

An Analysis of Competition, Competitiveness, and Determinants of Competitive Rivalry in Secondary Livestock Markets in Northwestern Kenya: A Review Study in Turkana County

Ekiru Francis Anno*

Unicaf University (UUM), School of Doctoral Studies, Lilongwe, Malawi

Corresponding Author: Ekiru Francis Anno

Unicaf University (UUM), School of Doctoral Studies, Lilongwe, Malawi

Article History

Received: 18 / 04 / 2026

Accepted: 22 / 05 / 2026

Published: 06 / 06 / 2026

Abstract: The review study was conducted in Kakuma, Lokichar and Kalemng'orok secondary livestock markets to assess the state of competition, competitiveness and determinants of rivalry in livestock trading. This study ran on the framework by Anno & Pjero (2021) study conducted in the same markets to assess the effects of traders' competitive rivalry on livestock market access in pastoral areas. The study objectives were (i) assess livestock production and market access in the selected markets and their catchment areas, (ii) ascertain the levels of traders' competition and rivalry in markets, (iii) determine livestock and products supply and demand relations in markets, and (iv) depict the integration of theory and best practices in livestock trading activities in Turkana. From a sampling frame of 180 active traders, 56 in each sub county were statistically sampled using a confidence level of 95% and a margin of error of 2% resulting in a total of 168 traders who participated in the study as primary respondents. In light of the importance of policy guidelines and administrative services, 24 individuals from government entities, both national and county, and 18 individuals from civil society organisations advocating for livestock production, marketing, peace and security, and community development were purposefully selected to participate in the study as secondary respondents. The primary research tool used was a semi-structured questionnaire, administered to study participants both individually and through focus group discussions (FGDs) and the data were analysed using different statistical, non-parametric and qualitative techniques. The study reveals that competitive rivalry negatively impacts supply and demand in livestock markets within pastoral areas, obstructing the shift to formal business models. Consequently, livestock prices, governance systems, and access to cross-border markets are adversely affected. Recommendations include empowering traders, youth, and women through business training and literacy programs to enhance their capabilities in market transactions. Improving capital access, infrastructure, and marketing organization will strengthen connections between production zones and markets. Enhancing market governance through ethical practices is crucial to mitigate rivalry. Future research should focus on supply-demand integration in livestock trade. Despite challenges, drylands offer potential for developing competitive livestock resources, benefiting rural economies and enhancing resilience in pastoral livelihoods.

Keywords: *Competition, Rivalry, Livestock markets, Livestock production, Market access, Livestock sector performance, Business theory, and Turkana County.*

How to Cite in APA format: Anno, E. F. (2026). An Analysis of Competition, Competitiveness, and Determinants of Competitive Rivalry in Secondary Livestock Markets in Northwestern Kenya: A Review Study in Turkana County. *IRASS Journal of Multidisciplinary Studies*, 3(6), 8-21. <https://doi.org/10.5281/zenodo.20566647>

Introduction

Livestock farming is essential for the economic stability of Kenya's dryland areas, accounting for 12% of GDP and 42% of Agricultural GDP, and it constitutes 11.4% of household spending on livestock-derived foods, contributing to nutrition, income, and labour. Turkana, Marsabit, Garissa, and Wajir counties possess substantial livestock populations, while the remaining dryland counties also exhibit elevated livestock numbers. This category illustrates the capacity of drylands to enhance national and regional economies via livestock farming and commercialisation. Despite obstacles such as drought and market competition, the livestock sector is crucial in rural and household economies, serving as a significant source of livelihoods, sustenance, revenue, and nourishment. Nonetheless, notwithstanding the challenges of livestock production and market access encountered by farmers This is an open access article under the CC BY-NC license

and businesses in arid regions, intense rivalry has persistently obstructed the capitalisation of livestock farming, markets and associated commercial developments.

The essential variables for examining the development of local capacities in production and marketing encompass comprehension of competition, competitiveness, and market dynamics management, along with the identification of factors that stimulate and maintain rivalry within the livestock production and marketing value chains. The study aimed to examine competition levels in livestock markets, evaluate the competitiveness of local market traders, and identify variables that drive competition, with the objective of enhancing market performance and promoting improved livestock business practices important for advancing the dryland economies.

Literature Review

Analysis of livestock sector performance

The global livestock business is swiftly transforming, with more than 1.3 billion individuals reliant on it for their livelihoods and food security, while livestock constitutes 40% of the total agricultural production value worldwide (FAO et al., 2020). Countries such as Australia, China, and the USA have become net exporters of animal goods owing to changing market dynamics. In Africa, South Africa, Côte d'Ivoire, Kenya, and Morocco are expected to maintain or enhance their positions as prominent agricultural exporters (Ryschawy et al., 2017; Anno & Pjero, 2021). Despite the expansion fostered by heightened commercialisation and sustainable business practices, substantial discrepancies in investment and market competitiveness threaten and continue to jeopardise the global marketing of animal resources (Veysset et al., 2017; Anno et al., 2023).

Supply and demand dynamics in eastern Africa markets

The livestock supply in eastern Africa is mostly derived from production zones and trade corridors, with a notable rise in camel exports to Saudi Arabia (Berihun, 2017; Anno & Nakeno, 2026). Countries such as Somalia, Ethiopia, Kenya, and Tanzania utilise their vast rangelands through extensive agricultural production methods to generate livestock and diverse livestock products (Devaux et al., 2018). Kenya, with a livestock-dependent population of over 16 million and primarily arid and semi-arid terrain, prioritises animal husbandry as a crucial economic endeavour. Nonetheless, the livestock trade encounters obstacles, particularly from affluent dealers who monopolise the market and marginalise low-capital traders, relegating them to subordinate positions. Mahmoud (2008) emphasises that poor pricing and inadequate capital impede these traders' competitiveness and profitability, rendering them vulnerable to intense competition and the risk of depleting their business resources.

Coordination of livestock marketing operations

Efficient and effective operation of livestock markets necessitates coordination grounded in robust governance mechanisms (Anno & Pjero, 2021). This methodology, as articulated by Watson and van Binsbergen (2008) and Abebe et al. (2018), will facilitate substantial advantages for highly marginalised markets, such as Turkana County, which has a population exceeding one million, hence supporting the socio-economic stability of livestock dependent groups. Although many markets function every day, the government advocates for designated market days to improve livestock trade, facilitating a more structured supply chain from production areas to terminal markets. Profitable livestock enterprises are utilising competition to balance supply and demand forces in the markets they operate in. Abebe et al. (2018) and Anno et al. (2024) underscore that examining livestock offtakes may enhance supply, hence increasing sales and profits for marketplaces and enterprises.

