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**ABSTRACT**

*Although the government has made several efforts of commercializing agriculture through marketing and trade, the off take of marketed livestock in the country has alarmingly stood at a low level. Commercialization of livestock is particularly limited to few sales in terms of skins and hides in the market. It is against this backbone that the current study sought to establish the determinants of livestock commercialisation among pastoral communities in Isiolo County. The design adopted by the study was descriptive and a total of 163 buyers from the community of Borana were targeted forming the study population. Census was employed resulting into 163 respondents as the study sample size. Questionnaires were used for collecting data from these respondents. Means, standard deviations and regression analysis were employed for extracting meaning from the data collected. The analysed data was presented using tables and figures. The study established that infrastructure; livestock marketing system, cultural barriers and price all positively influence livestock commercialisation among pastoral communities. The study concluded that infrastructure; livestock marketing system, cultural barriers and price all have direct and significant effect on livestock commercialisation among pastoral communities. The study recommended to the County government of Isiolo to improve on the livestock marketing systems in place by effectively organizing livestock operating in person to person systems. All pastoral communities were encouraged to improve on their cultural behavior by buy many cattle's due to the high dowry. The county government of Isiolo should regulations for guiding the price mechanisms of livestock product. All Counties with pastoral communities in Kenya should improve on road and other transport infrastructures by removal of export barriers and increasing accessibility to water and fodder.*

**Key Words:** Livestock Marketing System, Cultural Behaviour, Pricing, Transport Infrastructure, Livestock Commercialisation

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## INTRODUCTION

Livestock production as one component of the agriculture as an industry plays a significant function in social development and in the economic in a country at national and household level. At a national level, livestock contributes a significant amount to export earnings. It contributes 10 per cent of all formal export earnings (Oosting, Udo & Viets, 2014). Commercialization of the pastoral system would mean that all its components get adjusted to the new goals guiding the production process. Phonvisay (2013) states that commercialization is the process of re-orienting the livestock production by the parties and members within the pastoral community. The key features of a commercialized pastoral system include increased rates of sale of the live animals and an increase in the use of all inputs purchased. A more elaborate definition of commercialization is given by Henriksen and Rota (2014) as efforts resulting into either partial or complete shift in goals of producing products for meeting subsistence needs to the goods and services that meet the whole market.

According to Lind and Birch (2014), fewer infrastructures leads to serious limitation on the livestock when it comes to its market system. Majority of the cattle keeper stay in remote areas which are very far to the main market and since there are no enough infrastructures, the transport becomes a problem to them. It is in the remote areas and inaccessible far from town areas where the major cattle keepers are found. Fakudze and Machethe (2015) state that cultural behaviour is a behaviour exhibited by pastoralist that is learned. According to Nmadu, Iwuajoku and Jiya (2014) the price being imposed by the sellers positively influence the rate of the sale. The researcher further indicated that a price increase by one of the animals can raise the likelihood of rate of the sale. The cattle sellers turn up to the market only when the price of the cattle is fair to them. Also, when the roads are in good condition, the sellers are able to come to the market at a big

number and also with many cattle for sale. It becomes very expensive for the cattle sellers to travel to the market using damaged roads making them to charge high money for the cattle (Aggrey, Kugonza & Muwanika, 2018).

Globally, Fredriksson, Bailey, Davidova, Gorton and Traikova (2015) consider the factors and the challenges for increasing commercialization of subsistence and semi-subsistence farmers among European Countries. It was documented that location determines the costs of accessing the market for the agriculture products. It was shown that household factors including divorce and ageing plays an important role in the decision and process of commercialization. Regional differences in attitudes to co-operation are uncovered and lessons for rural policy discussed.

Regionally, in Ethiopia, agriculture is an important driver of the nation's growth, as well as its long-term food security. It contributes 85 per cent of the population's livelihoods, 38.5% of the GDP and 80% of revenue from exports in Ethiopia (MoFED, 2016). Livestock accounts for 15 to 17 per cent of total GDP and 35 to 49 per cent of agricultural GDP in many countries. At the household level, livestock contributes to the livelihood of approximately 70 per cent of Ethiopians (Sintayehu.G, etal, 2010).

Locally in Kenya, livestock is the main household asset and a key productive resource for pastoralist communities living in the border areas of Kenya. Recurrent droughts are eroding pastoralists' livestock base and weakening their livelihoods and their resilience to climatic shocks (Sintayehu, 2010). Livestock is a source of food and income for majority of households in Kenya. Furthermore, it helps in provision of social security while at the same time serving as social esteem and accumulation of wealth. These contributions however are limited to non-monetary industry where commercialization of livestock production is limited.

