the safety standards and to monitor their compliance. Additionally, study by Frohberg, Grote and Winter (2006) confirms that policy design and implementation concerning food safety can be improved by adopting vertical coordination at a global level if supported by an adequate legislative reforms at the national level.

4.8.8 Optimal Model

The model optimization was carried out based on the results of multiple regressions shown on table 4.40. Results of figure 4.26 and the resulting coefficients corroborated the multiple regression results which revealed that all variables were significant with a P- value of less than 0.05 yielding a multiple linear regression equation model:

$$Y = 10.029 + 0.291X_1 + 0.230\ X_2 + 0.302X_3 + 0.233X_4$$

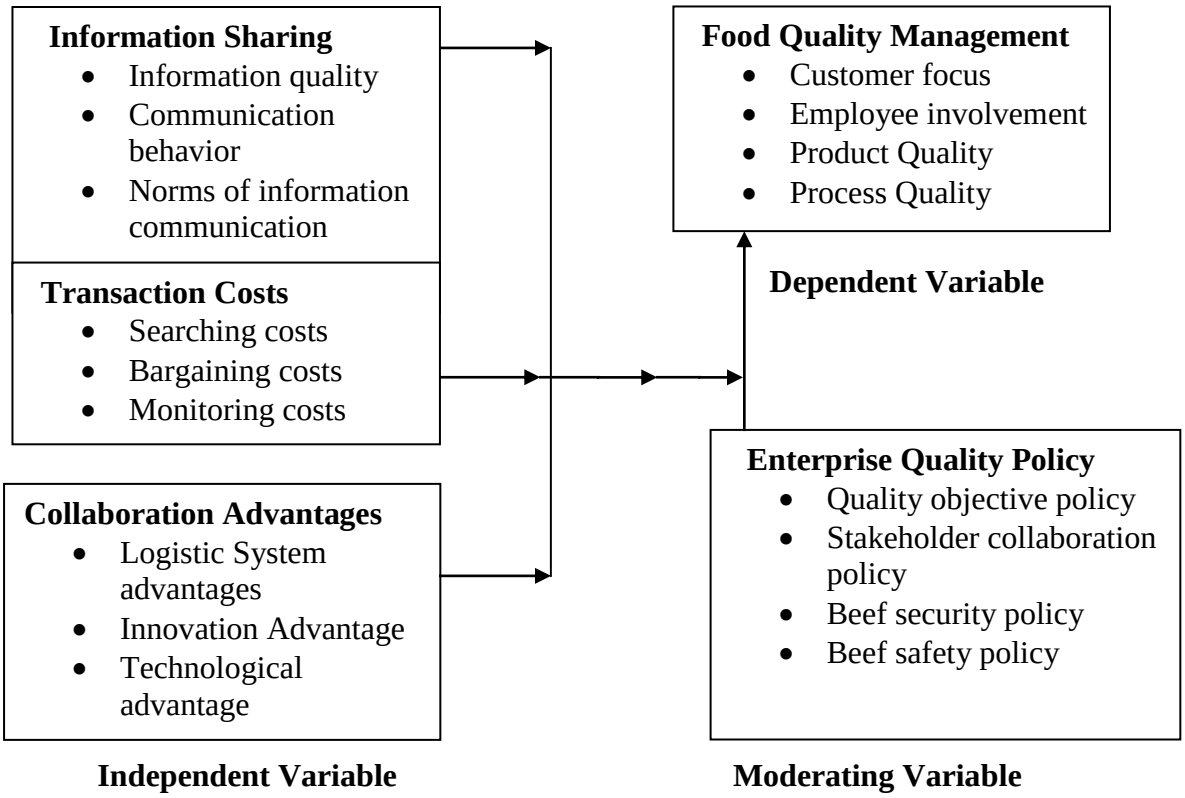

Figure 4.27: Optimal Conceptual Framework

The results confirm that, the beef SMEs who align their enterprises in the vertical linkage have an advantage of reducing uncertainties of supply, demand and grade (quality). The SMEs have relevant, timely and accurate information about quality concerns from their customers. They also reduce their transaction costs and achieve a collaboration value of logistics, innovativeness and technological advancement. The study also realized the need for an enterprise quality policy if quality management has to be enhanced in the beef sector.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter the summary, conclusions and recommendations of the study are presented. This study sought to examine the effect of Vertical Linkages on the food quality management in the beef enterprises in Kenya. The empirical contributions made by the study are discussed based on the outputs of the descriptive and the inferential findings. Finally, the chapter presents policy; enterprise managerial implications are also discussed as well as recommended possible areas of further study.

5.2 Summary of Findings

This section discusses the summary of the findings of the five objectives that guided the study on the effects of Vertical Linkages on the Food quality Management of the beef enterprises in Kenya. The objectives were; Transaction uncertainties, Information sharing, Transaction costs and collaboration advantage. The moderating effect of Enterprise quality Policy was also discussed.