Incorporation of theory in livestock marketing

In eastern Africa, specifically Kenya, livestock trading is devoid of a systematic framework, predominantly depending on buyer-seller agreements without formal regulatory mechanisms

(Roba et al., 2019). Despite the presence of formal market infrastructure, inefficiencies emerge from inconsistencies in livestock marketing systems. Anno and Pjero (2021) assert that livestock marketing systems can be enhanced by employing market-oriented business models, including Porter's Five Forces for identifying and analysing competitive dynamics within the livestock industry, Value Chain Theory for delineating critical activities in livestock production and value enhancement, and the Diamond Model for fostering competitiveness in cross-border markets. Additionally, an evaluation of the livestock industry's political, economic, social, technological, legal, and environmental factors is essential for a comprehensive understanding of the internal and external business environment (Akenbor & Okoye, 2011). Gupta (2013), Stanimir (2014), and Asfaw (2018) similarly assert that the integration of theory and practice in livestock marketing could improve its viability and sustainability.

Importance of business theory in livestock marketing

Theories and models are essential for evaluating market performance and usefulness in business situations (Stanimir, 2014; Harzing & Giroud, 2013). They specifically advantage enterprises in competitive settings by synchronising stakeholder interests and roles, hence improving consumer delight through economies of scale (Ndanga et al., 2015). This remains pertinent in pastoral situations, where efficient market management may coordinate operations and enhance linkages between supply and demand (Berihun, 2017). The literature emphasises the significance of livestock market management and the contribution of livestock to food security and revenue. McPeak and Barret (2001) and Anno and Ameripus (2022) assert that profitability in livestock production and marketing is enhanced through competitive value chains, increased business opportunities, market access strategies, and the incorporation of theoretical frameworks in livestock business modelling.

Methodology

Study area, sampling and research instruments

The research study was carried out in two sub counties of Turkana County i.e., Turkana West and Turkana South where the secondary markets of Kakuma, and Lokichar and Kalemng'orok, respectively together with a network of corresponding primary marketplaces and itinerant traders, were evaluated. From a sampling frame of 180 active traders, 56 livestock traders in each sub county were statistically sampled using a 95% confidence level and 2% margin of error, resulting in a total of 168 traders who participated in the study as primary respondents.

In light of the importance of policy guidelines and administrative services, 24 individuals from government entities, both national and county, and 18 individuals from civil society organisations advocating for livestock production, marketing, peace and security, and community development were purposefully selected to participate in the study as secondary respondents. The primary research tool used was a semi-structured questionnaire, administered to study participants both individually and through focus group discussions (FGDs). The sampling process is as presented in the table below.

Table 1: Sampling framework

Study participants	Sampling frame	Margin of error	Confidence level	Response rate	Sample size	% Sample size (from the population)
Primary participants	180	2%	95%	50%	168	93%
Secondary participants	42	Secondary participants (Government & NGO workers) n=24 government and n=18 from Civil Society				

Data analysis

Quantitative data analysis

Data analysis utilized means for numerical variables and frequencies for categorical variables, employing a chi-square test to assess categorical differences across three main markets. Non-normal data were analyzed with the Kruskal-Wallis test and subsequent Dunn-Bonferroni post-hoc comparisons. A significance level of 0.05 was established, incorporating Bonferroni adjustments for multiple comparisons. Internal consistency was measured using Cronbach’s alpha ($\alpha \geq 0.5$). A one-way ANOVA was conducted to evaluate mean score differences across four themes, while simple linear regression analyzed the effect of competitive rivalry on livestock production and marketing. Non-parametric methods were adopted due to non-normal distributions, with analyses performed using IBM SPSS Statistics (Version 25.0).

Reliability of research instruments

Test-retest reliability analysis

Test-retest reliability coefficients (also called coefficients of stability) were analyzed by computing the correlation coefficient from two sets of data that was generated during the pilot study. The test-retest reliability coefficients of 0.821 were computed. According to Everitt and Skrondal (2010), retest reliability coefficients should be as follows: 1 (perfect reliability), ≥ 0.9 (excellent reliability), $\geq 0.8 < 0.9$ (good reliability), $\geq 0.7 < 0.8$ (acceptable reliability), $\geq 0.6 < 0.7$ (questionable reliability), $\geq 0.5 < 0.6$ (poor reliability), < 0.5 (unacceptable reliability) and 0 (no reliability). This implies that the reliability of the instrument used in this study was good.

Table 2: Test-retest reliability analysis

		First set of data	Second set of data
First set of data	Pearson Correlation	1	.821**
	Sig. (2-tailed)		.049
	Number of variables	22	22
Second set of data	Pearson Correlation	.821**	1
	Sig. (2-tailed)	.049	
	Number of variables	22	22

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

Cronbach’s alpha reliability analysis

This study evaluated the reliability of various scales using Cronbach’s alpha, with a threshold of 0.7 for acceptable reliability. Items that did not contribute significantly were removed. A Likert scale was employed for data collection, utilizing previously tested measures with revised instruments to ensure relevance. The analysis examined reliability coefficients to confirm that items within each group measured the same construct and would yield consistent results upon repeated administration.

Table 3: Cronbach's alpha for the questionnaire

Scale	Number of items	Cronbach's Alpha
Livestock production and market access	7	0.818
Trader’s competitive rivalry	9	0.836
Demand and supply	3	0.883
Theory and livestock production and marketing	3	0.792
Overall		0.832

Using Cronbach's alpha, an index of 0.832 for the questionnaire was established. The reliability results exceeded the 0.7 level of acceptability revealing a very high degree of reliability. This implied that the reliability of the instrument was relevant. Using this score according to Kothari (2004), the instrument reliability can be considered to be satisfactory.

Results

Quantitative data results

Demography characteristics of farmer

The average respondent age across three markets was 37.10 years (SD = 8.96), with ages ranging from 19 to 70. The majority (85.1%) were male, and 75.0% had at least some formal education, with only 4.8% holding certificates of training. Respondents averaged 12.59 years in livestock production and marketing (SD = 6.16), with 95.2% identifying as livestock keepers, a pattern consistent across all markets.

Table 4: Descriptive statistics for selected respondents' demographic and socio-economic characteristics

Market	Overall	Kakuma Livestock Market	Kalemng'orok Livestock Market	Lokichar Livestock Market
Demographic characteristics	n=168	n=56	n=56	n=56
Age	37.1(8.96)	38.75(7.81)	36.88(10.68)	35.68(7.99)
Male (%)	85.1	80.4	87.5	87.5
Female (%)	14.9	19.6	12.50%	12.5
Education level (%)				
Adult Education	20.2	26.8	17.9	16.1
Certificate	4.8	5.4	3.6	5.4
Non-literate	75	67.9	78.6	78.6
Years in livestock marketing	12.59(6.16)	13.67(4.85)	13.41(6.24)	10.7(6.85)
Main occupation				
Business	4.8	5.4	3.6	5.4
Livestock keeping	95.2	94.6	96.4	94.6

Note: Figures in the parentheses are the standard deviations associated with the means for the variables indicated.

Test for statistically significant difference across the three markets

A Kruskal-Wallis H test identified significant differences in numeric variables among three markets, while a Chi-square test assessed categorical variables. The Kruskal-Wallis test highlighted a statistically significant difference in years of livestock production (p-value = 0.029), showing that Kakuma Livestock Market respondents had the highest mean at 13.67 years, contrasted with Lokichar's lowest mean of 10.70 years. Age differences among respondents, however, were not significant (p-value = 1.00).