Isiolo County is occupied by the pastoral society that practice pastoral economy as a means for livelihood. They are seen as hostile against each other especially, when it comes to sharing range resources such as pasture and water for livestock (Noor, Guliye, Tariq & Bebe, 2013). Livestock prices in Isiolo County have dropped by half as farmers rush to sell due to fears of an impending drought in 2018. Most livestock keepers have opted to sell their animals for fear of impending drought. For the last three years, the price of a cow was Sh30, 000 but it has reduced to Sh15,000 while a goat goes for Sh4,000 instead of Sh8,000. Lack of enough buyers in Isiolo and the existence of many livestock markets had also reduced prices in the market. The county depends on buyers from Nairobi, Meru, Nanyuki and Karatina (Kuria, Murage, Walaga & Lesuper 2013).

### **Statement of the Problem**

The value derived from commercial livestock is limited to skins and hides of cattle in markets locally and regionally (Ameso, Bukachi, Olungah, Haller, Wandibba & Nangendo, 2018). At present, there has been a significant drop in the contribution of livestock sector to the County of Isiolo in comparison to the available number of livestock. The government has tried to commercialize agriculture via marketing and trade but still the level of cattle being sold is very low. Further, this situation has been worsening by the strategies being used by the pastoralism to lessen the risk whereby they are now keeping many cattle so the production will not go under survival extend and prevent the risk of losing livestock.

The infrastructure is still poor; the changes in price, inadequate market support services, market information and also cattle keepers and traders are not getting the credit service. There is no organization acting as an effective producer at the bottom and partial entry to the market support service, the information and the credit service to the cattle keepers and traders and also there are inadequate

chances to increase the income. Participation of pastoralists in the livestock market influences the level of market offtake. These comprises of lack of investment in the non-livestock industry in pastoral schemes to offer the markets that are locally the productions from the livestock.

Several studies have been conducted on the determinants of livestock commercialisation, for instance, Fuller (2015) conducted a study on livestock commercialisation for pastoralist communities in Niger. The study indicated that in particular, supported households did not demonstrate any difference in destocking or migration behaviour, in the diversification of income sources in their households, or in the diversity of their herds. This study was done in Niger a different contextual frame work, there for the findings might not be applicable in the current study.

Ruhangawebare (2013) looked at the factors that has effect on the commercialization level on the livestock keepers not only for the wealthy purpose but for also for the commercial reasons. From the study findings; the reason why the cattle keepers were selling the livestock was because they wanted to keep cash meaning they were not led by the demand that was in the market. The study also indicated that the operation of the livestock market look place on the four-tier system, primary gates, secondary market, farm gates and terminal market. The market had a major function of helping the farmers to increase their rates in selling. This study missed out the determinants and only concentrated on the factors affecting commercialization. Therefore, this led to knowledge gap which the current study sought to fill by assessing the determinants of livestock commercialisation among pastoral communities in Isiolo County.

### **Research Objectives**

The purpose of this study was to establish the determinants of livestock commercialisation among

pastoral communities in Isiolo County. The specific objectives were:-

- To examine the effect of livestock marketing system on livestock commercialisation among pastoral communities in Isiolo County.
- To assess the effect of cultural behaviour on livestock commercialisation among pastoral communities in Isiolo County.
- To examine the effect of pricing of livestock on livestock commercialisation among pastoral communities in Isiolo County.
- To assess the effect of transport infrastructure on livestock commercialisation among pastoral communities in Isiolo County.

## LITERATURE REVIEW

### Theoretical Review

#### Social Exchange theory

Social exchange theory was initiated by Homans (1958). It was developed with the aim of bringing a clear understanding on the social behaviour of humans in economic undertakings. Social exchange theory makes use of rewards, costs and resources the foundation of interpersonal exchange is being discussed. Social exchange theory plays a key role in ensuring that human behaviour is an essence tool in making exchanges regarding rewards or resources of primarily material character. The theory views actors as dealing not with another actor but with the market responding to various market characteristics. This theory proposes that social behaviour is the result of an exchange process. In this theory, social ties among market actors are seen as conduits for information, opportunities and trust.

