

Value Chain Support Activities and Performance of Sheep Production Projects in Nyandarua County, Kenya

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ABSTRACT

As Kenya grapples with meat deficit and reduced livestock productivity in the ASALs, sheep production in the high rainfall areas offers an opportunity to bridge the gap. Sheep and goats have many advantages over large ruminants for most farmers, including lower capital investment requirement for flock establishment, lower feed consumptions and thus lower food-related costs, high fecundity and thus faster flock building, and are easier to manage. However, sheep production still faces a myriad of challenges that result in low productivity and ultimately low returns to farmers. Projects have been designed and implemented to improve sheep productivity but with little impact. The performance of such projects in terms of timeliness, cost, budget compliance, and quality has been questioned. This research aims to assess how various value chain support activities influence the performance of sheep production projects in Nyandarua County, Kenya. Specifically, the study sought to examine the influence of firm infrastructure assess the influence of human resource management, explore the influence of technology development, and evaluate the influence of procurement on the performance of sheep production projects in Nyandarua County, Kenya. Value chain support activities are the independent variable while the dependent variable is the performance of sheep production projects. The theories that support this study are Capability-Based View, Knowledge-Based View, Resource-based view, and Market-Based View. Descriptive design was used to conduct the study whose population was drawn from sheep production value chain stakeholders in the county, whose population is estimated at 596, 268. A sample size of 271 stakeholders were reached. Qualitative data was analyzed using content analysis while descriptive statistics were used to analyze quantitative data. Descriptive and inferential statistics were used in analyzing the data. Results were presented in form of tables, percentages, bar charts, and graphs. The study found that effective leadership styles has a positive influence on employees' motivation and morale and contribute positively to organizational and sheep production projects performance. At the same time, human capital planning, acquisition, and development strategies have a more positive influence on organizational and sheep production projects performance than traditional strategies. Further, information technology contributes to the successful introduction of new products or services, improved operational processes and provides guidance to decision making on project implementation and thus affect positively project performance. Moreover, respondents approved that, procurement is a strategic function in that it not only contributes to costs reduction but also to the achievement of budgetary compliance in sheep production projects. It can, therefore, be concluded that firm infrastructure, human resource management, technological development, and procurement are all key success factors in the increased performance of sheep production projects. As part of the recommendation, players in the sheep production value chain should consider adequately investing in firm infrastructure, human resource management, technological development, and procurement. They should also be guided by effective leadership styles that will yield the desired outcome through a positive

influence on employees' motivation and morale while exercising human capital planning, acquisition, and development strategies to enhance organizational performance.

Key Words: Value Chain Support Activities, Performance, Sheep Production Projects, Nyandarua County, Kenya

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1. Introduction

Livestock farming has an immense impact to humanity in terms of global food supplies, hunger alleviation, economic development and provision of employment (FAO, 2012). Therefore, agriculture can be considered as a pillar for human survival and hence the importance of agriculture globally being taught at all levels of education. In the U.S.A, formal programs in agricultural education are conducted at secondary schools, community colleges and universities. Njarui, Gichangi, Ghimire, & Muinga (2016) observed that the livestock sector in African economies contributes to 50% of the labor force in the agricultural sector, and is considered to be the primary source of livelihood for agro-pastoralists and pastoralists in dry lands. Locally, it is estimated that in 2016 Kenya's human population hit 46.5 million and is expected to grow to 83.2 million by 2050. At current per capita consumption of 16.05 Kgs, Kenya will require 1.3 billion MT of meat by 2050, or double the current levels. The sector also contributes an estimated 40 per cent of the Agricultural Gross Domestic Product (GDP) and 10 per cent of the country's total GDP. These facts underscore the importance of the livestock sector to the Kenyan economy.

As Kenya grapples with meat deficit and reduced livestock productivity in the ASALs, sheep production in the high rainfall areas offers an opportunity to bridge the gap. Sheep and goats have many advantages over large ruminants for most farmers, including lower capital investment requirement for flock establishment, lower feed consumptions and thus lower food-related costs, high fecundity and thus faster flock building, and are easier to manage. However, sheep production still faces a myriad of challenges that result in low productivity and ultimately low returns to farmers. Governments and development partners have often responded to these challenges through design and implementation of various programs and projects aimed at increasing productivity of sheep value chain. However, on evaluation, the majority of such projects have not helped a bit to alleviate the production challenges. The county is currently meat deficient and gets 20 to 25 per cent of its meat requirements through importation from the neighbouring countries (USAID, 2012). This means that even at the current low per capita meat consumption, Kenya will continue to be meat deficient unless means to increase livestock productivity are instituted. Though various reasons for project failures are established to be within the value chain itself, less work has gone into interrogating which activities within the value chain affect the performance of the projects. This study looked within the sheep production value chain for influence of value chain support activities on performance of sheep production projects.

