



MARKETING PRACTICES AND COFFEE POST-HARVEST VALUE CHAIN PERFORMANCE AMONG SMALLHOLDER FARMERS IN MOSHI DISTRICT TANZANIA

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Abstract:

Coffee is a dependable source of direct cash income for about four (4) million Tanzanians. Improving marketing practices for smallholder farmers is important in the coffee value chain, especially on the deployment of marketing activities to achieve better coffee post-harvest value chain performance. This empirical study assessed the contribution of marketing practices on coffee post-harvest value chain performance in Moshi District-Tanzania. A cross-section research design was adopted and a sample of 215 coffee smallholder farmers was obtained through multi-stage sampling technique. A questionnaire and key informants' interview guide were used as data collection tools. Qualitative data were analysed through the constant comparison content analysis method. Quantitative data were analysed through descriptive statistics and multinomial logistic regression. It was revealed that marketing transaction costs influenced coffee post-harvest value chain performance in terms of profits, output sales and post-harvest losses. Therefore, it is recommended that the Government and other stakeholders should create favourable marketing environment to smallholder farmers, market liberalisation to allow competition and reduction of marketing transaction costs.

Keywords:

Marketing transaction costs, coffee smallholder farmers, post-harvest value chain performance and Moshi Districts.

1. Introduction

Coffee is one of the leading traded commodities on the global market in both volume and value. In the global market, coffee is a strategic crop since it is a primary source of livelihood for many smallholder farmers (International Coffee Organisation, 2014). Only four (4) countries produce over 60 per cent of the world's coffee: Brazil (34%), Vietnam (14%), Indonesia (8%) and Colombia (7%) (ICO, 2015). Despite its market value, coffee smallholder farmers do not often benefit from sales and marketing, since farmers face high marketing transaction costs, poor marketing channels, price fluctuations and a lack of magnitude in marketing information flow (Zewdu, 2016).

In Africa, Ethiopia is the world's fifth largest coffee producer and Africa's top producer, with estimated coffee production of more than 450,000 tons and a marketable supply of 334,000 metric tons in the farm year 2015/16 (CSA, 2016). However, coffee marketing is still a challenge in Ethiopia, due to poor post-harvest practices including green coffee storage, access to marketing information, distribution, logistics, packing and inadequate infrastructure, too many controls and requirements. Furthermore, the market reforms might have unintended consequences on market performance and coffee quality leading to very high transaction costs. (Duguma et al., 2017; Minten, et al., 2015).

Tanzania's economy depends heavily on coffee production because it is the primary export product of the nation. Between 30,000 and 40,000 metric tonnes of coffee are produced in Tanzania on average each year, with Arabica making up around 70% and Robusta 30% (TCB, 2022). 90% of the coffee farms in the nation are smallholder operations, with estates making up the remaining 10%, according to industry estimates, the coffee business employs around 270,000 people thus supporting the livelihood of an estimated 2.4 million individuals (Mavuno, 2022). The

country is gifted with favourable climatic and natural resource conditions for the production of Arabica (70%) in Kilimanjaro, Arusha, Mbeya, Ruvuma and Mbinga, Tanga, Iringa, Morogoro, Kigoma, Manyara, and Mara while Robusta (30%) mainly produced in the Kagera region (Mavuno, 2022).

However, smallholder coffee farmers in Tanzania are usually exposed to and affected by the challenges such as; volatile price fluctuations in the global market, climate changing, lack the tools, training, bargaining power to create a profitable business as well as the poor performance of institutions responsible for an increase in coffee production (Gongwe, 2022). On the other hand, Coffee smallholder farmers delivered their coffee to primary societies, where they received an initial payment based on the co-operative price schedule provided to all farmers based on the co-operative grading systems. Based on the co-operative payment system, the coffee smallholder farmers will be paid later as per the increments from the auctions (TCB, 2017b).