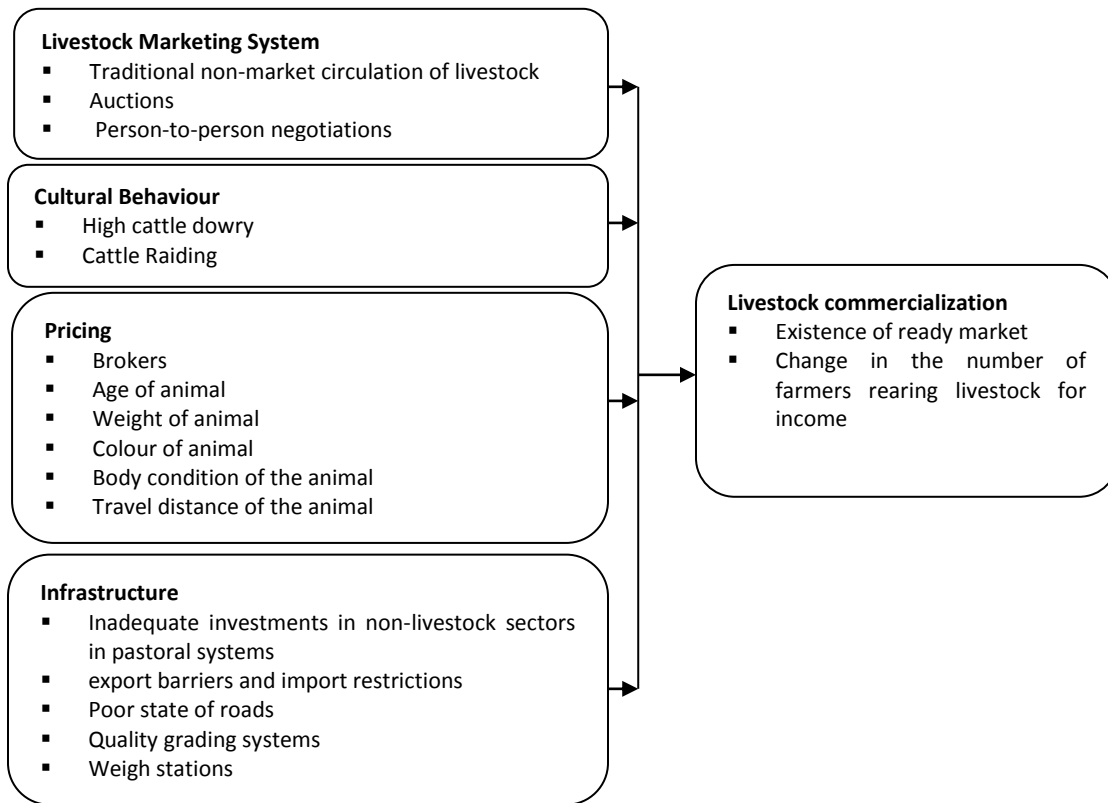
#### Theory of Planned Behavior

This theory was developed by Ajzen (1988). According to the theory, the behavior of an individual is driven by behavior intentions, where behavior intentions are a function of three determinants which include; subjective norms, individual's attitude towards behavior and the perceived behavioral control. Attitude refers to the degree to which a person has negative or positive feelings of the behavior of interest. The behavioral intention represents the motivation of a person in the sense of the conscious plan or decision of performing certain behavior. The perceived subjective norms are a person's own estimate of the social pressure to perform the target behavior. The subjected norms are assumed to have two components which work in interaction, beliefs concerning how other people who may be in some way important to the person and how the person would want them to behave.

#### Resource Based View Theory

This theory supports the concept of resources (Wernefelt, 1984). According to Barney (2001), resources can be defined as assets, capabilities, processes, form attributes, information and knowledge controlled by a firm that enable the firm to conceive and implement strategies that improve its efficiency and effectiveness. The resources of a firm can be categorised into three different forms namely; human capital resources, physical capital resources and organizational capital resources. The resource-based view theory makes two assumptions which include; resources are heterogenous distributed among firms across and the other assumption is that resources are imperfectly mobile.

## Conceptual Framework



### Independent Variables

Figure 1: Conceptual Framework

Source: Author (2019)

### Dependent Variable

## Empirical Literature

### Livestock Marketing System

Moll (2005) did a cost-benefit analysis of livestock and looked at the function of the market and the relation between market and non-market system. The researcher employed a descriptive design. The study used questionnaire which were structured and had open ended questions to collect data. The researcher used a Microsoft Excel and then presented the outcome in form of graphs, tables and pie charts. The study found out that viewpoint of people on the livestock system brings more strictly shows the decision which is observed by the cattle keepers.

McDermott, Staal, Freeman, Herrero and Van de Steeg (2010) investigated on how to sustain intensification of smallholder livestock systems in the

tropics. Forms were drafted in both the closed and open-ended format and then presented to the respondents for filling. The respondents were given a period of two week to complete the filling process. The forms were then collected for data analysis. The data was analyzed using descriptive statistics and the results indicated that intensifying livestock should have consideration of the environmental and social issues.