5.2.1 To explore the effect of Transaction Uncertainties on food quality management of Small and Medium Enterprises in the beef sector in Kenya.

The first objective sought to find out whether Transaction Uncertainty affects food quality management in the beef Enterprises in Kenya. The Transaction Uncertainties were: Demand uncertainties, Grade Uncertainties and supply uncertainties. Based on the findings of the study, food quality management of the SMEs in the beef sector in Kenya, when measured in terms of customer focus, employee involvement, product quality and

process quality was positively influenced by Transaction uncertainty. Quality grade and supply uncertainties have a strong positive influence on quality management in the beef SMEs in Kenya. Empirical findings have revealed that standard TCE arguments typically refer to the growing uncertainty in food chain enterprises especially in meat sector to give reasons for closer vertical coordination to minimize the uncertainties of inter-firm transactions. The results have indicated that success of the SMEs depends on the ability of the entrepreneur to always be optimistic to take every odd as the opportunity. In spite of the uncertainties, entrepreneur managers maneuver their environments (internal and external environments) in such a way that the goals are accomplished rationally and therefore winning by the application of their extraordinary insights and skill.

Ability to manage transaction uncertainty is about managing paradoxes and contradictions that may arise in the course of business transactions in particular by SMEs in the same sector that are expected to exhibit differences in quality management due to differences in production processes and quality specifications such as the beef SMEs. Though they shun uncertainties associated with supply and demand of the products, beef SMEs entrepreneurs are encouraged by the clarity and optimism with which they see the future in a complex business landscape. Moreover they limit the uncertainties they create by defining and strategizing their ends and by controlling and monitoring their means to suit what they see the future to be. By embracing vertical linkages for food quality management, entrepreneurs are managing transaction uncertainties by transferring and/or sharing uncertainties with other SMEs in the sector. The food sector and in particular the beef sector in Kenya is today concentrating more on entrepreneurial innovations for better organizational structures, new products and processes than on skills and knowledge per se.

5.2.2 To investigate the effect of information sharing on food quality management of Small and Medium Enterprises in the beef sector in Kenya.

The second objective was to establish whether information sharing affects the food quality management of the beef SMEs in Kenya. The study found out that information sharing (Information quality, communication behaviour, Norms of information communication) was an important trigger to Vertical Linkages by beef SMEs in order to improve food quality. Results indicate that information sharing has enabled feedback from suppliers and customer to change SMEs production practices and beef SMEs embrace the idea of honest inter-firm networks to enhance food quality.

One of the beneficial vertical linkage practices is extensive sharing of information. It facilitates decision making skill which is a fundamental characteristic of an entrepreneur necessary at every stage of the business. Information sharing enables the entrepreneur to consult experts for business and technical advice as well as seeking information on client's or supplier's needs and building networks. Based on the findings of this study, norms of communication and communication behaviour had a strong influence on food quality management. Entrepreneurial leadership exert inter-firm influence by means of communication towards the achievement of enterprise goals. By providing timely and relevant information they provide the necessary spark to motivation by inspiring, guiding and directing employees and stakeholders towards the achievement of unity of action and purpose.

The theory of inter-organization communication (Forrester 1958, 1966) emphasizes the importance of information exchange for effective enterprises' operations. Exchange of business-related information and quality of services among the meat processor and producer SMEs is beneficial for exploring business opportunities. Entrepreneurs alert to changes in business trends exhibit an innovative turn of mind and convert the market

change into a viable opportunity. By using good interpersonal communication skills in their enterprises, beef SMEs interact and share useful information with raw material suppliers, processor and customers, which enables future planning. Information sharing therefore plays a key role in ensuring that inter-linked beef SMEs manage quality and thus remains competitive in a rapidly changing global market.

5.2.3 To examine the effect of Transaction Costs on Food quality management of Small and Medium Enterprises in the beef sector in Kenya.

The third objective sought to examine whether Transaction Costs affects Food Quality Management of beef SMEs in Kenya. Transactions cost incurred by beef SMEs include: searching costs, bargaining costs and monitoring costs among others. The Transaction Cost Economics (TCE) theory indicates that firm's economic activity will be organized in such a way as to minimize costs in the long run. A transaction occurs whenever a product must move between separable stages in production, processing, or distribution. The findings of the study revealed that of the three costs studied, monitoring costs influenced the most to the choice to vertical linkages for food quality management by the beef SMEs in Kenya.

