TRANSACTION UNCERTAINTIES IN VERTICALLY LINKED SMALL AND MEDIUM BEEF ENTERPRISES: EFFECT ON FOOD QUALITY MANAGEMENT IN KENYA

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Abstract

Research on organization economics reports a general trend towards closer vertical coordination to minimize risks and uncertainties in transactions in food supply chains. Business globalization, efficient communication via Information Technology and consumer preferences has forced food enterprises to turn towards a more cooperative behavior. While this change to enterprises' interdependence in reducing uncertainties has occurred in other supply chains, it is not common in beef small and medium enterprises(SMEs).Studies have indicated that vertical coordination and quality management have become essential for SMEs to obtain competitive advantage and that efficient coordination of chain demand, supply as well as quality uncertainties enables harmonization of production processes between the various stages of the supply chains resulting in high quality products, access to global markets, sufficient raw material supply and customer satisfaction. There is substantial evidence documenting the effects of uncertainties on SME growth and performance but adequate empirical evidence on the relationship between uncertainties and quality management in the beef enterprises is lacking. This study sought to fill this important knowledge gap. A census of 160 Kenyan beef producer and processor SMEs was adopted and a semi-structured questionnaire was used to generate data which was analyzed using structural equation modeling. Results showed a positive relationship between transaction uncertainties and quality management. The study

recommended that beef enterprise managers that wish to improve their quality management should focus on ensuring that transaction uncertainties are minimized by developing closer vertical linkage with other partners in the supply chain.

Keywords: Beef enterprises, Transaction uncertainties, Food Quality management, Linkages, Small and Medium Enterprises

INTRODUCTION

The world food economy is expanding rapidly and is being increasingly driven by the shift of food consumption patterns towards livestock products (FAO, 2003). World meat consumption has increased from 47 million tons in 1950 to 260 million tons forecast for 2014 (Memedovic & Shepherd, 2009). However, in view of the liberalization of global trade and increasing demand by consumers for quality food, Entrepreneurs in this face the challenge of remaining competitive in a national and international quality-oriented market (Takenaka, 2005).

To remain relevant beef entrepreneurs are now entering the realms of international business by up scaling quality in their production process and product design (Prashantham, 2008).Quality management among the small and medium enterprises (SMEs) is often influenced by vertical linkages in order to reduce transaction uncertainties, risk taking and the ability to identify market opportunities (Luig, 2011). Hitt et al. (2001) identify domestic and global quality-oriented market access along with the ability to address demand uncertainties, supply uncertainties as well as grade uncertainties and collaborative innovation as a naturally occurring domain in strategic entrepreneurship.

The beef industry is ranked as one of Kenya's fast rising economic sectors through exports to overseas countries and is projected to hit Kshs 70 billion mark by 2017 (MoLD,2008). Beef production is estimated to have grown from 300,000MT by year 2008 and 430,000 Metric tonnes by 2010 (RoK, 2010, Mbwika & Farmer, 2012). However, SMEs in this industry are operating in a complex business environment characterized by highly variable seasons and fragmented markets resulting in uncertainties in supplies, inability to meet market demand and productivity attributable to inadequate quality standards compared to other industries (Otieno, 2012).Leading meat-processing SMEs like Choice Meat-Kenya and Quality meat packers (QMP) have invested heavily to develop cold chain to provide the consumers with brand products. These 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 and quality problems are

still of great concern to Kenyan consumers. Study by (Luig, 2011) indicates that, low quality and sanitation standards from these small household productions prevent beef SMEs from gaining competitive advantage and entering into the world market.

The topic of quality management and the governance choice has dominated most processing and service organizations (Hobbs, 2002; Hanf & Pieniadz, 2007; Trienekens, Omta & Han, 2007; Daley, 2009; Trienekens, Omta &Han, 2011). However, the number of studies interlinking transaction uncertainties in vertical linkages and quality management are still limited (Robinson & Malhotra, 2005). SMEs are now adopting a SMEs vertical coordination philosophy to benefit from chain partnerships and especially reduced transaction uncertainties and quality improvement gains critical to customer satisfaction. This study therefore sought to examine the interaction between transaction uncertainties and quality management (QM) in the beef SMES in Kenya.

THEORETICAL REVIEW

In Transaction Cost Economics (TCE), uncertainty affects the size of transaction cost and enterprises' quality management (Williamson, 1985; Hobbs & Young, 2000). In addition, uncertainty is an issue every practicing manager grapples with 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). Studies have shown that standard TCE arguments address 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 et al. 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) reveals uncertainty in cattle marketing as a cause of increased transaction cost in information search, monitoring, and sorting cost. Demand and supply uncertainties impose greater information cost while grade uncertainty imposes greater monitoring cost.