### Cultural Behaviour

Barrett, Bellemare and Osterloh (2004) carried out a study on household-level livestock marketing behavior among Northern Kenyan and Southern Ethiopian Livestock keepers. The study adopted a descriptive research design. Data collection was done using questionnaires which were administered using the drop and pick technique. The data was

descriptively analyzed. The analyzed data was then presented using tables and graphs. The findings of the study revealed that the northern livestock keepers are still far from autarky market conditions and the major driving factors that influence marketing of livestock in the area is adjustment to drought shocks. It further indicated that market participation widely varies from region to region and from season to season with an ultimate effect of trading routes for destined market traders.

Burton, Kuczera and Schwarz (2008) conducted a study on exploring farmers' cultural resistance to voluntary Agri-environmental schemes. The study adopted a descriptive survey design. Data collection was done using questionnaires which were administered using the drop and pick technique. The findings of the study indicate that voluntary Agri-environmental work returns little symbolic capital to farmers as, by prescribing management practices and designating specific areas for Agri-environmental work, such schemes fail to allow farmers to develop or demonstrate skilled role performance hence inhibiting the development of embodied cultural capital.

### **Pricing**

Doelamo and Assefa (2017) look at what determines the price of goats in the market in Afar Region, Ethiopia. The researcher gathered the data by the use of structured observation of the cattle and the characteristic of the market. The study also employed a secondary data which was collected via the website of the federal and region institution. The researcher selected 200 goats for the aim of observation according to their traits. From the study findings, the researcher indicated that traits of the goats comprise of age, body condition and weight. The study further indicated the market traits which had a positive effect on the variation of price of the goats.

Kassa, Anshiso and Fantahun (2017) investigated the price formation of livestock in pastoral communities

in Suri, South Ethiopia. primary data was collected through the use of interviews and questionnaires. The researcher selected 50 pastoralists through a random sampling. A multiple linear regression was employed by the researcher in the analyzing and the gathered data and then the researcher presented the data using graphs and tables. The findings indicated that livestock keeping brings many aids to Suris through the improving social status and wealth, the payment of dowry and conflict resolution improves and also other scholars are encouraged to be give out more factors that are hindering the aid of the pastoralist.

### **Transport Infrastructure**

Llanto (2012) analysed how infrastructure influences productivity in the agriculture sector. The design used was descriptive and data was collected with the use of questionnaires. To analyse data, descriptive statistics including frequencies and percentages were used. The key finding was that infrastructure just like other investments in the public domain help in raising productivity in agriculture terms and this drives growth in rural areas.

Miranda-De La Lama, Villarroel & María (2014) investigated on livestock transport from the perspective of the pre-slaughter logistic chain. The study adopted data analysis methods resulting into collection of data in qualitative as well as quantitative terms. The tools for collecting data included the interviews and observation schedules. The key finding was that an improvement in transportation system was essential in enhancing transportation of livestock to the entire market.

### **METHODOLOGY**

This study adopted a descriptive research design. Descriptive research design is preferred because it determines and reports the way things are and is appropriate because it is concerned with clearly defined problems with definite objectives (Kothari, 2004). The target population of this study were 163 buyers from Borana community. The researcher

targeted the information on the buyers from the county government of Isiolo County that deals with the agriculture. The researcher picked the market from Borana community since they practice pastoralism.

For this study census sampling was adopted where all the population was included in study. The study used primary data that was collected using questionnaires as the data collection instrument. The primary data was collected through self-administered questionnaires, which the respondents were given to fill and return to the researcher for further coding and analysis. The questionnaires were hand delivered to the respondents at their convenient places in the community.

The collected data was edited, coded and entered in Statistical Package for Social Sciences (SPSS version 22.0) for further data analysis. The study findings were presented in bar and pie charts and in narratives. The SPSS version 23.0 helped to analyze and describe the relationship between the independent and the dependent variables. The regression model used adopted was;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$$

WHERE:

Y = Livestock Commercialization

X<sub>1</sub> = marketing system

X<sub>2</sub> = Cultural behavior

X<sub>3</sub> = Pricing

X<sub>4</sub> = Infrastructure

β = constant,

β<sub>1</sub>β<sub>2</sub>β<sub>3</sub>β<sub>4</sub>= Régression Coefficients

ε = Error Term

## FINDINGS

### Descriptive Statistical Analysis

The study had four specific objectives which were to examine the effect of livestock marketing system on livestock commercialisation among pastoral communities in Isiolo County, to assess the effect of cultural behaviour on livestock commercialisation among pastoral communities in Isiolo County, to examine the effect of pricing of livestock on livestock commercialisation among pastoral communities in Isiolo County, and to assess the effect of transport infrastructure on livestock commercialisation among pastoral communities in Isiolo County.