The benefit of transaction costs to food quality management is that, it prompts entrepreneurs to be alert to confront any disequilibrium in the market. The economic theory of adjustment stipulates that the chief role of the entrepreneur as the leader of the enterprise is based upon the adjustment of price in the market as wrong price in the market may reduce profit. In a vertical linkage alignment, the searching costs aim at identifying a seller who would be willing to accept a lower price while maintaining quality, or sometimes negotiating for the buyer to pay a higher price for value obtained in quality products. Since the adjustment of price is the role of the entrepreneur, then the entrepreneur ought to be alert to information regarding market price fluctuations as this

will enable him to intervene in the market by changing the price. A vertical linkage to create value by ensuring quality products and processes orients the entrepreneur to the economy in purchase and profitable selling, resulting in greater monetary rewards. The entrepreneurial functions are determined by the degree of efficiency on the use of resources within the firm (X-efficiency).Transaction costs when not well checked result in deficiencies in the production function or input-output relationship. In the beef sector, monitoring of production is essential to ensure the producer SMEs get it right the first time in terms of quality attributes. Wastes and reworks are the costs of quality and these cause inefficiencies because all the inputs in the production function cannot be marketed. Within a vertical linkage, the entrepreneur is able to mobilize all the inputs to derive the final output, which is a quality product.

5.2.4 To assess the effect of Collaborative advantage on food quality management of the Small and Medium Enterprises in the beef sector in Kenya.

The fourth objective sought to examine the effect of Collaboration Advantage on Food Quality Management in the beef SMEs in Kenya. The Transaction Value (TVA) theory by Zajac and Olsen (1993) emphasizes the effect of transaction value on vertical coordination choice, noting that, when the pursuit of transactional value necessitates higher transaction costs, and expected joint gains outweigh transaction cost considerations, inter-organizational strategies having a greater joint value will typically require the use of less efficient vertical coordination. This is to imply that, enterprises rarely create value in isolation but instead, they align themselves with customers, suppliers, processors, producers and many others to develop new markets and expand existing ones by embracing quality.

The findings on the beef SMEs in Kenya reveal that the Technological advantage and innovation advantage contribute most to food quality management, while logistics

advantage is the lowest. However, the importance of a collaboration advantage in inter-linked firms cannot be over-emphasized. Collaboration and networking are traits exhibited by successful entrepreneurs for business sustainability and growth as they prompt eentrepreneurial innovation which is essential for SMEs to generate quality products and process quality in order to differentiate markets for enterprise growth. Entrepreneurs embrace co-innovate in order to drive their business ideas. In the beef SMEs, innovative vertical linkages build teams that are proactive in driving quality and safety in their products in order to satisfy customer expectations are essential. A logistic advantage can create customer value culminating into improved firm performance through enhanced quality products and processes as these create value by the efficiency, effectiveness, differentiation of products and increasing food quality attributes of freshness and safety. The producer SME is dedicated to satisfy the consumers by providing quality by reducing the travel distance and time resulting in a positive impact on meat quality.

SMEs that are looking outside their organizational boundaries for opportunities to collaborate with other related SMEs partners to ensure efficiency and responsiveness in business leverage the resources and knowledge of their suppliers and customers. Collaborations result to quicker product development processes, reduced development costs, greater technological improvements, and enhanced product quality in dynamic market conditions. Therefore, there is a great need for the SMEs partners to be innovative and responsive to add value through quality management for the customers in the form of extended business.

5.2.5 The moderating role of Enterprise Quality Policy on Vertical Linkages and food Quality management

The moderating effect of Enterprise quality policy on the relationship between vertical linkage and food quality management in beef SMEs was determined. The study found out that enterprise quality policy has a facilitating effect on the relationship. Quality compliance for SMEs depends on support from the organization as well as from the government in the form of designing sector specific quality policy, quality policy objectives by the enterprise, policy on selection of partners, technical advice as well as enforcement by the relevant institutions. The study concludes that policy plays a significant role in the food quality management of the beef SMEs in Kenya.

Right from the conception stage in promoting the enterprise, entrepreneurs should be careful to obey the legal formalities, procedures, policies and plans for the government so that they are freed from any form of legal tussles. Entrepreneurs intending to adhere to private quality policy should be aware of the policy regulations regarding food standards as consumers' value branded foods such as Halal or organic foods that have perceived quality attributes. For processing entrepreneurs, technology and innovation policy will be a critical component of meeting the environmental and health objectives of the future. To facilitate technology and innovation, Hodgins, (2011) argues that entrepreneurs must focus their efforts on ensuring a suitable regulatory environment, one that enables the sector and is transparent. She outlines the outcomes of such an environment as the commercialization of safe products, product labeling that allows consumers to make informed choices and legal protection for companies that enjoy intellectual property rights.

One of the prominent goals of food quality policy has been the protection of the consumers through the focus on setting food quality standards. Basu, Thomas and

Acharya (2007) note however that the market has witnessed the takeover of standard setting by the buyer end of the food system – the processors and retailers. These entrepreneurs are now setting standards increasingly higher beyond those set by public policy-makers. The consequence has been that these standards now act as barriers to market entry for smaller companies and production operations that cannot meet these stringent standards.