At the producer level, demand and supply uncertainties may also involve the compliance of grading. Ralston (2014) found that the greater the uncertainty about future needs, the more explicit the vertical linkage contingencies which foster 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 (Thograttana, 2012).

Therefore, it is believed that high price (Demand, supply and grade) uncertainty has a negative relation with quality management and there is need to move towards more organizational interactions in form of vertical linkages to minimize uncertainties (Van der Vorst, 2005). Based on the argument the following hypothesis is developed:

H_{o1}: *Transaction uncertainty does not affect quality management in the beef SMEs.*

EMPIRICAL REVIEW

Uncertainties in Transaction

Transaction uncertainty is an issue with which every practicing Entrepreneur contends with (Hult et al. 2010), stemming from the increasing complexity of global supply-chain networks, which include increased potential for delivery delays and quality problems (Bhatnagar & Sohal, 2005). Empirical research building on the work of Davis (1993) has argued that uncertainties are a major problem and important to understand. The specific sources of supply-chain uncertainty are relevant to internal manufacturing processes, supply-side processes, or demand-side issues (usually end-customer demand).

Transaction uncertainty is a broad term that refers to uncertainties (including risks) that may occur at any point within a supply-chain network. Van der Vorst and Beulens (2002), add further depth and refers uncertainty to a situation in which in the decision-maker does not know definitely what to decide as he is indistinct about the objectives; lacks information about (or understanding of) the supply-chain or its environment; lacks information processing capacities; is unable to accurately predict the impact of possible control actions on supply-chain behaviour; or, lacks effective control actions.

Thongrattana (2012) on an analysis of the uncertainty factors affecting the sustainable supply of rice production in Thailand realized that the uncertainty factors mainly supply, demand, process, competitor and government policy uncertainties have a negative effect on the performance of the rice enterprises as was measured by the quality and customer service.

Food Quality Management

In the food industry, quality is a vital aspect in that it determines the degree 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 entrepreneurs within the food chain and it is perceived individually (Batt, 2008). Food quality has a several meanings and encompasses parameters such as organoleptic characteristics, physical and functional properties, nutrient content and consumer protection from fraud

Quality improvement requires that the entrepreneur continuously improve quality. Old bad habits should be abandoned in favor of real quality improvements. It involves getting closer to the customer and employee empowerment and ensuring process quality to minimize risks and uncertainties and costs (Luning, 2006). 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) conceptualized various quality management practices, including supply chain management, top management involvement, quality training, employee involvement and customer focus.

Sila & Ebrahimpour (2002) validated Total Quality Management factors and their effects on various performance measures across countries. Results showed that top management commitment and leadership, customer focus, information and analysis, training, supplier management, strategic planning, employee involvement, human resource management, process management, product and service design, process control, continuous improvement among others were the critical factors extracted factors across these 76 studies.

Food Quality Management and Transaction Uncertainty

José, Karim and Fabrício (2014) analyzed quality management strategies of the fruit SMEs in the UK. The results indicated 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. The study realized that, once uncertainty is under control the chances are high that the complexity of the trade relations will also decrease.

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. Results of his study found incentives to vertical linkage at both the end-user and millers are the application of quality norms and standards in product market.

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.

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 demand, supply, quality grade uncertainties. 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.

METHODOLOGY

This study adopted a positivism deductive research approach and an objectivism ontology as data collection was based on active involvement of the people within an organizational set up. A descriptive cross-section survey was conducted and data was collected using a semi-structured questionnaire self-administered to beef processors and producers in beef producing Kajiado County in Kenya. A Census of 160 beef processors and producer SMEs were included in the study. A list of beef producer SMEs vertically linked to the beef processors was provided by the beef processing SMEs. Therefore, the units of analysis for this study were the beef producers and processors in Kenya.

The construct of transaction Uncertainties (UT) was measured using Demand uncertainties (UT1), Grade Uncertainties (UT2) and Supply uncertainty (UT3, UT4).

Food quality management (FQM) was measured using the Total Quality Management (TQM) principles of Customer Focus (Items; QM1, QM2), Employee Involvement (Items; QM3) Product Quality (Item; QM4, QM5) and Process Quality (QM6). These items were measured at 5-point Likert scale ranging from 1= strongly disagree to 5= strongly agree. Internal consistency (Cronbach's α) of the construct was used to assess the inter-item consistency following the procedure of Fornell and Lacker (1981) where the cut-off point is 0.7,which indicates high reliability. Sample adequacy was measured using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of sphericity. The normality distribution of the data was confirmed using Kolmogorov-Sminov and Shapiro-Wilk tests, while the scatter plot was used to measure the linearity of the data. Factor analysis was conducted for the computation of factor loading, principal components analysis and communalities. A total of 139 questionnaires were returned out of the 160 administered and they were analyzed using the SPSS 21 and an analysis of moment structures (AMOS version 21) was used for structural equation modeling.