These objectives resulted into research questions that were answered in the questionnaires. The questionnaires were designed on a five point Likert scale where 1= not at all and 5=very large extent. When the values of the Likert are placed on a continuous scale, values of means below 3.5 imply moderate to little extent while all values of means above 3.5 indicate large to very large extent. This section therefore presents the findings of the descriptive statistics covering means and standard deviations.

### Livestock Marketing System

The first objective sought to determine the influence of livestock marketing system on livestock commercialisation among pastoral communities in Isiolo County. The findings on means and standard deviations are shown in Table 1.

**Table 1: Livestock Marketing System**

	Mean	Std. Dev
We use traditional non-market circulation of livestock to buy our livestock.	3.85	.719
We use auctions to buy our livestock	3.33	.622
We use person-to-person negotiations to buy our livestock.	4.07	1.10
Auctions system leads to price distortions due to a cartel of buyers.	3.70	1.36
Auctions system leads to trade volume fluctuations.	4.04	.807
Livestock operating in person to person system are poorly organized	4.33	.484
There is standardized order of pricing of livestock	3.22	1.03



There is ready market for our livestock	3.76	.776
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The findings on livestock marketing systems are shown in Table 1. From the findings, vast majority of respondents agreed that livestock operating in person to person system were poorly organized (M=4.33, SD=0.484) and that they use person-to-person negotiations to buy their livestock (M=4.07, SD=1.10). The findings are in line with Storaas (2015) who established that the relationship of the pastorals is maintained by the interpersonal relationship with a trait of attendance of claims among the individuals.

Most of the respondents further agreed that auctions system leads to trade volume fluctuations (M=4.04, SD=0.807). Gufwoli and Behnke (2013) opine that due to the bad weather such as drought or flood, the auction is affected since the animals are not in good condition therefore the price is low making them not to get money. Gufwoli and Behnke (2013) further argues that the nature of the pastoralists, poor information arrangement and issues in the community, the destruction of price because of the cartel buyer and the fluctuations affect auction as a marketing system of livestock.

Respondents of the study further agreed that they use traditional non-market circulation of livestock to buy their livestock (M=3.85, SD=0.719) and that there is ready market for their livestock (M=3.76, SD=0.776). The finding is consistent with Storaas

(2017) who established that individuals and groups in the community are using the non-market circulation of livestock and their products between themselves for the purpose of security among the pastoral community. According to Storaas (2017), the circulation is mainly branded by an individual ad hoc in the condition of demand supply where the transaction of a person is not carried out for more suggestion for the connection among the individuals, though it normally occurs.

Respondents also agreed that auctions system leads to price distortions due to a cartel of buyers (M=3.70, SD=1.36). The nature of the pastoralists, poor information arrangement and issues in the community, the destruction of price because of the cartel buyer and the fluctuations affect auction as a marketing system of livestock (Gufwoli & Behnke, 2013). However, respondents were neutral on whether they use auctions to buy their livestock (M=3.33, SD=0.622) or there is standardized order of pricing of livestock (M=3.22, SD=1.03).

### Cultural Behaviour

The second objective of the study sought to determine the effect of cultural behaviour on livestock commercialisation among pastoral communities in Isiolo County. The findings are indicated in Table 2.

**Table 2: Cultural Behaviour**

	Mean	Std. Dev
We buy many cattle's due to the high dowry needed to marry	4.16	.726
We practice polygamous, making men to buy more cattle for the bride price	3.97	.846
Cultural determination of a man's wealth is in cattle heads	3.85	1.03
We buy many cattle's due to the high dowry needed to marry	3.56	1.37
We buy bulls to fight them so that we can be the warriors in the community.	2.88	1.19
We buy bulls and slaughter to praise the heroes in our festivals	3.67	1.06
We buy and sale the cattle to feed our family as we are the breadwinners of the family.	3.95	.869
We buy cattle to slaughter them for rites of passage/ initiation ceremonies that graduate a youth into an elder.	3.64	1.61

From Table 2, most of the respondents agreed that they buy many cattle's due to the high dowry needed to marry ( $M=4.16$ ,  $SD=0.726$ ). According to Kenya Television Network (KTN) breaking news on the 25th of July 2007, permission of polygamous marriages paid out with a high dowry compels the youth to raid their neighbours to acquire the animals needed to enable them wed. The only source of livestock for marrying many wives is buying more livestock. Young men without cows are obliged to raid to be able to marry a wife and have children to name. Marriage and participation in livestock raiding determine the place of an individual in the society. These two conditions are measures of warrior-hood. To enjoy this recognition, many young men look for livestock to buy (USAID, 2005).