5.3 Conclusions

Based on the research findings, the study concluded that the dimensions of vertical linkages are critical and an integral part of the firm to the enterprises' operations regarding quality management. The results, while supporting the notion that vertical linkages are associated with food quality management, also show that some attributes are more important in this regard than others. The hypotheses were verified with empirical data collected to explore the food quality management framework of the beef enterprises in Kenya drawing from previous research studies. Based on the findings, a number of conclusions can be made. Transaction uncertainties were found to relate positively to food quality management and quality management benefits were attributed to enhanced ability by the SMEs to address demand.

Additionally, vertically aligned SMEs settled the uncertainties that would result from grade and supply uncertainties as indicated by the significant and positive relationship. However, grade uncertainty has the strongest positive relationship to food quality management. Based on respondents' responses, transaction uncertainty plays an important role in the food quality management of SMEs. The vertical linkage dimensions of information sharing, transaction costs and collaboration advantages had a greater and more significant effect on food quality management. Information quality had the highest effect on food quality management and communication norms and

Communication behaviour followed. Again, bargaining and monitoring cost had the highest positive and significant relationship compared to searching cost. Collaboration advantages of innovation and technological advantages had the most effect on food quality management. The vertical linkage dimensions, being within the control of the SMEs, provide an opportunity for SMEs to develop entrepreneurial strategies that lead to more closer vertical linkage for successful food quality management compliance in the most effective and efficient manner.

5.4 Recommendations

Based on the findings, the following recommendations can be suggested:

There is need for the beef SMEs to re-orient their production and marketing strategies to cope with the changing business environment. The current Auction markets are costly and offer very little quality assurance to consumers. A vertical alignment could be an option that the sector could explore. To curb on the demand and supply uncertainties, the State department of Livestock need to enhance the technical advice on modern innovations regarding pasture production, beef animal breeding and the concepts of entrepreneurship. There is need to identify policies and strategies that reduce transaction costs and enhance collaborations through clear and reliable logistics and production technologies to enhance market access for poor livestock keepers, and explore policy options that might reduce market distortions prompted by information asymmetries.

Information is an asset to any entrepreneur as this enhances transparency and trust among the beef SMEs in the value chain. Improvement of media coverage on how market prices are behaving, changing consumer preferences is essential. Today the media covers the prices of items such as maize, carrots, vegetables and many others but gives no information animal products. This makes the beef SMEs quite vulnerable to the

scrupulous middlemen. Opportunistic behavior by withholding vital information may be minimized by formation of registered SMEs associations which will have mutual benefits for all beef SMEs. Collective bargain and lobbying as well as quality setting would work best if SMEs work as a team. The beef sector SMEs should embrace innovation to identify opportunities for the SMEs, especially women, to participate in value added production of beef and beef products, thereby capturing a greater share of additional value within the beef production and marketing chain.

Education is the most important asset for the entrepreneur. As a tool of entrepreneurial development, education makes the entrepreneur informative as well as rational in approach. There is therefore need for the government to take crucial steps to promote first generation entrepreneurs by providing capital as well as training for managing the enterprise. By so doing the entrepreneurs in the beef sector shall be more aware of the government policies and incentives provided by the government. The National and the County governments should endeavour to promote agricultural development and especially beef entrepreneurship in the Arid and Semi-Arid areas (ASALs).

5.4.1: Contribution to Knowledge

The results of the research contributed to existing theory by providing empirical evidence of a food quality management framework within a developing economy context. Additionally, the research exemplified the importance of vertical linkages by SMEs to achieve food quality management by revealing the role of transaction uncertainty, information sharing transaction costs and collaboration advantage in vertically linked firms. This study identifies transaction uncertainty as a key aspect consistent in influencing SMEs to achieve quality management with enterprise quality policy enhancing compliance to the quality management.

Founded on an integrated theoretical framework the current study built on existing theory to generate a predictive conceptual model that demonstrated strong explanatory and predictive power and has opened up an understanding on what vertical alignment aspects of SMEs affect food quality management within the context of Kenyan food enterprises. By examining the effects of vertical linkage dimensions, this study contributed to our understanding of what aspects of vertical linkages favour and influence Kenyan SMEs and how they affect the food quality management of these SMEs. The study made a number of contributions to quality management research. It makes a number of contributions to theory, methodology and practice. Importantly, in the statistical ground, the study developed a theoretical model under a new empirical research setting drawn from existing theories and exhibiting desired levels of fit of the data. Regarding knowledge and theory, the current study used four basic theories and their causal arguments as a framework to gain more insights to the effect of vertical linkages on the food quality management of SMEs in the beef sector in Kenya. The review of the literature appears to indicate inconsistencies, and varied views among researchers on the effect of SMEs vertical linkages on food quality management. The study endeavoured to fill this contextual gap in the existing literature.

The theoretical development and empirical testing of the theories was based mostly on the developed economies context. However, understanding food quality management SMEs from developing countries is essential for a clear comprehension of the phenomena for academicians, SMEs managers and policy makers. Therefore, the study has contributed to the literature by incorporating developing country data in the wider empirical generalisations of the findings from an analytical perspective.