Nyandarua County comprises of five sub-counties, namely Ol'kalou, Kipipiri, Ndaragwa, Kinangop, and Ol'joroorok. Its capital and largest town is Ol'kalou and has a population of 596,268 (Kenya population and Housing census, 2009) in an area of 3,304 km². It has 324,530ha of the

land of which 201,100ha are arable. The mean household landholding size is 3.5ha with an average small-scale farm size of 1.2 ha and a large-scale farm size of 24ha. The majority of landholdings are by small-scale farmers with a few large-scale farms and ranches. Large-scale farms are located evenly all over the county and the majority of them are used for horticulture and dairy farming. Livestock farming is a major activity in Nyandarua County and the main animals reared are indigenous and exotic species of cattle, goats, sheep, rabbits and poultry. Dairy farming is the dominant enterprise in the livestock subsector while bee keeping is also being practiced by several farmers in the region. The main value addition activities on livestock products include milk cooling and processing, processing and packaging of honey and leather tanning with most of these activities are on small scale. Therefore, increasing livestock productivity in highlands (high rainfall areas) areas like Nyandarua County could be a viable means to bridge the meat production deficit.

Nyandarua County rears a wide range of exotic sheep breeds including; fine-wool merino, Romney Marsh, Hampshire and Suffolk (Ron & Anton, 2014). Southdown, Corriedale, and Dorper are also reared (ASDSP, Nyandarua county profile 2016). The Dorper breed is mainly kept in the drier northern parts of the county while the other breeds are kept in the wetter and cooler southern parts of the county (County government of Nyandarua, 2014). The county has one 300ha ranch in Kipipiri (Ol'Magogo ranch) run by Kenya Agriculture and livestock Research Organization (KALRO) for rearing sheep and cattle (ASDSP, Nyandarua county profile 2016). The county government of Nyandarua estimates that the county has a population of 337,598 sheep with an annual output of wool worth KSh. 9,862,650 (~197,250 Kgs) and mutton and skins worth KSh.224,103, 370. Upgrading this sheep value chain offers numerous economic opportunities and as the country grapples with meat production deficit and high meat quality demand by the growing middle class, sheep or mutton production looks like a promising avenue to meet the needs.

2. Statement of the Problem

Currently, Sheep production is one of the most ignored industry by farmers in Kenya and hence management is very poor. For Nyandarua County, sheep farming continues to face a myriad of challenges that result in low productivity and profitability by farmers and other value chain stakeholders. Diseases and parasites are among the most serious factors that negatively affect productivity and returns from the livestock industry. Review of the literature undertaken reveals that though many studies have been undertaken focusing on value chain in various industries, not many of them focused on performance as postulated by Porter. For instance, Mwende (2010) also did a similar study evaluating supply chain governance and performance of organizations in the public sector in Kenya, but nothing specific to the independent variables of the current study, the value chain and the performance of sheep production projects. Kiuluku (2008) examined the concept of the global value chain and the evolution of the leather chain in Kenya but his study did not drill into how activities within the value chains affect the performance of projects. From an international perspective, Nathan & Kalpana (2007) dealt with issues related to employment, income and the integration of Indian production into global value chains. As can be seen from the above-sampled studies, studies on value chains for manufacturing firms have indeed been done, but none has gone to the point of specifically bringing out the influence of support activities on the performance of value chain support activities projects. This study will therefore focus on feeling the existing research gap by determining the influence of value chain support activities on the performance of sheep production projects in Nyandarua County, Kenya

3. Objectives of the Study

The general objective of this study was to determine the influence of value chain support activities on the performance of sheep production projects in Nyandarua County, Kenya.