The study revealed that most respondents do practice polygamous, making men to buy more cattle for the bride price ( $M=3.97$ ,  $SD=0.846$ ). The Kenya Television Network (KTN) breaking news on the 25th of July 2007 showed that permission of polygamous marriages paid out with a high dowry compels the youth to raid their neighbours to acquire the animals needed to enable them wed. The findings of the study indicated that most respondents buy and sale the cattle to feed their family as they are the breadwinners of the family ( $M=3.95$ ,  $SD=0.869$ ). This finding is consistent with Oxfam (2016) arguing that among the pastoralists, men are considered to be the breadwinners for their families and therefore in times of scarcity, men must replenish food supplies through any means, including raiding.

Respondents agreed that the cultural determination of a man's wealth is in cattle heads ( $M=3.85$ ,  $SD=1.03$ ). Coetze (2015) argued that livestock rustling is believed to be the most direct way to wealth accumulation because livestock occupies such a central place among pastoralists and that social status being determined by the number of livestock in

one's possession, those without cattle are rebuked as poor and enthused to raid other clans to overcome their condition.

There was agreement among respondents that they buy bulls and slaughter to praise the heroes in their festivals  $M=3.67$ ,  $SD=1.06$ ). Mburu (2015) asserts that special warrior names distinguish one from the rest of the men in the society and that constant reference and praise of heroes in meetings and cultural festivals encourages others to engage in raiding and in other acts of lawlessness as a way of emulating or surpassing the prowess of heroes. Respondents indicated that they buy cattle to slaughter them for rites of passage/ initiation ceremonies that graduate a youth into an elder ( $M=3.64$ ,  $SD=1.61$ ). Coetze (2015) indicates that rites of passage/ initiation ceremonies that graduate a youth into an elder of a special age set are an entitlement to all men, but they are only possible for those who have cattle

Other respondents said that they buy many cattle's due to the high dowry needed to marry ( $M=3.56$ ,  $SD=1.37$ ). Kassa et al. (2017) investigated the price formation of livestock in pastoral communities in Suri, South Ethiopia and indicated that livestock keeping brings many aids to Suris through the improving social status and wealth, the payment of dowry and conflict resolution improves and also other scholars are encouraged to be give out more factors that are hindering the aid of the pastoralist. However, to a moderate extent did respondents buy bulls to fight them so that we can be the warriors in the community ( $M=2.88$ ,  $SD=1.19$ ).

### **Price**

The third objective analysed the influence of price on livestock commercialisation among pastoral communities in Isiolo County. The findings are reported in Table 3.

**Table 3: Price**

	Mean	Std. Dev
Brokers interferes with the price of the livestock	3.82	.760
Period of sale affect the price of the livestock	3.62	.747
The price of the livestock varies with the age of the animal.	4.34	.730
The higher the weight of the animal, the higher the price	4.45	.798
The color of an animal will determine its price	3.24	1.39
The distance producers travel to sell animals will determine the price of the animal	3.99	1.20
We buy quality animals at a higher price	3.96	1.31
We buy poor condition animal at a lower price	3.86	1.12
During draught season, we buy animal at a cheap price	3.69	1.57
We have well bargaining power when buying the animals	2.93	1.12

From Table 3, respondents agreed that the the higher the weight of the animal, the higher the price (M=4.45, SD=0.798). It was noted that the price of the livestock varies with the age of the animal (M=4.34, SD=0.730). According to Gebremedhin (2017), the prices of livestock are affected by a number of factors including the color, weight and age of the animal. The distance producers' travel to sell animals will also determine the price of the animal (M=3.99, SD=1.20). Musemwa (2016) said that distance it takes for accessing formal markets affect the ability of the keepers of livestock to attract more buyers.

Respondents agreed that they buy quality animals at a higher price (M=3.96, SD=1.31) and poor condition animal at a lower price (M=3.86, SD=1.12). Jabbar (1998) notes that animals whose quality low fetch little prices and thus revenues. Respondents further agreed that brokers interferes with the price of the livestock (M=3.82, SD=0.760). According to Jabbar and Benin (2015), the involvement of broker during

transportation and transaction in animals require buyers and sellers to pay them a high commission.