5.5: Areas for Further Research

From the above limitations, it is possible to group for future research recommendations into three main types, namely, to address the shortcomings of the current study, to extend this work to other applications and to identify new areas of research of relevance to those in academics and industry. This study provides a number of future research possibilities. Although the research looked at a number vertical linkage dimensions, it opens up an avenue to review the effect of other aspects of vertical linkages on food quality management that was not covered in the research.

There would be need to replicate the research to cover a number of countries as this study was performed only within the context of Kenyan beef SMEs. The findings of both longitudinal and cross-sectional studies would help to establish whether the scales were generalisable for different times and socio-cultural settings. It is suggested that subsequent research further validate the measurements, as well as examine the relationships between the concepts from other stakeholders' perspectives in different countries and also over time. The vertical linkage of the beef enterprise does not stop at the processing stage but also includes importers which serve as wholesalers, and retailers. The current research however could not cover these stages. Therefore, future research should perform data collection for the entire beef enterprise chain to provide the full view of the value chain.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

SECTION 1: BACKGROUND INFORMATION

1.1 Personal Details.

1 Name of the organization ……

2 Gender: (1) Male ☐ (2) Female ☐

3 Owners age (1)18-35 ☐ (2) 36-45 ☐ (3) 46-55 ☐ (4) 56 and above ☐

4 Educational level:

i. O-Level ☐
ii. Tertiary Certificate ☐
iii. Diploma ☐
iv. Bachelor's degree ☐
v. Master's Degree ☐
vi. Other level……

1.2. Company Information

5. Number of years in business (1) 1-5 ☐ (2) 6-10 ☐ (3) 11- 15☐ (4) 16- 20☐ (5) 20 and above ☐

6. What is your organization's motivation towards production of quality products?

1. A condition by business partners [ ]
2. As a marketing tool [ ]
3. Satisfy customers [ ]
4. A requirement to do business [ ]

SECTION 2: VERTICAL LINKAGES

7. Tick from the following list the category of beef firms you collaborate with;

i. Beef producers [ ]

ii. Beef suppliers/agents [ ]

iii. Beef processing firms [ ]

iv. Others……..

8. Operating as part of a vertically linked enterprise positively affects a beef enterprises' quality management (tick one).

Strongly Disagree [ ] Disagree [ ] Neutral [ ]

Agree [ ] Strongly Agree [ ]

9. A beef enterprises' quality management should be a subset of the beef sector Quality management system. Yes [ ] No [ ]

10. When you have to choose the collaborating partner, the main factor that you consider is; (Tick one)

[ ] Quality [ ] Production scale [ ] Credit [ ] Producing experience

[ ] Stable supply from the supplier [ ] Low cost of the supplier

2.1. Transaction Uncertainty (UT)

The objective of subsection 2.1 is to get your feedback on the Transaction Uncertainties (Demand, grade, supply uncertainty) that prompt you to link with other beef SMES in your enterprise.

2.1.2. Tick the answer that accurately reflects your enterprises' current conditions

Factor	Strongly Disagree (SD)	Disagree (D)	Slightly Agree (SA)	Agree (A)	Strongly agree (SA)
1. The volume of customer demand is difficult to predict					
2. Beef quantity from beef producers is unpredictable					
3. Beef quality and specifications from producer SMEs are unpredictable					
4.Beef delivery time is not certain					

2.2. Information Sharing (ISC)

The objective of part 2.2 is to get your feedback on how information shared enhances your choice to link with other Beef SMEs.

2.2.1: You and your collaborating partner ensure quality related information is honestly shared promptly. (Tick one).

Always [ ] Not always [ ] Not sure [ ]

2.2.2: You and your partner can share information about the following (please tick one)

Cost [ ] price [ ] product safety [ ] quality and quantity [ ]

2.2.3: Tick the answer that accurately reflects your enterprises' current conditions

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Information to your partners is timely					
2. Information received from beef enterprise partners is accurate					
3.Information on beef products quality is relevant to your partners					
4.The enterprise organizes for special meetings to communicate important information regarding quality with partners					
5. Feedback from suppliers and customers regarding quality is frequently communicated to all departments					
6.Our firm and partners trust each other with information about quality					
7.Our firm shares full information on quality with honesty with partners					

2.3. Transaction Costs (TC)

2.3.1. It costs us less money when we purchase (sell) beef from our most important partners.

(Tick one). Yes [ ] No [ ]

2.3.2. Please tick the number for each Transaction costs statement that applies to your enterprise using a 5-point scale.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. It is very difficult find proper business partner					
2. It is very difficult to know the information about a cooperative partner					
3. It is very difficult to get on an agreement with a cooperative partner					
4. It is very difficult to agree on the conditions of the contract with the collaborating partner					
5. It is very difficult to decide to sign the contract with the collaborating partner					
6.It takes a lot effort (time, fund, labour) to ensure compliance to an agreement					
7 It is very difficult for you to monitor your partner					

2.4. Collaboration Advantage (CA)

2.4.1: Our most important supplier (We) consult on Quality management related matters.