Livestock production and Market access

Most respondents (29.8%) were neutral on whether livestock production is real and progressive, with 22.6% agreeing and 9.5% strongly agreeing. Conversely, 22.6% disagreed and 15.5% strongly disagreed. On the statement regarding significant livestock production factors (pasture, water), 29.2% disagreed and 28.0% strongly disagreed, while 25.6% remained neutral. A

smaller percentage (14.3% agreed and 3% strongly agreed) supported this statement. In a survey regarding livestock marketing, 27.4% of respondents had a neutral opinion on its scope and size. Agreeing with the statement were 21.4%, while 16.1% strongly agreed. Disagreement came from 22.0% and strong disagreement from 13.1%. On the benefits for livestock producers, traders, and consumers, 32.1% strongly agreed, 20.8% agreed, and 23.2% remained neutral, with 14.9% disagreeing and 8.9% strongly disagreeing.

Most respondents (75.6%) strongly disagreed that livestock productivity value addition was considered, with an additional 8.9% disagreeing. Only 3.0% agreed, and none strongly agreed. Regarding livestock marketing systems, 35.1% strongly disagreed and 19.0% totally disagreed, while 19% disagreed. Neutral responses accounted for 25.6%, with 14.9% agreeing and 5.4% strongly agreeing. Additionally, 46.4% strongly disagreed that research and market surveys are regularized, with 23.8% also disagreeing.

Table 5: Livestock production and market access

Statements	SD	D	N	A	SA
Livestock production progress	15.5	22.6	29.8	22.6	9.5
Factors of production (pasture, water)	28.0	29.2	25.6	14.3	3.0
Considerable Livestock marketing	13.1	22.0	27.4	21.4	16.1
Market stakeholders benefitting	8.9	14.9	23.2	20.8	32.1
Livestock production value addition	75.6	8.9	12.5	3.0	0.0
Efficient and competitive livestock marketing	35.1	19.0	25.6	14.9	5.4
Regularized research and market surveys	46.4	23.8	20.2	7.7	1.8

Key: SD=Strongly disagree; D=Disagree; N=Neutral; A= Agree; SA= Strongly agree

Note: Statements 1.3, 1.5 and 1.7 were excluded from the analysis

The study analyzed respondent scores related to livestock production and market access, revealing an overall mean score of 2.51 (neutral), with a standard deviation of 0.61. The highest score recorded was 3.86, while the lowest was 1.14. One-way ANOVA indicated a significant difference in scores across three livestock markets (Kakuma, Kalemng'orok, and Lokichar) with $F(2,165) = 34.253$ and a P-value of 0.000. Kakuma had the highest mean score of 2.89 (SD = 0.50), while Kalemng'orok had the lowest mean score of 2.09 (SD = 0.50), and Lokichar had a mean of 2.54 (SD = 0.54).

Table 6: Summary of livestock production and market access scale

Elements	N	Minimum	Maximum	Mean	Std. Dev.
Livestock production progress	168	1.00	5.00	2.88	1.20
Factors of production (pasture, water)	168	1.00	5.00	2.35	1.12
Considerable Livestock marketing	168	1.00	5.00	3.05	1.27
Market stakeholders benefitting	168	1.00	5.00	3.52	1.32
Livestock production value addition	168	1.00	4.00	1.43	0.82
Efficient and competitive livestock marketing	168	1.00	5.00	2.36	1.25
Regularized research and market surveys	168	1.00	5.00	1.95	1.07
Overall	168	1.14	3.86	2.51	0.61
1 Kakuma livestock market	56	1.57	3.86	2.89	0.50
2 Kalemng'orok livestock market	56	1.14	3.00	2.09	0.50
3 Lokichar livestock market	56	1.43	3.57	2.54	0.54

Calculated $F(2,165) = 34.253$; critical $F(2,165) = 3.050$; P-value = 0.000

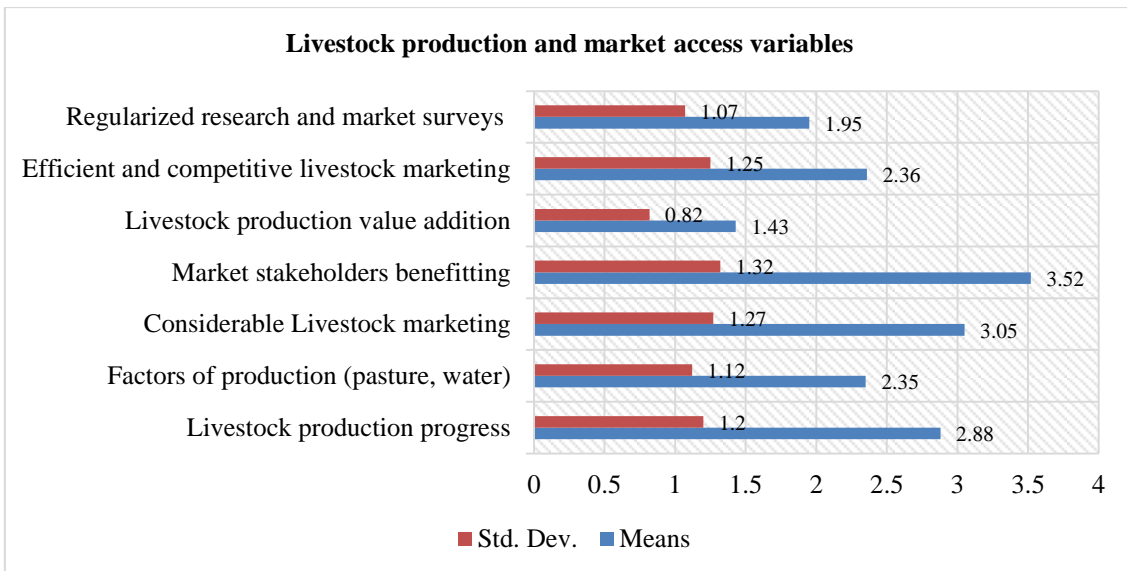


Figure 1: Comparative livestock production and market access means

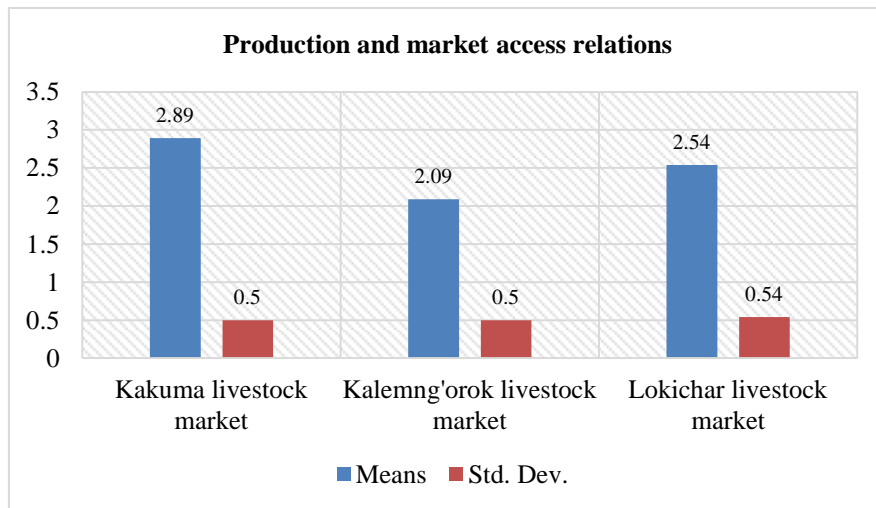


Figure 2: Production and market access relations in markets

A post hoc analysis results for multiple comparison using Tukey HSD indicated a significant difference in the mean score of livestock production and market access between all markets, that is, Kakuma and Kalemng'orok livestock markets, Kakuma and Lokichar livestock markets, as well as, Kalemng'orok and Lokichar livestock markets at 5% level.