A review of literature in coffee value chain-related studies (Ismail Srinivas, and Tundui, 2015; Mrema, 2017; Aku, 2017; Rutatola, 2018 and Ntimba and Akyoob 2017), indicates that the sector faces many challenges due to a lack of bargaining power, high marketing transaction costs, limited efforts in market linkage (channels) and poor market information sharing among actors. Reviewed literature focused on determining the challenges within the chain exclusive with their impact on chain performance, factors for the choice of market linkage, benefits and opportunities within the coffee value chain. Therefore, the study assessed the influence of marketing practices on coffee post-harvest value chain performance of smallholder farmers in Moshi District using market information, market linkage and marketing transaction costs influencing coffee post-harvest value chain performance.

The need for improving coffee value chain performance is not sufficiently addressed in Tanzania regardless of some efforts from the government to improve and support the sector. In fact, the coffee value chain in the country has been constrained by poor marketing performance due to the low price offers poor post-harvest handling, high marketing transaction costs, poor governance, poor marketing linkage systems, poor warehousing and storage facilities which have a negative impact on coffee post-harvest value chain performance (Mhando, Haller, Mbeyale and Ludi 2013; TCB, 2017a). Therefore, among the critical challenges facing coffee smallholder farmers in Tanzania are poor market linkages, high marketing transaction costs and lack of reliable marketing information, thus, this study focused on addressing the contribution of marketing practices on coffee post-harvest value chain performance and experience gained from the coffee smallholder farmers in Moshi District

2. Research Methodology

The study adopted a Cross-sectional Research Design. The total number of smallholder coffee farmers were 18623 from six wards (Kirua Vunjo West, Kirua Vunjo East, Uru North Msuni, Uru North Njari, Mwika North and Mwika South). Moshi District was selected among the other seven districts within a region since is the main hub for the coffee trade and also is the leading coffee-producing district in the region for the last 4 years (2014-2018) with a 4496 Tons of Parchment (TaCRI, 2015). The study involved a total of 384 respondents, who were coffee smallholder farmers. The desired sample size was determined using the formula of Fisher et al (1991) $Sample = Z^2PQ/e^2$. The study used proportionate stratified random sampling to obtain a sample size of coffee smallholder farmers within each selected ward. It was possible to use this method since the study population from selected wards had similar characteristics. Strata sample size determined by the following equation $n_h = (N_h / N) \times n$. Questionnaire and key informants interview guiding checklists were used as data collection tools. Both qualitative and quantitative data were collected from coffee smallholder farmers. Coffee smallholder farmers were asked to indicate the extent to which marketing transaction costs incurred influence coffee post-harvest value chain performance from selected wards in the Moshi district. Descriptive statistics: Mean and standard deviation used to indicate a significant relationship between independent variables (transportation costs, information costs and storage costs) and dependent variable (coffee post-harvest value chain performance; sales volume, gross margin and post-harvest losses). The study relied on primary sources of data directly from smallholder coffee farmers in the selected wards through questionnaires and interviews from key informants including district agricultural extension officers, district marketing officers, and Agricultural Marketing Co-operative Societies (AMCOS) leaders. Qualitative data were analysed through the constant comparison content analysis method. Quantitative data were analysed through descriptive statistics with the help of Statistical Package for Social Sciences (SPSS) to generate mean, standard deviation, frequency distribution and percentages. Multinomial logistic regressions were used to establish the existence of the hypothesised relationship

Table 1: Model Definition and Unit of Measurements

Variable Description	Variable Measurement
Access to information	Access to coffee marketing information (1=yes, 0=otherwise)
Sources of information	Marketing information obtained (1=co-operative, 0=otherwise)
Types of information	Marketing information accessed (1=price schedule, 0=otherwise)
Co-operative price schedule	Average coffee price provided (TSH)
Co-operative payment system	Payments on selling coffee (1= if payment is done once, 0= if payment is done more than once)
Co-operative grading system	Methods of grading system
Transportation costs	Cost incurred for transporting coffee to market (TSH)
Information costs	Cost incurred in accessing the marketing information (TSH)
Storage costs	Cost incurred for keeping harvested coffee (TSH)

Sales volume, post-harvest losses and profitability per kg of coffee were used as performance measures to determine the effect of marketing practices on coffee post-harvest value chain performance in the study. Sales volume was measured in kg of coffee sold in a season (Mwagike, 2015). Gross margin as an indicator of efficiency was measured as the difference between market revenue and total coffee post-harvest transaction costs incurred per bag of coffee sold in one season (Mwangi, 2015). Lastly, post-harvest losses were determined by the difference between bags of coffee harvested versus the quantity of coffee final used for consumption or sale per one season (Canwat, 2014).