Always [ ] sometimes [ ] Never [ ] Not sure [ ]

2.4.2. Indicate the level of your agreement with each statement applied to the firm using a

5-point scale

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Logistics between you and your linked partner ensure good quality management					
2. You and your partner can collaborate to co-innovation					
3. You and your collaborating partner benefit from the co-innovation					
4. You and your partner adopt the new technology of the industry quickly					
5. Your firm can change and improve technology adjusting the demand from your business partner					

2.5. Food quality management

2.5.1 Collaborations between you and your partner for any changes in quality management have been (Please circle appropriate response)

1. Very limited 2. Limited 3. Neutral 4. Moderately Extensive 5. Extensive

2.5.2. Indicate the level of your agreement or disagreement on the following practices as applied by your firm to manage quality in your enterprise.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1 Customer requirements are reviewed , prior to supply of the product					
2. Working with partners ensures customer feedbacks are collected, communicated and coordinated to every level of our enterprise.					
3. Employees are empowered and committed to quality					
4. Supplier provides products which fit quality requirements					
5. We are satisfied with the product quality of our most important supplier.					
6.there is a comprehensive enterprise quality plan and procedure					

2.6 Enterprise Quality policy

2.6.1 Collaboration with other beef SMEs ensures compliance to the following enterprise Quality Policies. (Please tick one)

Beef enterprise quality policies [ ] National food safety policies [ ]

Public Health policies [ ] Global food policies [ ]

2.6.2 Please tick the number representing the most appropriate responses for you in respect of the following statements.

Statement	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**	**Not Applicable**
1.Quality policy is always consistent with enterprises' objectives					
2.Quality policy is well understood and implemented at all levels					
3. There is a clear quality collaboration policy with other beef SMEs.					
4.An effective policy of stakeholder participation in quality improvement efforts is in place					
5.There is a formal commitment with other beef SMEs to provide the same quality of products					
6.Your enterprise has an effective policy on food security					
7. Effective policy on food safety is in place in our enterprise.					
8. The enterprise has a policy regarding making a contribution to the public interest					

APPENDIX II CONTRUCT RELIABILTY

Construct	Items	Item-to-total Correlations	Cronbach's A
Transaction Uncertainty	UT1 Volume of customer demand is difficult to predict	.611	0.841
	UT2 Beef quantity is unpredictable	.726	
	UT3 Beef quality are unpredictable	.696	
	UT4 Beef delivery time is not certain	.671	
Information Sharing	ISC1 Information to your partner is timely	.635	0.901
	ISC2 information beef enterprise partner is accurate	.809	
	ISC3 Information on beef product quality is relevant to your partners	.787	
	ISC4 meetings are organized to communicate quality with partners	.685	
	ISC5 Feedback regarding quality is frequently communicated to partners	.788	
	ISC6 SMEs and partners trust each other with information on quality	.718	
	ISC7 SMEs share full information on quality	.686	
Transaction Costs	TC1 It is difficult to find a business partner	.630	0.859
	TC2 It is difficult to know information about your business partner	.351	
	TC3 It is difficult to get an agreement with your partner	.774	
	TC4 It is difficult to agree on conditions of contract with your partner	.826	
	TC5 It is difficult to decide to sign contract with your partner	.800	
	TC6 It costs you effort to ensure compliance to agreement	.772	
	TC7 It is difficult for you to monitor your partner	.252	
Collaboration Advantage	CA1 Logistics with partners ensure quality management	.526	0.761
	CA2 Partner collaborate to co-innovate	.649	
	CA3 Partners benefit from co-innovation	.614	
	CA4 Partners adopt new technology quickly	.546	
	CA5 partners can change and improve technology to suit demand from partner	.457	
Food Quality Management	QM1 Customer requirements reviewed prior to supply	.779	0.905
	QM2 Customer feedbacks are collected and communicated to every level of enterprise	.830	
	QM3 Employees are committed to quality	.824	
	QM4 suppliers provide products that fit quality requirements	.645	
	QM5 satisfied with product quality of suppliers	.803	
	QM6 Enterprise has quality plan and procedure	.633	

APPENDIX III: SKEWNESS AND KURTOSIS.