ANALYSIS

A total of 139 out of the 160 questionnaires administered were returned. 21 firms did not return their questionnaires resulting in a response rate of 87%. Five questionnaires that had at least 10% of the overall questionnaire incomplete were omitted from the preliminary analysis. 10 questionnaires with less than five missing data (4% of overall questionnaires) were imputed using a maximum likelihood function to replace the missing values. Therefore, a total of 134 questionnaires were usable, resulting in an adjusted effective response rate of 84%.

The results indicated an acceptable internal consistency of 0.841 for Transaction Uncertainties and 0.905 for food Quality management which is above 0.7. The Kaiser Meyer-Olkin (KMO) measure of Sampling Adequacy and Bartlett's Test of Sphericity supported the suitability of exploratory factor analysis (EFA). For every EFA, it was found that manifest variable has KMO measures of sampling adequacy of 0.842 which is considered good for adequate sample size and a p-value for Bartlett's test of sphericity below 0.5.

Table 1: Results of KMO and Bartlett's Test for Suitability of Structure

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.842
Bartlett's Test of Sphericity	
Approx. Chi-Square	5088.524
Df	528
Sig.	.000

The transaction Uncertainties (UT) scale items had loadings between 0.833 and 0.905, Eigen value of 2.327, Cumulative Variance of 73.972 and communalities ranged between 0.722 and 0.790. Quality Management (QM) construct had factor loading ranging between ranged between 0.624 and 0.894 which is well above 0.5 suggesting satisfactory factorability for all items, cumulative variance of 66.92 and communalities ranging between 0.647 and 0.806. A descriptive analysis reviewed a male dominated enterprise (87%) and only 23% female owned. This may be explained by the cultural inclination that the Maasai community depends on ranching for its livelihood and the beef animal is the reserve for the man. Results showed that 90% of the enterprises' owners are aged above 36 years and 57 % have operated the beef enterprise for 20 years and above.

As regards education background, 44% of the beef SMEs lack basic education. The findings may be explained that, the beef enterprise in Kenya is gender biased toward male ownership and education may not be an emphasis among the entrepreneurs. Study by Otieno (2012) observed a low level of education among the beef enterprise in Kajiado. Study by Nguyen (2011) on global supply chains in Georgia reveals a positive relationship between the

level of education and technical, entrepreneurial and managerial skills, which implies that beef entrepreneurs in Kenya portray inadequacies n these skills.

The test of linearity revealed an R^2 value of 0.677 significant at .000 (p<0.05) and a slope of 0.237.

Table 2: Regression model for Transaction Uncertainties

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.823ᵃ	.677	.674	.25212
a. Predictors: (Constant), UT				

Table 3: Regression Coefficient Results for Transaction Uncertainty

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.966	.213		4.544	.000
	UT	.237	.017	.823	13.743	.000
a. Dependent Variable: QM						

Hypothesis Testing

The study adopted Structural Equation Modeling (SEM) to test the hypothesized relationship and to fit the structural model. The objective of the study was to determine the effect of Transaction Uncertainties on Food Quality Management in the beef enterprises in Kenya. The hypothesis used to test this hypothesis was:

$H_{o1;}$ *Transaction Uncertainty has no effect on the food quality management of small and medium enterprises in the beef sector in Kenya.   ($H_{o:}$ β=0)*

$H_{02:}$ *Transaction Uncertainty is positively related to food quality management of small and medium enterprises in the beef sector in Kenya.   ($H_{a:}$ β≠0)*

The study established that the path coefficient is positive and statistically significant at 0.05 level of significance (β=0.237, p=0.003, CR=13.743). An adjusted R^2 of 0.674 and R^2 value of 0.677 confirmed 67.7% of the variations in food quality management of small and medium beef enterprises in Kenya can be accounted for by transaction uncertainty. Transaction Uncertainty is therefore confirmed to have a positive significant relationship with food quality management and the null hypothesis is rejected.

Table 4: Regression Weight and CR Values for Transaction Uncertainties

			Estimate	standardized Regression(β)	S.E.	C.R. (t)	P-value
QM	<---	RM	.966	.237	.079	13.743	0.003
RM1	<---	RM		1.000			
RM2	<---	RM	.920	.824	.090	10.231	***
RM3	<---	RM	.932	.871	.086	10.901	***
RM4	<---	RM	1.010	.840	.097	10.464	***

Therefore, with CR =13.743, this model was statistically significant at 95 % significance level. The null hypothesis is therefore rejected and the alternative Hypothesis H_{02} that stated that firm's Transaction Uncertainties is positively related to food quality management of small and medium beef enterprises is supported.