The specific objectives are:

- (i) Examine the influence of firm infrastructure on the performance of sheep production projects in Nyandarua County, Kenya.
- (ii) Assess the influence of human resource management on the performance of sheep production projects in Nyandarua County, Kenya.
- (iii) Explore the influence of technology development on the performance of sheep production projects in Nyandarua County Kenya.
- (iv) To evaluate the influence of procurement on the performance of sheep production projects in Nyandarua County, Kenya.

4. Theoretical Review

The previous section provided a brief introduction to this chapter. This section discusses the theoretical foundation that is used in this study. This section covers the five theories upon which the study is grounded, namely Market-Based View (MBV), Resource-Based View (RBV), the Knowledge-Based View (KBV), and Capability-Based View (CBV). These theories are briefly discussed in the sections below.

4.1 The Market-Based View

The theory of the market-based view originated from Mason and Bain (1950) who link the structure of an industry to a firm's success in the so-called Structure-Conduct-Performance-Paradigm. This theory addresses both firm infrastructure and technology development as variables given that key factors for the success of an organisation are entry barriers, number of players in the market as well as the elasticity of demand. In 1980, Michael Porter further developed this idea in his book 'the competitive advantage', which is one of the cornerstone literature's in management science today. The MBV theory presents the argument that external market orientation and industry factors are critical to organizational performance (Peteraf & Bergen 2003). The two best-known theories in this category are Porter's (1980) five forces and Bain's (1968) Structure-Conduct-Performance. According to Schendel (1994), an organization's strategic position is defined by how it performs similar activities, employing different methods. Schendel further opines that the profitability of organizational performance is determined by competitive dynamics and the structure of the industry in which it operates.

Bain (1968) proposed the Industrial Organization paradigm, which was also referred to as the "Structure-Conduct-Performance (SCP) paradigm". The SCP describes how the structure of the industry influences the behaviour of an organization and the ultimate performance. Bain researched on an organization with a structure that is monopolistic and established factors that influence firm behaviours to include the number of competitors, barriers to entry, and demand levels. The SCP paradigm was advanced by researchers (Porter, 1980; Caves & Porter, 1977; Caves, 1980) and explains why firms need to develop the strategy to respond to industry structure within which the firms compete, aimed at gaining competitive advantage. Porter (1985) opines that an overall assessment of competitive advantage is undertaken by organizations against an assessment of the external environment based on the five forces model to formulate the strategy.

The five forces highlighted by Porter are buyers' bargaining power, the threat posed by substitutes, entry barriers, rivalry among competitors, and suppliers' bargaining power. Consequently, an organization's sources of market power dictate its relative importance in the industry. According to (Grant, 2001), three sources of market power are bargaining power, monopoly, and the barrier to entry. Peteraf (1993) argues that organizations with monopolistic characteristics have strong market positions and hence have the tendency to perform better. The higher the try barriers for new competitors in an industry, the less the competition, and hence relatively better performance. The higher the bargaining power of firms within an industry relative to customers and suppliers, the better the performance. (Grant, 2001).

Even though the five-force model empowers firms to embrace an examination of the present circumstance of their industry in an organized way, the model has various confinements. As per Wang (2004), the model makes the supposition that the market is flawless and static, which isn't probably going to be found in the present market elements. Wang had further seen that a few businesses are described by complex various connections that make it hard to break down and fathom the five powers demonstrate. Rumelt (1991) inferred that the most basic determinants of gainfulness are firm-explicit and not industry explicit. As indicated by Prahalad and Hamel (1990), an association's upper hand started on capacities and assets that could compare to simply being exclusively founded on market and item situating as for committing to the reasonable upper hand. Despite what might be expected, Penrose (1959), Prahalad and Hamel (1990) and Rumelt (1991), set accentuation on the essentialness of assets that are utilized by associations similar to the essential wellspring of the upper hand. This way to deal with methodology is known as the Resource-Based View (RBV), examined in the following area.

4.2 Resource-Based View Theory

RBV is an approach to achieving competitive advantage that emerged in 1980s and 1990s, after the major works published by Wernerfelt, B. ("The Resource-Based View of the Firm"), Prahalad and Hamel ("The Core Competence of The Corporation"), Barney, J. ("Firm resources and sustained competitive advantage") and others. The theory addresses both infrastructure and human resource management as independent variable by the virtue that it explores the effects of capabilities and resources that belong to an organization on competitive advantage, which leads to the overall organizational performance. A study by Ray *et al.* (2004) established that capabilities and resources that are not conditioned into sustaining business processes and activities do not have a significant direct effect on the organization's performance.