Table 7: Post hoc multiple comparisons

(I) Livestock Market	(J) Livestock Market	Mean Difference (I-J)	Std. Error	Sig.
1 Kakuma Market	2 Kalemng'orok Market	.80357*	.09731	.000
	3 Lokichar Market	.35459*	.09731	.001
2 Kalemng'orok Market	1 Kakuma Market	-.80357*	.09731	.000
	3 Lokichar Market	-.44898*	.09731	.000
3 Lokichar Market	1 Kakuma Market	-.35459*	.09731	.001
	2 Kalemng'orok Market	.44898*	.09731	.000

Traders' competition and rivalry

Majority of respondents had a neutral view (31.5%) on livestock producers and traders' relationships, with 29.2% agreeing

and 19.6% strongly agreeing. Disagreement was low, at 11.9% and 7.7% for disagreeing and strongly disagreeing, respectively. On the relationships among livestock traders, 34.5% agreed and 23.2% strongly agreed. A significant 35.7% strongly disagreed that

competition benefits individuals in the sector, while 13.7% disagreed and 25.6% were neutral. About 24.4% strongly agreed that competitive rivalry is evident in livestock markets, with 23.8% agreeing. On the impact of competitive rivalry on market performance, 37.5% strongly agreed and 19.6% agreed, with 17.9% remaining neutral.

Most respondents (38.7%) strongly agreed that competitive rivalry among traders is self-serving, while 25% agreed and 23.8% were neutral. Regarding regulation of competition, 34.5% strongly disagreed, and 20.8% disagreed, with 20.8% neutral. A majority (26.2%) strongly disagreed that competition strengthens markets, and 19.6% disagreed, with 20.8% neutral. On whether competition reduces livestock prices, 28% strongly disagreed, 19% disagreed, and 23.2% were neutral.

Table 8: Summary of traders' competitive rivalry

Statements	N	Minimum	Maximum	Mean	Std. Dev.
Producers and trader relations	168	1.00	5.00	3.41	1.16
Trader relations	168	1.00	5.00	3.60	1.11
Competition is beneficial	168	1.00	5.00	2.48	1.34
Competitive rivalry is evident	168	1.00	5.00	3.24	1.42
Competitive rivalry affect market	168	1.00	5.00	3.57	1.42
Competitive rivalry instigated by traders	168	1.00	5.00	3.84	1.19
A system in regulate competition	168	1.00	5.00	2.42	1.32
Competition strengthening markets	168	1.00	5.00	2.77	1.41
Competition reducing livestock prices	168	1.00	5.00	2.74	1.46
Overall	168	1.11	4.89	3.12	0.63
1 Kakuma Livestock Market	56	2.67	4.89	3.62	0.49
2 Kalemng'orok Livestock Market	56	1.11	3.89	2.79	0.62
3 Lokichar Livestock Market	56	2.11	4.33	2.94	0.44

Calculated $F(2,165) = 39.966$; critical $F(2,165) = 3.050$; $P\text{-value} = 0.000$

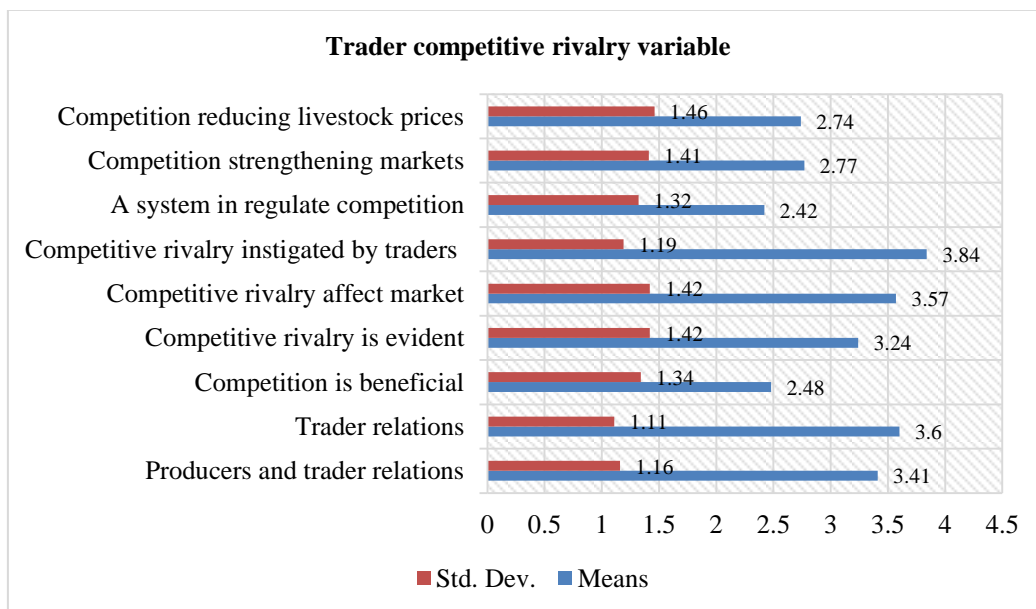


Figure 3: Competitive rivalry in markets

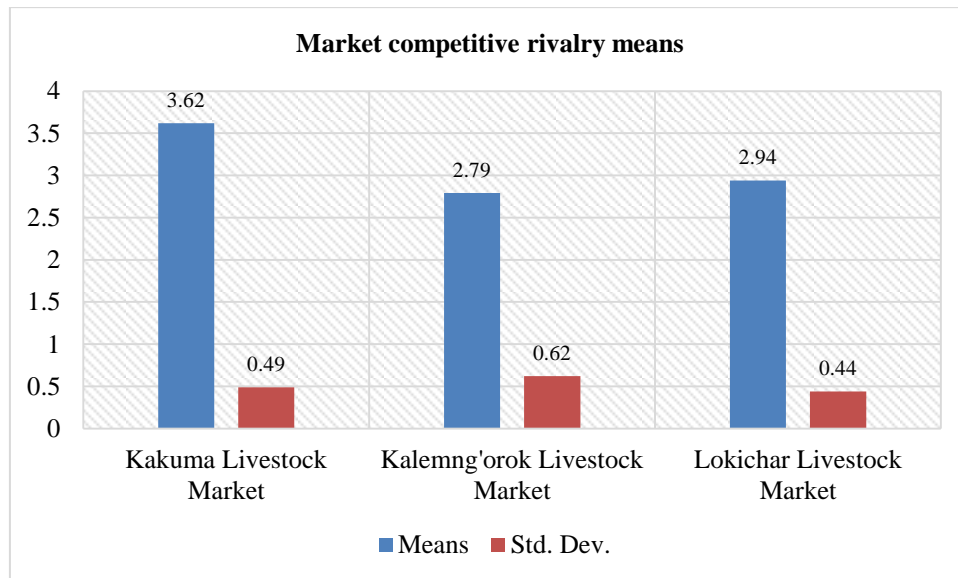


Figure 4: Traders competitive rivalry

The analysis of respondents' scores on trader's competitive rivalry shows a mean of 3.12 (SD = 0.63), with scores ranging from 1.11 to 4.89. A one-way ANOVA indicated a significant difference in mean scores across three markets ($F(2,165) = 39.966$; $P\text{-value} = 0.000$). Kakuma Livestock Market had the highest mean score of 3.62 (SD = 0.49), while Lokichar and Kalemng'orok Livestock Markets both recorded the lowest mean of 2.79 (SD = 0.44 and 0.62, respectively).