Variable	Item	Mean	STDV	Skew	Kurtosis
UT	UT1	2.85	1.02	0.107	0.399
	UT2	3.09	1.07	-0.033	-0.730
	UT3	3.14	1.02	-0.362	-0.320
	UT4	3.11	1.14	-0.075	-0.488
ISC	ISC1	3.39	1.12	0.107	-0.99
	ISC2	3.6	0.92	0.233	-0.647
	ISC3	3.2	1.24	0.08	-0.70
	ISC4	3.55	1.02	0.115	-0.811
	ISC5	3.26	1.03	-0.184	0.865
	ISC6	3.33	1.12	0.067	-0.948
	ISC7	3.61	0.99	-0.151	-0.874
TC	TC1	3.39	1.12	-0.0595	-0.417
	TC2	3.6	0.92	-0.574	0.026
	TC3	3.2	1.24	-0.523	-0.838
	TC4	3.55	1.02	-0.802	0.068
	TC5	3.26	1.03	-0.373	-0.506
	TC6	3.33	1.12	-0.557	-0.528
	TC7	3.61	0.99	-0.883	0.591
CA	CA1	4.07	0.63	-1.057	1.592
	CA2	3.84	0.76	-0.969	1.115
	CA3	4.1	0.70	-1.019	1.319
	CA4	4.01	0.69	-0.797	1.59
	CA5	3.38	1.15	-0.578	-0.602
QM	QM1	3.55	0.99	-0.900	0.481
	QM2	3.54	0.98	-0.722	0.137
	QM3	3.59	0.98	-0.727	0.145
	QM4	3.71	0.88	-0.780	0.815
	QM5	3.57	0.96	-0.682	0.061
	QM6	3.3	1.32	-0.625	-0.845
PS	PS1	3.33	1.29	-0.600	-0.898
	PS2	3.65	0.99	-0.923	0.340
	PS3	3.37	1.32	-0.762	-0.783
	PS4	3.38	1.17	-0.876	-0.293
	PS5	3.45	1.10	-0.867	0.016
	PS6	3.61	1.00	-0.438	-0.202
	PS7	3.49	1.07	-0.736	-0.109
	PS8	3.04	1.19	-0.411	-0.904

APPENDIX IV: FACTOR LOADINGS FOR THE CONSTRUCTS

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.996	24.229	24.229	7.996	24.229	24.229	7.413
2	5.563	16.858	41.087	5.563	16.858	41.087	5.125
3	4.628	14.023	55.111	4.628	14.023	55.111	4.940
4	3.897	11.809	66.920	3.897	11.809	66.920	5.409
5	2.327	7.052	73.972	2.327	7.052	73.972	3.928
6	1.725	5.227	79.199	1.725	5.227	79.199	2.369
7	.911	2.760	81.959				
8	.612	1.853	83.813				
9	.526	1.593	85.406				
10	.516	1.565	86.970				
11	.468	1.419	88.389				
12	.414	1.256	89.645				
13	.401	1.214	90.859				
14	.368	1.115	91.974				
15	.298	.903	92.877				
16	.283	.856	93.734				
17	.258	.782	94.516				
18	.244	.740	95.256				
19	.224	.678	95.934				
20	.213	.647	96.581				
21	.181	.548	97.129				
22	.161	.487	97.615				
23	.146	.443	98.059				
24	.139	.422	98.481				
25	.122	.370	98.850				
26	.111	.337	99.188				
27	.090	.272	99.460				
28	.069	.208	99.667				
29	.035	.107	99.774				
30	.030	.091	99.865				
31	.018	.053	99.918				
32	.015	.047	99.965				
33	.012	.035	100.000				

a. Extraction Method: Principal Component Analysis

b. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

APPENDIX V: FACTOR ANALYSIS FOR VARIABLES

Variable Items	Components					
	1	2	3	4	5	6
PS1	0.976					
PS2	0.998					
PS3	0.995					
PS4	0.987					
PS5	0.984					
PS6	0.988					
PS7	0.988					
QM1				0.880		
QM2				0.882		
QM3				0.819		
QM4				0.885		
QM5				0.894		
QM6				0.624		
ISC1			0.697			
ISC2			0.870			
ISC3			0.829			
ISC4			0.778			
ISC5			0.872			
ISC6			0.814			
ISC7			0.774			
TA1		0.877				
TA3		0.913				
TA4		0.894				
TA5		0.923				
TA6		0.881				
TA7		0.858				
UT1					0.833	
UT2					0.905	
UT3					0.869	
UT4					0.905	
CA1						0.771
CA2						0.829
CA3						0.815
Scale reliability(Cronbach's alpha)		0.905	0.91	0.905	0.841	0.761
% of Variance	24.229	16.858	14.023	11.809	7.052	5.227
Cumulative variance	24.229	41.087	55.111	66.92	73.972	79.199
Eigen Value	7.996	5.563	4.628	3.897	2.327	1.725

KMO=0.918, Bartlett's Test of Sphericity; Chi-Square=9515.515, df=171; Sig=0.000

APPENDIX VI: COMMUNALITIES

	Initial	Extraction
PS1	1.000	.938
PS2	1.000	.969
PS3	1.000	.970
PS4	1.000	.974
PS5	1.000	.965
PS6	1.000	.969
PS7	1.000	.968
QM1	1.000	.757
QM2	1.000	.799
QM3	1.000	.806
QM4	1.000	.679
QM5	1.000	.787
QM6	1.000	.647
ISC1	1.000	.653
ISC2	1.000	.754
ISC3	1.000	.753
ISC4	1.000	.674
ISC5	1.000	.747
ISC6	1.000	.745
ISC7	1.000	.689
TC1	1.000	.766
TC3	1.000	.813
TC4	1.000	.835
TC5	1.000	.857
TC6	1.000	.806
TC7	1.000	.761
UT1	1.000	.722
UT2	1.000	.757
UT3	1.000	.784
UT4	1.000	.790
CA1	1.000	.601
CA2	1.000	.697
CA3	1.000	.702