On the other hand, Baltacioglu *et al.* (2007) posit that effectively organized and efficiently operated service resources and management capacities have a direct bearing on an organization's performance. Resource and capacities of value chains are therefore one of the dimensions that form the basis for this study. A similar opinion is held by Hoffer and Schendel (2006) who suggest that resources include all capabilities, processes, organizational attributes, assets, knowledge and information under the control of an organization to enable it to develop and implement strategies that contribute to enhanced effectiveness and efficiency. Porter (1985), opines that effective application of the organization's strength leads to differentiation, focus and cost leadership. Therefore, customer relations and demand management are two key components studied in this research. Efficient and effective sheep production value chain practices will result in cost leadership because of the management of supplier relationships and optimal contracting. Supplier relationship management through; sharing, commitment, cooperation, coordination, and feedback are key components of performance according to Baltacioglu *et al.* (2007).

Fynes *et al.* (2005) asserted that in uncertain environments, cordial interrelationships among supply chain stakeholders enable institutions to work together towards the attainment of a common goal. According to Dierick and Cool (2009), the sustainability of an organization's strategic position is determined by the ease with which its resources can be imitated or substituted. Project performance is influenced by the resources at a firm's disposal. This theory is therefore important in this study because it expresses the necessary financial, physical and technological resources required to enhance the performance of road projects. The project management context fits into this theory as envisaged by Rumelt (1984) and Wernerfelt (1984), the initiators of RBV theory. Since the intention of any construction firm is to have a successful project, performance becomes a critical issue. In this context therefore, the RBV theory is relevant to the study because it outlines the resources required in performance of sheep production projects.

5. Conceptual Framework

A conceptual framework regarding Mugenda and Mugenda (2006), is a visual description of the research variable or the aspect being researched on, and which outlines possible courses of action. The study's conceptual framework is illustrated in figure 2 and is premised on the assumption that the performance of sheep production projects (dependent variable) is influenced by value chain support activities that include firm infrastructure, human resource management, technology development, and procurement.