A post hoc analysis using Tukey showed significant mean score differences between respondents at Kakuma and Kalemng'orok Livestock Markets, and between Kakuma and Lokichar Livestock Markets at the 5% level. No significant difference was observed between Kalemng'orok and Lokichar Livestock Markets.

Table 9: Multiple comparison trader's competitive rivalry

(I) Livestock Market	(J) Livestock Market	Mean Difference (I-J)	Std. Error	Sig.
1 Kakuma Market	2 Kalemng'orok Market	.82738*	.09849	.000
	3 Lokichar Market	.67460*	.09849	.000
2 Kalemng'orok Market	1 Kakuma Market	-.82738*	.09849	.000
	3 Lokichar Market	-.15278	.09849	.270
3 Lokichar Market	1 Kakuma Market	-.67460*	.09849	.000
	2 Kalemng'orok Market	.15278	.09849	.270

Supply and demand relations

Most respondents (42.3%) indicated that season-long livestock marketing is practiced in their area. Additionally, 33.3% totally agreed that traders have maintained and diversified investments through livestock marketing initiatives, while 43.5% expressed neutrality regarding the consistency and affordability of livestock prices and products year-round.

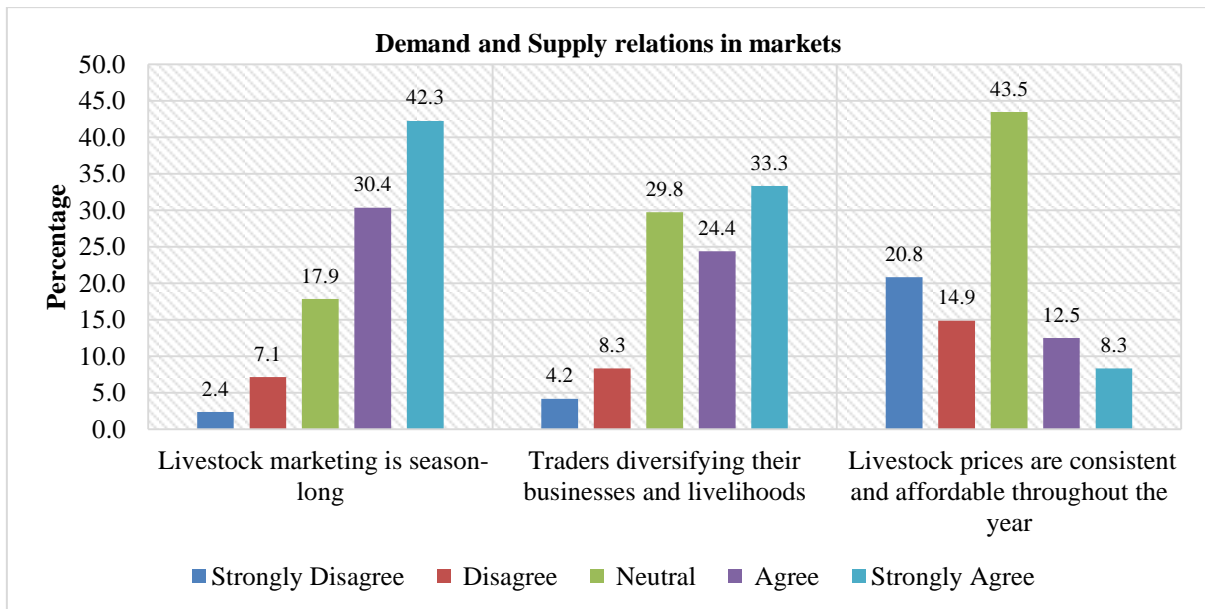


Figure 5: Supply and demand relations in markets

An analysis of the livestock market revealed that respondents in Kakuma Livestock Market had the highest mean score of 2.74, whereas those in Kalemng'orok recorded the lowest at 2.17. A one-way ANOVA demonstrated a significant difference in mean scores across the three markets ($F(2,165) = 25.124$; $P\text{-value} = 0.000$).

Table 10: Summary of demand and supply

Statements	N	Minimum	Maximum	Mean	Std. Dev.
Livestock marketing is season-long	168	1.00	5.00	4.03	1.05
Traders diversifying their businesses and livelihoods	168	1.00	5.00	3.74	1.13
Livestock prices are consistent and affordable throughout the year	168	1.00	5.00	2.73	1.17
Overall	168	1.00	5.00	3.50	0.83
1 Kakuma Livestock Market	56	2.33	5.00	3.74	0.53
2 Kalemng'orok Livestock Market	56	1.00	4.67	2.93	0.88
3 Lokichar Livestock Market	56	2.33	5.00	3.82	0.75

Calculated $F(2,165) = 25.124$; critical $F(2,165) = 3.050$; $P\text{-value} = 0.000$

Post hoc analysis showed significant differences in mean scores between Kakuma Livestock Market, Kalemng'orok Livestock Market, and Lokichar Livestock Market at 5% level, but no significant difference in Kakuma Livestock Market and Lokichar Livestock Market.

Table 11: Post hoc multiple comparisons

(I) Market_Two Market	(J) Market_Two Market	Mean Difference (I-J)	Std. Error	Sig.
1 Kakuma Market	2 Kalemng'orok Market	.80952*	.13860	.000
	3 Lokichar Market	-.07738	.13860	.842
2 Kalemng'orok Market	1 Kakuma Market	-.80952*	.13860	.000
	3 Lokichar Market	-.88690*	.13860	.000
3 Lokichar Market	1 Kakuma Market	.07738	.13860	.842
	2 Kalemng'orok Market	.88690*	.13860	.000

*. The mean difference is significant at the 0.05 level.

Theory and livestock production and marketing

Majority of respondents (38.1%) strongly agreed that competition enhances innovation in livestock marketing, while 26.8% agreed and 25.0% were neutral. Conversely, 10.2% disagreed (6.0% strongly disagreed, 4.2% disagreed). Regarding the application of corporate theories in livestock marketing, most respondents were neutral, with more disagreeing (44.1%) than agreeing (20.3%). For the effectiveness of formulated livestock marketing strategies, 37.5% disagreed and 18.5% strongly disagreed, while only 19.7% agreed (13.7% agreed, 6.0% strongly agreed). Overall, a significant proportion of respondents expressed skepticism about corporate theory applications and marketing strategies.