Table 2: Model Definition and Unit of Measurements

Variable Description	
Co-operative price schedule	average coffee price provided (TSHs)
Co-operative payment system	payments on selling coffee (1= if payment is done once, 0= if payment is done more than once)
Transportation costs	cost incurred for transporting coffee to market (TSHs)
Information costs	cost incurred in accessing the marketing information (TSHs)
Storage costs	cost incurred for keeping harvested coffee (TSHs)

The selected variables in Table 2 were regressed simultaneously holding post-harvest losses as a reference or baseline for the other dependent variable categories. Each coffee post-harvest losses alternative offers some utility that comprises two components (Manski, 1977) as follows:

$$U_{in} = V_{in} + \epsilon_{in} \tag{4}$$

Whereby: U_{in} is the utility derived by the n th individual from choice alternative

V_{in} is the systematic (deterministic) component of utility and ϵ_{in} is the random/stochastic part of utility. The deterministic component of utility can be expressed as:

$$V_{in} = X_{in}\beta \quad (5)$$

Whereby: X is a vector of observable attributes and β are unobservable parameters estimated. Then, probability that an individual n chooses alternatives j or i from the choice set is presented with a normalised scale factor. The MNL (conditional on alternative i being chosen by respondent n) becomes a conditional logit model given by (McFadden, 1973).

Where P_{ij} is probability of farmer j choosing alternative i

Coffee post-harvest value chain performance i : 1 = sales volume, 2 = gross margin and 3 = post-harvest losses

X_i = vector of marketing transaction costs

β_i = the vector of coefficients associated with the market choice

3. Findings And Discussion

3.1. Marketing transaction costs

Table 3, Mean and standard deviation of the study data were 4.62 and 1.16 respectively. Study findings imply that, to a very great extent transportation costs influence coffee post-harvest value chain performance and therefore, when the transportation cost will be maintained, then the post-harvest value chain performance will increase in terms of gross margin earned by smallholder farmers, sales volume and reducing post-harvest losses. Ouma (2011) had similar findings on the influence of transportation costs and post-harvest value chain performance. Also, Rutatola (2018) had a similar observation that, maize smallholder farmers face high transportation costs which at the end influences maize post-harvest value chain performance.

Table 3: Descriptive Analysis for marketing transaction costs (n=215)

Statements on Marketing transaction costs	SA%	A%	N%	D%	SD%	Mean	Std. Deviation
Transportation costs incurred among coffee smallholder farmers is fair and reasonable in your area	24.2	44.7	0.00	31.1	0.00	4.62	1.16
Transportation costs incurred by smallholder farmers influences coffee post-harvest value chain performance	20.9	35.8	12.1	31.2	0.00	3.47	1.13
Information costs has an influence on coffee post-harvest value chain performance	0.00	33.5	9.3	37.7	19.5	2.57	1.14
Costs in accessing marketing information by coffee smallholder farmers influences the gross margin earned	14.9	31.6	0.00	41.4	12.1	2.96	1.34
Storage costs incurred by coffee smallholder farmers influence coffee post-harvest value chain performance	19.5	58.6	12.6	9.3	0.00	3.88	0.82
Storage costs incurred are reasonable and affordable by coffee smallholder farmers	28.4	42.3	0.00	29.3	0.00	3.70	1.17

Overall Mean**3.53****1.12***SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly Agree*

Furthermore, the findings portrayed that, Mean of the study data were 2.57 while the standard deviation was 1.14 which implies that, marketing information costs have a very small extent of influence on coffee post-harvest performance. Similar observations by Alam and Kausar (2016) indicated that information costs are unobservable types of transaction costs which may be difficult to be noticeable during Moshi District was selected among the other seven districts within a region since is the main hub for the coffee trade and also is the leading coffee-producing district in the region for the last 4 years (2014-2018) with a 4496 Tons of Parchment(TaCRI,2015). a given transaction. On the other hand, these study findings are in contrary with the study of Silva, Ratnadiwakara, and Soysa, (2008) which found that information related costs constituted 70% of the total marketing transaction costs, which is 15 % of the total production cost incurred by the smallholder farmers. Also, Omiti, et al., (2009) indicated that there is a significant relationship between market information and sales volume of maize farmers, On the other hand, the study findings are in contrary to Osebeyo and Aye (2014) which found that market information cost influences market participation of maize smallholder's farmers.