Independent Variables

Dependent Variable

Value Chain Support Activities

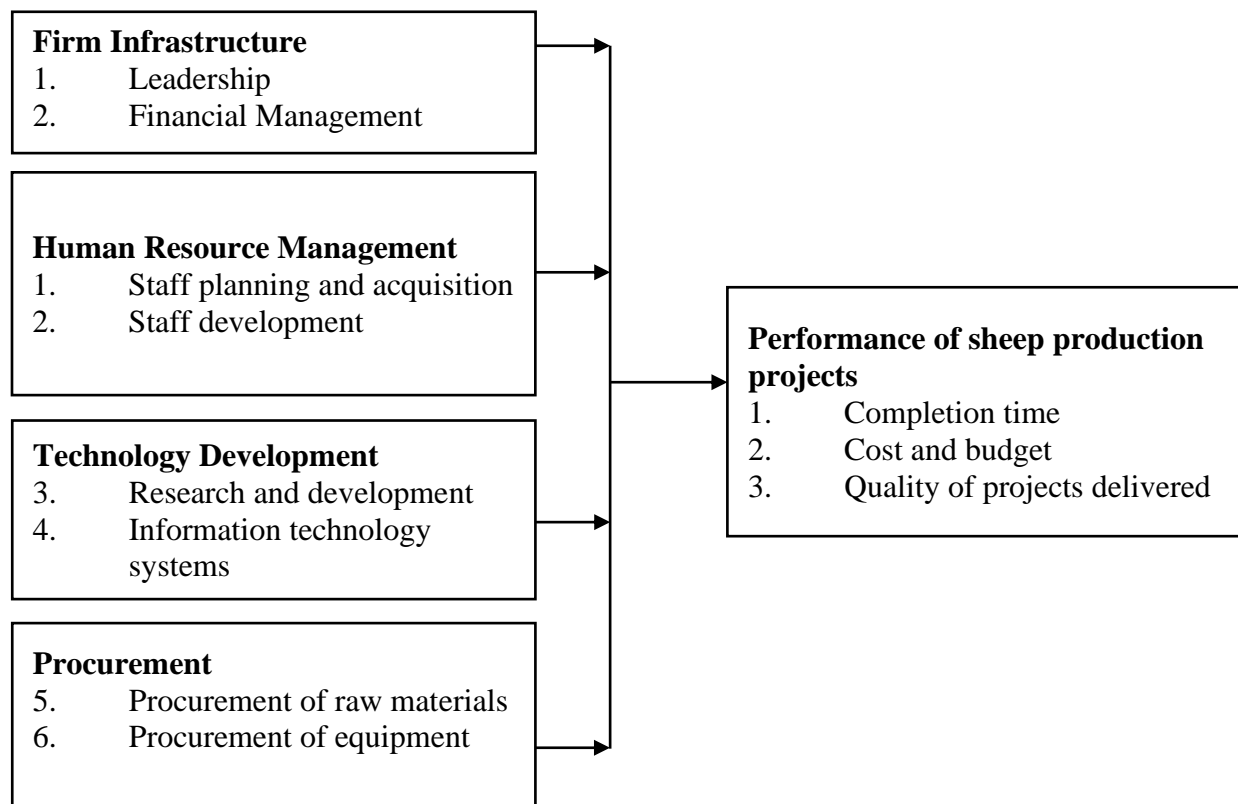


Figure 1: Conceptual Framework

The framework above shows that the independent variables of the study are “Porter’s generic value chain factors” namely, firm infrastructure (leadership and financial management), human resource management (staff planning and acquisition and staff development), technology development (Research & Development, Information technology systems), and procurement (raw materials and equipment). The dependent variable of the study is “performance of sheep production projects”, whose measurement indicators are; project’s completion time, cost and budget and quality.

6. Research Methodology

This study utilized a descriptive research design, since it fits well into the description of such design, besides focusing on data as opposed to theory. The population for this research includes sheep production projects in Nyandarua County, Kenya which were five hundred and ten (510) based on the department of Agriculture, Nyandarua County. The unit of analysis was therefore the sheep production projects in Nyandarua County, with unit of observation being the stakeholders involved in the supply of production inputs, sheep production (breeding and rearing), collection, processing, and marketing (wholesale and retail) of products. Value chain stakeholders in sheep production in Nyandarua County formed the population of interest in this study. Based on the population figures (number of sheep production projects in Nyandarua County, Kenya), simple random sampling technique was used to select 30% of the population (sheep production projects).

The calculated sample size is therefore 170 (30% of 510 sheep production projects). By including a 15 per cent non- response rate, the final sample is estimated at approximately 196 with an equal number of large scale and small-scale farmers. Further adjustments were be made to account for the cluster sampling methodology using a design effect of two; as is typical for surveys using a cluster sampling methodology. According to this rationale, it is deemed that a sample of 196 is desired for collecting aggregated data for the study. -that is, for generating evaluation statistics for research as a whole. Therefore, 98 farmers were randomly selected to represent the two groups of projects (small-scale and large-scale sheep production projects each). Besides the 196 farmers who were targeted to participate in the study, 3 people were conveniently selected from each of the 5 Sub-Counties to represent each category of stakeholders along the value chain for sheep production. The data collection instruments were questionnaires. Kothari (2004) defines a questionnaire as a document that consists of a number of questions printed or typed in a definite order on a form or set of forms. Multiple regression analysis was used to ascertain the extent to which each of the independent variables influenced the dependent variable.

7. Data Analysis

Inferential statistics entailed coefficient of determination (R-Square), analysis of variance as well as regression coefficients. Test for autocorrelation was also performed

Table 1: Coefficient of Determination (R^2)

Change Statistics										
R	R^2	Adjusted R^2	Std. error of the Estimate	The R^2 Change	F Change	df1	df2	Sig. Change	F	Durbin - Watson
0.872	0.760	0.756	0.360	0.760	163.388	4	206	0.000		1.589

Results in Table 1 show an R-Square of 0.760 with the standard error of estimate being 0.360. This implies that at the composite level, value chain support activities explain any performance of sheep production up to 75.7 per cent. This is significant prediction given that $p\text{-Value}=0.000<0.05$ when $df_1=4$ and $df_2=206$ at 5% significant level. The researcher also tested for autocorrelation using Durbin Watson statistic which is a test for autocorrelation in the residuals from statistical regression analysis and always between 0 and 4. The Hypotheses for the Durbin Watson test are:

H_0 = No first-order autocorrelation

H_1 = First order correlation exists.