Summary of retained statements on theory and livestock production and marketing

The analysis of livestock marketing theories across three markets highlighted significant differences in respondents' opinions. The statement regarding competition improving innovation had the highest mean score of 3.87, while the application of corporate theories scored 2.61, and the effectiveness of formulated strategies received 2.51. The overall average for the three statements was 3.00. One-way ANOVA indicated a significant difference in scores, with Lokichar leading at 3.40, followed by Kakuma at 3.11, and Kalemng'orok at 2.48.

Table 12: Summary of retained statements on theory, livestock production and marketing

Statements	N	Minimum	Maximum	Mean	Std. Dev.
Competition is improving innovation in livestock marketing	168	1.00	5.00	3.87	1.15
Corporate theories are applied in livestock marketing	168	1.00	5.00	2.61	1.06
Formulated livestock marketing strategies are working	168	1.00	5.00	2.51	1.12
Overall	168	1.00	4.67	3.00	.86
Kakuma Livestock Market	56	1.00	4.67	3.11	0.85
Kalemng'orok Livestock Market	56	1.00	4.33	2.48	0.85
Lokichar Livestock Market	56	2.33	4.67	3.40	0.59

Calculated $F(2,165) = 20.528$; critical $F(2,165) = 3.050$; $P\text{-value} = 0.000$

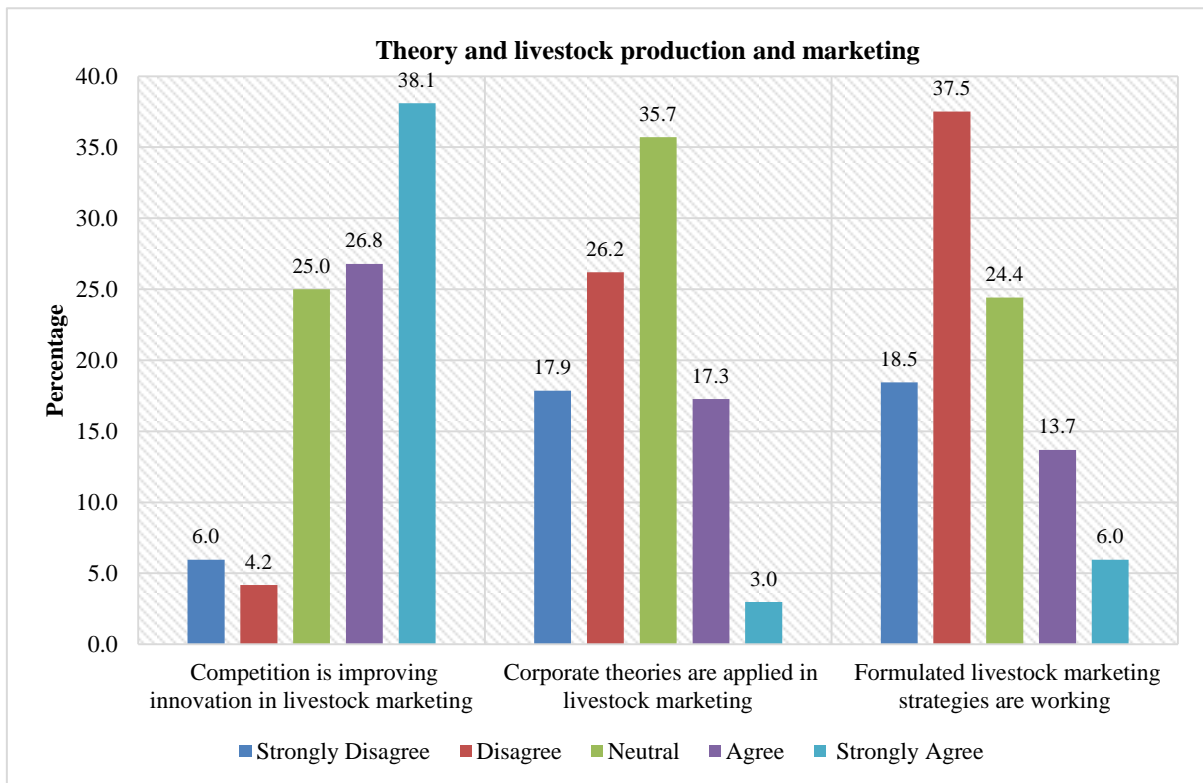


Figure 6: Theory integration in livestock production and marketing

The post hoc analysis results using the Tukey HSD results (Table 4.13) showed no significant difference between Kakuma and Lokichar Livestock Markets in the scoring since the mean difference of -.286 was not significant.

Table 13: Multiple comparisons Tukey HSD

(I) Market_Two Market	(J) Market_Two Market	Mean Difference (I-J)	Std. Error	Sig.
1 Kakuma Market	2 Kalemng'orok Market	.63095*	.14640	.000
	3 Lokichar Market	-.28571	.14640	.128
2 Kalemng'orok Market	1 Kakuma Market	-.63095*	.14640	.000
	3 Lokichar Market	-.91667*	.14640	.000
3 Lokichar Market	1 Kakuma Market	.28571	.14640	.128
	2 Kalemng'orok Market	.91667*	.14640	.000

*. The mean difference is significant at the 0.05 level.

Effects of traders’ competitive rivalry on livestock production and market access

Results from the simple linear regression analysis indicate that trader competition and rivalry significantly impact livestock production and market access in pastoral areas, as shown in Table 4.8 and Appendix D(2a). The model's F-ratio was 30.642 (p=0.000), with an adjusted R² of 0.151, suggesting that 15.1% of the variability in livestock production and access is explained by trader competition. The coefficient of 0.381 indicates that a one-unit increase in competition correlates with a 0.381 increase in production and access. Therefore, the null hypothesis was rejected, confirming the significant effect of trader's competitive rivalry on these factors.

Table 14: Effects of traders’ competitive rivalry on production and market access

Variable	Coef.	Std. Err.	T	P>t
Constant	1.319	.219	6.028	.000
Trader’s competition and rivalry	.381	.069	5.536	.000

F (1, 166) = 30.642, Prob> F = 0.000, R-squared = .156, Adj R-squared= .151

These results align with Bojnec (2003) regarding competitiveness measures in livestock production within Central and Eastern European (CEE) countries, particularly through Porter’s diamond of competitive advantage. The decline in livestock production and market access is attributed to increased competitive rivalry. This rivalry challenges the sector to develop sustainable practices that enhance quality, competitiveness, and cost efficiency in an international market. Supporting these findings, Marshall and Parra's (2019) study asserts that competition in the product market influences firms' incentives to innovate, and the effect of competition on innovation is fundamentally determined by the payoffs in the product market. The study also indicates that market concentration can either enhance or detract from welfare and innovation results, while competition may elevate consumer welfare but diminish overall welfare.