During draught season, most of the respondents agreed that they buy animal at a cheap price (M=3.69, SD=1.57) and that the period of sale affect the price of the livestock (M=3.62, SD=0.747). Sara (2018) argues that pastoral farmers operating on the border between Kenyan and Ethiopia are significantly affected during times of drought as the body mass of animals are largely affected. On the other hand, respondents agreed to a moderate extent on whether the color of an animal will determine its price (M=3.24, SD=1.39) or they have well bargaining power when buying the animals (M=2.93, SD=1.12).

#### Transport Infrastructure

The last objective examined the influence of transport infrastructure on livestock commercialisation among pastoral communities in Isiolo County. The findings are shown in Table 4.

**Table 4: Transport Infrastructure**

	Mean	Std. Dev
There is adequate investment in non-livestock sectors in pastoral systems	3.95	.607
Export barriers affect our market	4.23	.697
Import restriction affect our market	2.84	1.31
Poor state of road affects our market	3.56	1.25
Less weigh stations affect our markets	3.84	.719

Poor quality grading systems affect our market	3.67	.491
Poor fences delimiting the market yards affect our market	3.76	.934
Lack of holding grounds affect our market	3.96	.587
Lack of water and fodder affect our market	4.11	.698

From Table 4, respondents agreed that export barriers (M=34.23, SD=0.697) and lack of water and fodder affect their market (M=4.11, SD=0.698). Inadequate infrastructure covers insufficient investment in non-livestock sectors to ensure that local markets have sufficient supply of the livestock products (Barrett, 2013), the unequal balance between monetary and cultural values attached on livestock by the pastoralists and the barriers for imports and exports in foreign markets (Aklilu, 2014).

Lack of holding grounds (M=3.96, SD=0.587) also affect the market of livestock farmers among the pastoral communities. The most important physical infrastructural weakness for rural cattle producers are related to transport and holding facilities (Musemwa 2016). Respondents agreed that there is adequate investment in non-livestock sectors in pastoral systems (M=3.95, SD=0.607) and that less weigh stations affect the markets of the livestock farmers (M=3.84, SD=0.719). Availability of marketing

infrastructures also plays an important role in promoting commercialization of livestock. These cover the presence and availability of stations for weighing, systems for grading the quality, fodder and water (Sara, 2010).

Respondents also agreed that poor fences delimiting the market yards (M=3.76, SD=0.934), poor quality grading systems (M=3.67, SD=0.491) and poor state of roads (M=3.56, SD=1.25) all affected affect the market of livestock farmers to a large extent. Musemwa (2016) indicates that some areas have poor road systems that limit the speed at which cattle keepers get to the market while at the same time increasing the costs of transportation. However, import restriction (M=2.84, SD=1.31) moderately affect the market of livestock farmers.

#### Livestock Commercialization

The dependent variable of the study was livestock commercialization and the findings are shown in Table 5.

**Table 5: Livestock Commercialization**

	Mean	Std. Dev
The number of local members keeping livestock for sale to earn income has increased	3.97	.827
There is ready market for our livestock	4.45	.666
The prices offered on our livestock earn us profits	3.84	1.11
Livestock farming has become a major income generation activity for a majority of the residents	3.93	.877

As shown in Table 5, the market for livestock of the pastoral communities is readily available to a larger extent (M=4.45, SD=0.666). The number of local members keeping livestock for sale to earn income has increased to a large extent (M=3.97, SD=0.827).

Livestock farming has become a major income generation activity for a majority of the residents to a large extent (M=3.93, SD=0.877). The prices offered on livestock earn pastoralist profits to a large extent (M=3.84, SD=1.11).

## Regression Analysis

**Table 6: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.874 <sup>a</sup>	.763	.755	.97669

a. Predictors: (Constant), Infrastructure, Livestock Marketing System, Cultural Barriers, Price

**Table 7: Analysis of Variance**

	Sum of Squares	df	Mean Square	F	Sig.
Regression	368.761	4	92.190	96.644	.000 <sup>b</sup>
Residual	114.471	120	.954		
<b>Total</b>	<b>483.232</b>	<b>124</b>			

a. Dependent Variable: Livestock Commercialization

b. Predictors: (Constant), Infrastructure, Livestock Marketing System, Cultural Barriers, Price

**Table 8: Regression Coefficients**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.728	2.129		2.690	.000
Livestock Marketing System	.311	.064	.212	4.859	.004
Cultural Barriers	.317	.074	.035	4.284	.019
Price	.623	.106	1.811	5.855	.000
Infrastructure	.574	.254	2.853	2.260	.000

a. Dependent Variable: Livestock Commercialization

From Table 8, the following regression equation is established;

$$Y = 5.728 + 0.311X_1 + 0.317X_2 + 0.623X_3 + 0.574X_4$$

Where:

Y = Livestock Commercialization

X<sub>1</sub> = Live stock marketing system

X<sub>2</sub> = Cultural behavior

X<sub>3</sub> = Pricing

X<sub>4</sub> = Infrastructure

Therefore; at 5% level of significance, livestock marketing system has a p value of 0.004 < 0.05 and beta coefficient of 0.311. This shows that livestock marketing system has positive and significant effect on livestock commercialization. Russelle et al. (2007) investigated on reconsidering integrated crop–livestock systems in North America and indicated that

farmers should expect that adoption of integrated crop–livestock systems would enhance both profitability and environmental sustainability of their farms and communities.

Cultural behavior has a p value of 0.019 < 0.05 and beta coefficient of 0.317. This means that cultural behavior has positive and significant effect on livestock commercialization. Walsham (2002) examined cross-cultural software production and use and show that structural analysis provides a deeper examination of cross-cultural working.

Price (p=0.000 < 0.05) has positive and significant effect on livestock commercialization. Doelamo and Assefa (2017) looked at what determines the price of goats in the market in Afar Region, Ethiopia and

indicated the market traits which had a positive effect on the variation of price of the goats.

Infrastructure ( $p=0.000<0.05$ ) has positive and significant effect on livestock commercialization. Kembe and Omondi (2016) examined the infrastructural development and commercialization of smallholder dairy Farming in Uasin Gishu County, Kenya and revealed that infrastructural development have significant influence on commercialization of small holder dairy farming.

## CONCLUSION

Livestock marketing system has positive and significant effect on livestock commercialization. Livestock operating in person to person system were poorly organized. Most pastoralists use person-to-person negotiations to buy their livestock. Auctions system leads to trade volume fluctuations among the pastoral communities. Most pastoralists use traditional non-market circulation of livestock to buy their livestock and that there is ready market for their livestock.

Cultural behavior has positive and significant effect on livestock commercialization. Most pastoral communities buy many cattle's due to the high dowry needed to marry. Majority of the pastoral communities practice polygamous, making men to buy more cattle for the bride price. The pastoral communities buy and sale the cattle to feed their family as they are the breadwinners of the family. Cultural determination of a man's wealth is in cattle heads. Most of the pastoralists buy bulls and slaughter to praise the heroes in their festivals.

Price has positive and significant effect on livestock commercialization. Animals with higher weights result into greater prices. The price of the livestock varies with the age of the animal. The distance producers' travel to sell animals will also determine the price of the animal. Most pastoralists buy quality animals at a

higher price and poor condition animal at a lower price. Brokers interfere with the price of the livestock.

Infrastructure has positive and significant effect on livestock commercialization. Export barriers and lack of water and fodder affect the livestock market. Lack of holding grounds also affects the market of livestock farmers among the pastoral communities. There is adequate investment in non-livestock sectors in pastoral systems and that less weigh stations affect the markets of the livestock farmers. Poor fences delimiting the market yards, poor quality grading systems and poor state of roads all affected affect the market of livestock farmers to a large extent.

## RECOMMENDATIONS

The study recommends to the County government of Isiolo to improve on the livestock marketing systems in place by effectively organizing livestock operating in person to person systems. This would significantly improve livestock commercialization among the pastoral communities.

All pastoral communities are encouraged to improve on their cultural behavior by buy many cattle's due to the high dowry. The pastoral communities should be encouraged to buy and sale their cattle to feed their families. All these would results into significant improvement on livestock commercialization among the pastoral communities.

The county government of Isiolo should regulations for guiding the price mechanisms of livestock product. The County government of Isiolo should pass strict regulations to regulate and control the number of brokers who distort the price of livestock. More pastoralists should be encouraged to buy quality animals at a higher price and poor condition animal at a lower price.

All Counties with pastoral communities in Kenya should improve on road and other transport infrastructures by removal of export barriers and

increasing accessibility to water and fodder. The County government of Isiolo should establish holding grounds and the fences delimiting the market yards while improving on quality grading systems and state of roads in the County.

### Suggestions for Further Studies

The current study looked at infrastructure, livestock marketing system, cultural barriers and price. From

the regression analysis, these determinants explain 76.3% change in livestock commercialization. Thus, future studies should focus on other factors explaining the remaining 23.7% change in livestock commercialization. The study specifically focused on Isiolo County, future similar studies should be carried out in other Counties with pastoral communities including Narok County.

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