APPENDIX VII: REGRESSION WEIGHT AND C.R VALUES FOR EXPLANATORY VARIABLES

			Estimate	Standardized Regression (β)	S.E.	C.R.	P-value
QM	<---	ISC	.296	.262	.098	3.019	.003
QM	<---	TC	.323	.251	.107	3.021	.003
QM	<---	UT	.269	.320	.073	3.680	.000
QM	<---	CA	.387	.243	.154	2.505	.012
ISC1	<---	ISC	1.000	.693			
ISC2	<---	ISC	1.176	.868	.135	8.716	***
ISC3	<---	ISC	1.101	.785	.107	10.306	***
ISC4	<---	ISC	1.170	.782	.170	6.892	***
ISC5	<---	ISC	1.151	.800	.143	8.078	***
ISC6	<---	ISC	1.058	.741	.138	7.664	***
ISC7	<---	ISC	.944	.708	.128	7.385	***
QM1	<---	QM	1.000	.837			
QM2	<---	QM	1.037	.873	.082	12.633	***
QM3	<---	QM	1.040	.879	.082	12.757	***
QM4	<---	QM	.750	.702	.082	9.120	***
QM5	<---	QM	.973	.835	.083	11.755	***
QM6	<---	QM	1.096	.686	.124	8.842	***
TC1	<---	TC	1.000	.808			
TC3	<---	TC	1.099	.861	.092	11.893	***
TC4	<---	TC	1.159	.907	.090	12.866	***
TC5	<---	TC	1.107	.935	.082	13.474	***
TC6	<---	TC	1.097	.866	.091	11.994	***
UT1	<---	UT	1.000	.789			
UT2	<---	UT	.917	.823	.090	10.229	***
UT3	<---	UT	.932	.872	.085	10.940	***
UT4	<---	UT	1.009	.840	.096	10.481	***
CA1	<---	CA	1.000	.604			
CA2	<---	CA	1.160	.724	.213	5.459	***
CA3	<---	CA	1.302	.760	.240	5.415	***

APPENDIX VIII: MODERATED REGRESSION WEIGHTS

			B	Estimate	S.E.	C.R.(t)	P-value
QM	<---	ISC	.291	.314	.096	3.282	.001
QM	<---	TC	.230	.285	.103	2.756	.006
QM	<---	UT	.302	.257	.071	3.620	***
QM	<---	CA	.232	.363	.148	2.448	.014
QM	<---	PS	-.217	-.097	.035	-2.774	.006
PS1	<---	PS	.957	1.000			
PS2	<---	PS	.977	1.009	.022	46.272	***
PS3	<---	PS	.982	1.012	.032	31.912	***
PS4	<---	PS	.988	1.026	.031	33.599	***
PS5	<---	PS	.982	1.018	.032	31.979	***
PS6	<---	PS	.985	1.026	.031	32.895	***
PS7	<---	PS	.982	1.032	.032	31.895	***
ISC1	<---	ISC	.696	1.000			
ISC2	<---	ISC	.867	1.169	.133	8.767	***
ISC3	<---	ISC	.787	1.098	.106	10.340	***
ISC4	<---	ISC	.781	1.163	.168	6.905	***
ISC5	<---	ISC	.799	1.145	.141	8.114	***
ISC6	<---	ISC	.739	1.050	.137	7.686	***
ISC7	<---	ISC	.710	.942	.127	7.435	***
QM1	<---	QM	.834	1.000			
QM2	<---	QM	.874	1.041	.083	12.571	***
QM3	<---	QM	.878	1.042	.082	12.657	***
QM4	<---	QM	.696	.747	.083	8.983	***
QM5	<---	QM	.829	.970	.084	11.573	***
QM6	<---	QM	.687	1.103	.125	8.834	***
TC1	<---	TC	.808	1.000			
TC3	<---	TC	.862	1.098	.092	11.906	***
TC4	<---	TC	.907	1.158	.090	12.875	***
TC5	<---	TC	.935	1.106	.082	13.488	***
TC6	<---	TC	.866	1.096	.091	11.994	***
UT1	<---	UT	.789	1.000			
UT2	<---	UT	.824	.919	.090	10.244	***
UT3	<---	UT	.871	.932	.085	10.917	***
UT4	<---	UT	.840	1.009	.096	10.471	***
CA1	<---	CA	.610	1.000			
CA2	<---	CA	.725	1.151	.210	5.479	***
CA3	<---	CA	.755	1.281	.235	5.445	***

APPENDIX IX: CONFIRMATORY FACTOR ANALYSIS