Figure 1: T- Statistics for Transaction Uncertainties

CR=13.743

Transaction
Uncertainties

Food Quality
Management
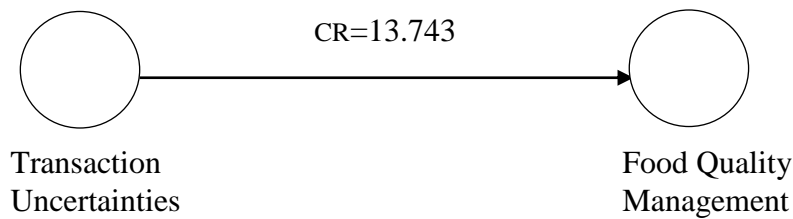
The test model was subjected to a maximum-likelihood confirmatory factor analysis (CFA) using Analysis of moment structures (AMOS-21.0) software with a minimization of 11 iterations. The chi-square goodness-of-fit statistic (p=0.000) was statistically significant at p<0.05 suggesting that the model fitted the data.

Table 5: Fit Indices for the Model on Transaction Uncertainties

Model	χ2	DF	χ2/df	P	NFI	GFI	CFI	RMSEA
First-order	80.892	34	2.379	0.000	.913	.898	.947	.062

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

DISCUSSION OF FINDINGS

The structural equation modeling results showed that the dimensions of variable Transaction Uncertainty thus; demand, grade and supply uncertainties portray a convergent validity. Supply uncertainty showed a stronger relationship to transaction uncertainty compared to demand and grade uncertainty. Convergence validity for food quality management reviewed a stronger

relationship between product quality and employee involvement. The results affirm the TCE theory (Williamson, 1985) which portrays uncertainty as a central theme and a critical factor determining the choice between spot market and vertical coordination in a supply chain.

Mooi and Gosh (2010) concur that 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. Thongrattana (2012) in the study of uncertainty factors affecting sustainable supply of rice production in Thailand noted a positive relationship between environmental and behavioral uncertainties (supply, demand, process, competitor behaviour, government behavior and climate policy) and the performance of the SMEs especially the product quality and customer. Study by Autora (2012) also realized that uncertainty of supply in the food enterprises could be minimized with closer collaborations between pork producers and processors realized when partner SMEs maintain closer vertical linkages. Martino and Frascarelli (2013) in the study on adaptation in food networks on Italian Agri-food enterprises affirmed that, decision rights allocation is 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.

A major contribution of this study is the development and application of a conceptual framework that provides a study of transaction uncertainty and food quality management for the beef SMEs from a developing country's context. The study validates the TCE theory and has added grade uncertainty to determine how transaction uncertainty affects quality management in the food sector. This has not been investigated for the beef supply chain. The conceptual framework can be confirmed as a solid model that provides a foundation for this research.

CONCLUSION AND RECOMMENDATIONS

The study and application of Transaction Uncertainty support the views that, Entrepreneurs in a supply chain can function efficiently in a competitive global market if closer vertical linkages are established between down and upstream entrepreneur partners especially for harmonized and better quality management strategies. Moreover, collective quality management practices of the beef SMEs are paramount if the actors have to maintain a competitive edge over other meat SMEs such as poultry, pork and fish. Improved performance through production of quality and safe beef products can only be achieved if Uncertainties are addressed through inter-linked SMEs.

In view of the contribution of Transaction Uncertainties and food quality management, managers of beef enterprises should ensure that there is demand, grade and supply uncertainties-related information flows within and without the enterprise. This can be done by holding inter-organization meetings, cluster meetings as well as establishing beef supply chain information technology where stakeholders would receive quality related issues.

LIMITATIONS OF THE STUDY

Like all other studies this study has some limitations. The target sample comprises the beef processors and producers in Kenya. Accessing all the target respondents to issue with the questionnaire was unfeasible for this study. Besides, the literacy level among the beef producers was found to be low, which may lead to response error. A census of the beef processors and the producers was adopted and therefore the study findings may not be generalized for the other stages of the beef supply enterprise supply chain.

The study population was sourced from Kajiado County which is the main source of beef animals in Kenya. Other minor beef producing counties were omitted in this study. Moreover a close section survey was adopted. The recommended future research therefore includes; a relatively large sample size to allow for random sampling which would provide a more confident result. To make up for any response error caused by low literacy levels, a mixed method of data collection could be adopted. More research in other livestock related supply chains could be considered and other stages in the supply chain taken on board.

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