These findings support Dobbins et al. (2020), indicating that high rivalry in production agriculture hinders market growth

due to significant fixed costs and high exit barriers. Maximizing productive capacity leads to excess supply, lowering prices and diverting resources, which impedes growth. Similarly, Yuzaria and Rias (2017) showed that competitive rivalry can improve short-term market access in the livestock sector, but as more entrants join, market accessibility declines.

Effects of trader’s competition and rivalry on demand and supply

Results indicate that competition and rivalry among traders significantly impact the balance of supply and demand in the livestock market of pastoral areas, at a 5% significance level. The F-ratio for the model was 5.914 (p = 0.016), with an R² of 0.029, indicating that traders' dynamics account for 2.9% of the supply-demand balance. A coefficient of 0.245 suggests that a unit increase in traders' competition leads to a corresponding 0.245 increase in supply and demand, affirming the significance of trader competition and rivalry in this market context.

Table 15: Effects of traders’ competitive rivalry on supply and demand in markets

Variable	Coef.	Std. Err.	T	P>t
Constant	2.737	.320	8.551	.000
Trader’s competition and rivalry	.245	.101	2.432	.016

F (1, 166) = 5.914, Prob> F = 0.016, R-squared = .034, Adj R-squared= .029

These findings support Ndzabukelwako et al. (2024) findings highlighting that industry rivalry and customer bargaining

power are the most influential forces if not well managed can lead to competitive rivalry in markets. Ndanga et al. (2015) also observed that due to competitive rivalry in the fish value chain,

most smallholder farmers are characterised by low bargaining power when dealing with input suppliers. Despite government efforts to stabilize prices, these interventions have had limited success, as prices are largely dictated by production costs, resulting in a medium bargaining power for customers in the input supply market. These findings align with Ward (2010), indicating that increased competitive rivalry in the U.S. beef sub-sector has enhanced efficiency by allowing firms to operate closer to their optimum capacity. Larger operations now rely more on long-term supply agreements with medium to large livestock buyers to mitigate risks linked to larger plant operations. Additionally, some larger livestock firms seek marketing agreements with processors to secure market outlets, leading to shifts in bargaining power, as both buyers and sellers increasingly favor longer-term contracts for risk management.

These results further align with Yuzaria and Rias (2017), indicating that the livestock industry is accessible to new competitors, which can lead to market development challenges. Increased competition benefits buyers but reduces profits for

suppliers. Existing suppliers experience diminishing profitability as new entrants increase rivalry, while early entrants gain more than late ones, whose profitability diminishes amid intense competition. These results are equally consistent with Abdu et al. (2016), who found that competitive rivalry in cattle markets in Kano State, Nigeria, leads to many sellers and fewer changes in buyer numbers. In a market with many sellers, low product differentiation, easy entry, and high exit costs, buyers benefit from lower prices, resulting in increased demand.

Effects of trader’s competitive rivalry on theory and livestock production and marketing

Results indicate that the coefficient for trader’s competitive rivalry was not statistically significant, with an F-ratio of 2.652 and a probability value of 0.105. Consequently, the theory and livestock production and marketing were not significantly influenced by this rivalry, leading to the conclusion that trader’s competitive rivalry has no significant effect on these areas.

Table 16: Effects of traders’ competitive rivalry on theory application in markets

Variable	Coef.	Std. Err.	T	P>t
Constant	2.465	.334	7.380	.000
Trader’s competitive rivalry	.171	.105	1.628	.105

F (1, 166) = 2.652, Prob> F = 0.105, R-squared = .016, Adj R-squared= .010

Conclusion

In summary, the study concludes that extreme competition significantly affects livestock markets in Turkana, creating barriers for producers and consumers. The lack of a formal marketing system hinders market growth, resulting in informal and uncompetitive practices. Factors like supply-demand imbalances and inadequate business model integration are critical obstacles. Competitive rivalry is prevalent, particularly impacting secondary market traders in Turkana, who struggle against external traders. The findings align with past research, indicating persistent challenges in livestock marketing, necessitating action from the Kenyan government and other stakeholders. Enhanced funding for livestock marketing activities and the development of competitive strategies are essential for socioeconomic development in pastoral areas.

Recommendation for Application

The recommendations for improving livestock marketing in Turkana County focus on empowering women and youth, introducing adult literacy programs, and ensuring year-round functioning of all market categories. Key actions include enhancing stakeholder engagement for better coordination, applying effective business models and theories to the livestock sector, and establishing complaints management mechanisms to address market rivalry. Additionally, equitable market allocation based on traders' resources and regularising market research are crucial for enhancing competitiveness and understanding of market needs.

To enhance the vibrancy and sustainability of livestock production in Kenya's drylands, several key actions to bolster

overall livestock trade and economic stability in the region are hereby proposed:

- Assess the value addition through breed and genetic improvements to enable local traders to compete better in external markets;
- Measure the impact of market forces to balance supply and demand in livestock markets;
- Research the application of corporate theories in the livestock sector;
- Determine the livestock marketing potential of East Africa's trade corridors;
- Transform Livestock Marketing Associations (LMAs) into cooperatives to improve resource mobilization;
- Investigate the socio-economic factors leading to the Lomidat Slaughterhouse's closure to restore its functionality and for better business positioning;
- Explore the prevalence of livestock diseases and management strategies to improve animal health and productivity; and
- Research the roles of women and youth in livestock production and trade to empower these groups socially and economically.

Areas for Future Research

The study identifies the analysis of competition in livestock markets as a factor influencing the stability of supply and demand factors. Defining competition within the dynamic livestock market

of Turkana would facilitate the structuring of market operations and establish an equitable marketing procedure for the benefit of all stakeholders concerned.

Disclaimer

- The views stated in this article are those of the author and do not necessarily represent those of any of the entities mentioned.

Interest Conflicts

- The author declares no conflict of interest whatsoever in this publication.

Funding Statement

- This research study was conducted in its entirety without any form of funding from external sources. Fieldwork and publication costs were covered by the author.