From the study findings, it was observed that, a mean and standard deviation of the study data were 3.88 and 0.82 respectively. Study findings imply that to a great extent storage costs influence coffee post-harvest value chain performance. Similar findings observed by Ismail et al.,(2015) that, most of the smallholder farmers incur costs during the storage of their harvested crops which in turn influence the value chain performance in terms of gross margin obtained and post-harvest losses incurred.

The transaction costs theory is useful in explaining the position of marketing transaction costs toward better coffee post-harvest value chain performance. Transaction costs theory assumes to work well, and that the theory is based on the principle that institutions are transaction cost minimizing arrangements that may change and evolve with changes in the nature and sources of transaction costs (Ouma, et al., 2009). This study findings are the sign that the government put more efforts to improve the performance of the coffee value chain by reducing marketing transaction costs from to coffee smallholder farmers through maintaining roads condition as a way to reduce transportation costs from farm to marketplace, authorizing co-operatives as the only market linkage for coffee smallholder farmers to reduce unnecessary middlemen costs and making sure that, coffee marketing information are reliable, available and easily accesses by smallholder farmers to reduce the information costs incurred to a great extent, with an overall mean of 3.53. These findings relate to those of Rutatola (2018), Ismail et al., (2015) and Jagwe (2011) who found that access to reliable marketing information, good nature of road conditions that reduces transportation costs and avoiding the use of middlemen for marketing activities leads into improved better value chain performance.

3.1.1 Model analysis marketing transaction costs and coffee post-harvest value chain performance

Table 4: Parameter estimates

Coffee post-harvest		B	Std. Error	Wald	df	Sig.
value chain performance	Intercept	3.353	1.037	10.459	1	0.001
	T.performance=2	-.429	.572	.562	1	0.453
	T.performance=4	-2.266	.514	.268	1	0.032*
Sales volume	I.performance=1	-.985	.656	2.253	1	0.133
	I.performance=2	-2.177	.655	11.042	1	0.334
	S.performance=2	.829	.688	1.451	1	0.001*
	S.performance=4	.712	.500	2.029	1	0.154

	Costinformation=1	-1.236	.486	6.478	1	0.228
	Intercept	3.432	1.024	11.225	1	0.001
	T.performance=2	-.250	.561	.199	1	0.655
	T.performance=4	.086	.500	.030	1	0.014*
Gross margin	I.performance= 1	-.885	.654	1.830	1	0.176
	I.performance= 2	-1.575	.642	6.015	1	0.086
	S.performance=2	-.142	.659	.046	1	0.830
	S.performance=4	.365	.485	.567	1	0.005*

Note: The reference category = Post harvest losses, Statistically Significant at * (5%), Number of observations = 215, (-) = Negative relationship, (+) = Positive relationship

3.1.2 Sales volume compared to postharvest losses (the referent category)

Transportation costs were negatively and significantly associated with sales volume at 5% significance level. Other things being equal, the probability of influencing sales volume compared to post-harvest losses would be lower by -2.266. Transportation costs incurred by coffee smallholder farmers are more likely to influence post-harvest losses rather than sales volume. This might be due to large costs incurred by smallholder farmers during the movement of harvested coffee from farm to the marketplace that makes farmers incur post-harvest losses compared to sales volume.

Similar observation by Rutatola (2018), among the three transactions, costs variables used in the study transportation costs were found to be the main contributor of high transaction costs incurred by farmers thus affecting post-harvest maize value chain performance more than middlemen and information costs as it had the significant relationship with all the three post-harvest maize value chain performance indicators namely profit, sales and post-harvest losses. Also, the study finding supported by the observation of Kaminski, Elbehri, and Zoma, (2013) explained that there is a significant relationship between transportation costs and maize value chain and competitiveness.