(For a first-order correlation, the lag is one-time unit).

The basic rule is that test statistic values in the range of 1.5 to 2.5 are relatively normal. Values outside of this range could be cause for concern. Field (2009) suggests that values under 1 or more than 3 are a definite cause for concern. For the current study, Durbin Watson statistic was 1.589 which falls within the relatively-normal range and therefore there was no presence of autocorrelation in the residuals from a regression analysis.

Table 2: Analysis of Variance (ANOVA)

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	84.751	4	21.188	163.388	.000a
Residual	26.713	206	0.130		
Total	111.464	210			

a. Predictors: (Constant), Procurement, Human Resource Management, Firm Infrastructure, Technology Development

b. Dependent Variable: Performance of Sheep Production projects

As shown in Table 2, the overall model was significant given that, $F\text{-Calculated}(4, 26) = 163.388 > F\text{-Critical}(4, 26) = 2.41$ at 2-tail test and 95% confidence level. Results also show $p\text{-Value} = 0.000 < 0.05$. This further confirms that value chain support activities (through procurement, human resource management, firm infrastructure, and technology development) significantly influences the performance of sheep production projects.

Table 3: Regression Coefficients Matrix

Value chain support activities	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	0.111	0.174		0.638	0.026
Firm Infrastructure	0.269	0.054	0.295	4.981	0.042
Human Resource Management	0.295	0.041	0.248	7.195	0.000
Technology Development	0.210	0.078	0.225	2.692	0.037
Procurement	0.201	0.066	0.209	3.045	0.010

a. Dependent Variable: Performance of Sheep Production projects

Findings as shown in Table 3 express that, when firm infrastructure, human resource management, technology development, and procurement are at component level increased by one unit, the performance of sheep production would increase by 0.269, 0.295, 0.210, and 0.201 units respectively given that all the coefficients have positive coefficients. When all the explanatory variables are held constant, the performance of projects will remain at 0.111 out of 5 scores. This indicates that firm infrastructure, human resource management, technology development, and procurement all significantly influences the performance of sheep production projects given p-Value <0.05 for each. This can be summarized by the following model: $Y = 0.111 + 0.269X_1 + 0.295X_2 + 0.210X_3 + 0.201X_4$ where Y = performance of sheep production value chain and X_i is the explanatory variable.

8. Conclusion

It can be concluded that firm infrastructure, human resource management, technological development and procurement are all key success factor in the sheep production value chain. In particular, effective leadership styles have a positive influence on employees' motivation and morale and contribute positively to individual and organizational performance with inefficient organizational leadership style being the key hindrances to organizations improving their performance. For better results, firm infrastructure is complemented by the adequacy of human capital planning, acquisition, and development strategies to enhance organizational performance. Additionally, information technology contributes to the successful introduction of new products or services, improved operational processes and provides guidance to decision making in management with an approval since it is the enabling factor in organizational change and innovation and hence positively influences value chains as well as contributing to organizations' integration and cooperation within supply chain stakeholders. Moreover, procurement is a strategic function in that it not only contributes to costs reduction and achievement of maximum savings for organizations and therefore procurement planning is critical to service delivery with strategic sourcing being critical to target specific manufacturing flexibilities. Over and above, strategic leadership as being critical for enhanced organizational performance while organizational performance can only be sustainable if the competitors are not able to duplicate the sources.

9. Recommendations

Players in sheep production value chain should consider adequately investing in firm infrastructure, human resource management, technological development and procurement. They should also be guided by effective leadership styles that will yield the desired outcome through a positive influence on employees' motivation and morale while exercising human capital planning, acquisition, and development strategies to enhance organizational performance. The government through the relevant policy-making organs should consider enhancing and ensuring implementation of policies that would assist in the growth of sheep production sector throughout its value chain. All players in sheep production and value addition path should employ relevant information, communication and technology to ensure successful introduction in to the market of new products or services, improved operational processes and provides guidance to decision making in management with an approval since it is the enabling factor in organizational change and innovation and hence positively influences value chains as well as contributing to organizations' integration and cooperation within supply chain stakeholders. Procurement is a strategic function, organizations in sheep production value chain should consider developing

efficient and effective procurement procedures that will not only contribute to costs reduction and achievement of maximum savings for organizations and therefore procurement planning is critical to service delivery.

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