References

1. Abdu, Z., Mustapha, A., & Danbatta, A. B. (2016). Structural Analysis of Cattle Market in Kano State, Nigeria. *Journal of Marketing and Consumer Research*. ISSN 2422-8451. Vol. 25. 24-28.
2. Abebe, B. D., Tadie, M. A., & Taye, M. M. (2018). Factors affecting market outlet choice of wheat producers in North Gondar Zone, Ethiopia. *Agriculture & Food Security; London* Vol. 7. DOI: 10.1186/s40066-018-0241-x.
3. Akenbor, C. O., & Okoye, E. I. (2011). An Empirical Investigation of Value-Chain Analysis and Competitive Advantage in the Nigerian Manufacturing Industry. *International Multidisciplinary Journal, Ethiopia* 5 (6) 188-198.
4. Anno, E. F., & Nakeno, D. L. (2026). Regional Integration Provisions for Efficacy of Cross-border Trade: Enhancing Livestock Marketing Activities in Trade Corridors in the Turkana, Karamoja, Eastern Equatoria, and South Omo Regions. *IRASS Journal of Multidisciplinary Studies*,3(1),11-21.
5. Anno, E. F., Nakeno, D. L., Lele, J. E., Erukun, E. N., & Anno, S. D. (2024). The Influence of Marketing Theory and Practice on Supply and Demand Forces in Turkana's Livestock Markets: A Case of Kakuma, Lokichar and Kalemng'orok Secondary Markets. *International Research Journal of Economics and Management Studies*, Vol. 3, No. 12, pp. 13-23.
6. Anno, E. F., Eipa, J. S., & Emase, J. N. (2023). Impact of Competition and Market Access Factors on the Performance of Secondary Livestock Markets in Turkana, Kenya. *International Journal of Business and Economics Research*. Vol. 12, No. 3, pp. 87-98. doi: 10.11648/j.ijber.20231203.12
7. Anno, E. F., & Ameripus, M. E. (2022). Effects of Internal and Cross-Border Resource-Based Conflicts on Livestock Market Performance in Pastoral Areas of Karamoja, Uganda and Turkana, Kenya. *American Journal of Environmental and Resource Economics*. Vol. 7, No. 3, 2022, pp. 87-96. DOI: 10.11648/j.ajere.20220703.14
8. Anno, E. F., & Pjero, B. E. (2021). Impact of Traders Competitive Rivalry on Supply and Demand Relations in Livestock Markets in the Drylands of Kenya. *International Journal of Business and Economics Research*. Vol. 10, No. 3, 2021, pp. 99-109. doi: 10.11648/j.ijber.20211003.13
9. Anno, E. F., & Pjero, B. E. (2021). Impact of Traders Competitive Rivalry on Supply and Demand Relations in Livestock Markets in the Drylands of Kenya. *International Journal of Business and Economics Research*. Vol. 10, No. 3, pp. 99-109. DOI: 10.11648/j.ijber.20211003.13
10. Asfaw, A. A. (2018). Prevalence and economic significance of bovine fasciolosis in Bale Rural Abattoir, Ethiopia. *Academy of Agriculture Journal* 3 (9): 541-550. <http://www.innovativejournal.in/index.php/aaj/article/view/2286>
11. Berihun, T. (2017). Livestock Marketing Performance Evaluation in the Afar Region, Ethiopia. *International Journal of Agricultural Marketing*, 4 (2): 152-160. Retrieved from <https://premierpublishers.org/ijam/160620177736>.
12. Bonjec, S. (2003). Three Concepts of Competitiveness Measures for Livestock Production in Central and Eastern Europe. *Agriculturae Conspectus Scientificus*, Vol. 68, Issue 3. 209-220.
13. Devaux, A., Torero, M., Donovan, J., & Horton, D. (2018). Agricultural innovation and inclusive value-chain development: a review, *Journal of Agribusiness in Developing and Emerging Economies; Bingley* Vol. 8 (1): 99-123. DOI:10.1108/JADEE-06-2017-0065
14. Dobbins, M., Sollmann, R., Menke, S., Almeyda, Z. A., & Broadbent, E. (2020). An Integrated Approach to Measure Hunting Intensity and Assess its Impacts on Mammal Populations. *Journal of Applied Ecology*. Vol. 57, Issue 11, 2100-2111
15. Everitt, B., & Skrondal, A. (2010). *The Cambridge Dictionary of Statistics*. Cambridge University Press, Cambridge. <https://doi.org/10.1017/CBO9780511779633>
16. FAO, IFAD, UNICEF, WFP and WHO. (2020). *The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets*. Rome, FAO. ISBN:978-92-5-132901-6.
17. Gupta, A. (2013). Environment & PEST Analysis: An Approach to External Business Environment. *International Journal of Modern Social Sciences*, 2013, 2 (1): 34-43.
18. Harzing, A. W., & Giroud, A. (2013). *The Competitive Advantage of Nations. An application to Academia*. *Journal of Informetrics*, pp. 23.
19. Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. Illustrated, reprint, revised. New Age

- International. ISBN 8122415229, 9788122415223. P. 401.
20. Mahmoud, H. A. (2008). Risky trade, resilient traders: Trust and livestock marketing in Northern Kenya. *Africa (pe-2011); Edinburgh* Vol. 78, Iss. 4, (2008): 561-581.
 21. Marshall, G., & Parra, A. (2019). Innovation and Competition: The Role of the Product Market. *International Journal of Industrial Organization*, Volume 65, 221-247. <https://doi.org/10.1016/j.ijindorg.2019.04.001>
 22. McPeak, J., & Barret, C. B. (2001). Differential Risk Exposure and Stochastic Poverty Traps among East African Pastoralists. *American Journal of Agricultural Economics*, Vol. 83 (4):674-679
 23. Ndanga, L. Z. B., Quagrainie, K., Ngugi, C. C., & Amadiva, J. (2015). Application of Porter's Framework to Assess Aquaculture Value Chain in Kenya. *African Journal of Food, Agriculture, Nutrition and Development*, 15 (3). 10118 –10137.
 24. Ndzabukelwako, Z., Mereko, O., Sambo, T. V. B., & Thango, B. A. (2024). The Impact of Porter's Five Forces Model on SMEs Performance: A Systematic Review. Department of Electrical Engineering Technology, University of Johannesburg, Johannesburg, South Africa,2092doi: 10.20944/preprints202410.0119.v1. pp. 57.
 25. Roba, G. M., Lelea, M. A., Hensel, O., & Kaufmann, B. (2019). Elusive Profits: Understanding the economic performance of local traders in the pastoral small ruminant value chain in northern Kenya Nomadic Peoples; *Isle of Harris* Vol. 23 (1):78-105. DOI: 10.3197/np.2019.230105.
 26. Ryschawy, J., Disenhaus, C., & Bertrand, S. et al. (2017). Assessing multiple goods and services derived from livestock farming on a nation-wide gradient. *Animal* 2017; 11: 1861–72.
 27. Stanimir, M. (2014). Factors Influencing the Degree of Competition in the Telecom Industry. Dept. of Strategic Planning, D. A. Tsenov Academy of Economics, Bulgaria. ISSN: 2278-3369.
 28. Sürücü, L., & Maslakçi, A. (2020). Validity and reliability in quantitative research. *Business & Management Studies: An International Journal*, 8(3), 2694-2726.
 29. Veysset, P., Benoit, M., & Laignel, G. et al. (2014). Analysis and determinants of the evolution of the performance of sheep for meat and suckler cattle farms in less favored areas from 1990 to 2012. *INRA Prod Anim* 2014; 27: 49–64.
 30. Ward, C. E. (2010). Assessing Competition in the U.S. Beef Packing Industry. A Publication of Agricultural & Applied Economics Association (AAEA), Volume 25 Issue 2.
 31. Watson, D. J., & van Binsbergen, J. (2008). Livestock market access and opportunities in Turkana, Kenya. ILRI Research Report 3. ILRI (International Livestock Research Institute), Nairobi, Kenya. pp. 106.
 32. Yuzaria, D., & Rias, M. I. (2017). Market Structure of Beef Cattle Business in Payakumbuh West Sumatera. *Journal of Advanced Agricultural Technologies*, Vol. 4, No. 4. 324-330. DOI:10.18178/JOAAT.4.4.324-330.