Storage costs were positively and significantly related to sales volume at a 5% significance level. Coffee smallholder farmers who incur storage costs for their harvested coffee have a high probability of influencing sales volume relative to the referent category. The result showed that as farmers incur more storage costs, the probability of influencing sales volume increases by 0.829 contrasting to post-harvest losses in the base category, with other factors remaining constant. The most apparent reason might be the costs incurred during purchasing quality storage materials, and building a special room to keep the harvested coffee before the selling time source of marketing Wilson & Lewis (2015) had a similar observation to this study finding that, storage costs incurred by smallholder farmers influence value chain performance.

3.1.3 Gross margin compared to postharvest losses (the referent category)

Transportation costs were positively and significantly related to gross margin at 5% significance level. Coffee smallholder farmers who incur transportation costs for their harvested coffee have high probability of influencing gross margin relative to the referent category. The result showed that as farmers incur more transportation, the probability of influencing gross margin increases by 0.086 contrasts to post-harvest losses the base category, other factors remaining constant. The most noticeable reason might be the costs incurred during the movement of harvested coffee from farm to market place and this is due to nature of the road conditions which are not friendly during rainy seasons. This finding is in line with the study of Ismail et al., (2015) and Canwest (2014) which pointed out that, the nature of the road conditions and the longer the distance from respondent households to the market the higher the transportation costs incurred.

Storage costs were positively and significantly related to gross margin at 5% significance level. Coffee smallholder farmers who incur storage costs for their harvested coffee have a high probability of influencing gross margin relative to the referent category. The result showed that as farmers incur more storage costs, the probability of

influencing gross margin increases by 0.365 contrasting to post-harvest losses the base category, with other factors remaining constant. Study Finding in line with, Chokera (2011) and Minten, Dereje, Engida and Kuma (2015) that, storage costs incurred by smallholder farmers influence coffee value chain performance.

Basing on multinomial regression outputs (p-values) showing that, there is a significant influence. The null hypothesis that there is no significant relationship between marketing transaction costs and coffee post-harvest value chain performance was rejected. This implies that, marketing transaction costs in terms of access to marketing information costs, transportation costs and storage costs support the alternative hypothesis that, there is a significant association between marketing transaction costs and coffee post-harvest value chain performance. Similarly, Rutatola (2018) came up with the same observation.

4. Conclusion And Recommendations

Based on the study findings, marketing transaction costs were observed to influence coffee post-harvest value chain performance at $2.57 \leq \text{mean} \leq 4.62$ with a mean of 3.53. MNL results showed that transportation costs were negatively and significantly at 5% significant level in sales volume in relation to post-harvest losses. Storage costs were positively and influenced sales volume at 5% significant level compared to post-harvest losses. Furthermore, the findings revealed that both transportation costs and storage costs were positive and significant at 5% in gross margin relative to post-harvest losses the referent category. Therefore, based on logistics results, the null hypothesis was rejected and the alternative hypothesis was accepted.

Moreover, the study found and concluded that marketing transaction costs have a significant and positive influence on coffee post-harvest value chain performance. The study further concluded that to a great extent marketing transaction costs: transportation costs, information costs and storage costs have influence on coffee post-harvest value chain performance. The study hence concluded that marketing transaction costs enhances coffee post-harvest value chain performance in terms of sales volume, gross margin earned by farmers and post-harvest losses incurred by farmers. Marketing transaction costs were observed to influence coffee post-harvest value chain performance. The study recommends that co-operatives through the coffee board should establish the Central Processing Unit (CPU) for coffee smallholder farmers to use that centre for storage activities. The centre will ensure that all harvested coffee in a particular area will be collected together, stored and processed in a single place which will ensure the increment of coffee quality to a very large extent since there will be a proper storage area, equipment which does not allow any coffee contaminations, reduction of storage costs and unnecessary post-harvest losses. The study recommends that there should be a coffee market liberalisation to involve the use of more than one market channel to increase competition. On top of that, the Government should provide subsidies to smallholder coffee farmers to reduce the general transaction costs to improve the value chain performance. The study focused only on three marketing practices namely marketing information, market linkages and marketing transaction costs, thus other researchers can further assess other marketing practices such as distribution, branding, and labelling their influences on coffee post-harvest value chain performance.

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