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Factors Influencing Choice of Differentiation Strategy among Small-Scale Potato Enterprises in Nakuru County, Kenya

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Abstract
Potato crop plays a crucial role in national food nutrition and ensures food security that alleviates poverty among small-scale potato farmers in Kenya. Potato farming is characterized by several constraints leading to declining production and yields in Kenya. This paper determined factors influencing the choice of differentiation strategy among small-scale potato enterprises in Nakuru County, Kenya. The study used a descriptive research design to produce statistical information about factors influencing differentiation strategy among small-scale potato enterprises. A semi-structured questionnaire was used to elicit information from a sample of 267 respondents in Molo Sub County where the primary data collected was analyzed using the probit regression model. The study findings indicate that age, education level, farmer group, access to storage, proactiveness behaviour, and cosmopoliteness behaviour influenced the choice of differentiation strategy among small-scale potato enterprises. It was concluded that participation in farmer groups and access to a storage facility and entrepreneurial behaviour skills drive small-scale potato farmers to build and maintain a sustainable competitive advantage in the small-scale potato enterprises in Nakuru County. The government needs to provide technical assistance, credit support, and provide storage facilities for potato farmers to improve competitiveness in the small-scale potato enterprises.
Key Words: *Behaviour, cosmopoliteness, differentiation, enterprise, proactiveness, strategy*

1. Introduction

Competitive advantage is a key driver for the continuous survival and growth of agribusiness firms (Porter, 1985). Porter postulates that an agribusiness firm creates its business strategies to obtain a competitive advantage over its competitors in the same agro industry. The main aim of every agribusiness industry is to compete and outperform its rivals. This is achieved when the farm enterprise uses its resources and capabilities to obtain a low-cost structure or use a different product to position itself in the industry (Yamin *et al.,* 1999). According to Porter (1990), cost leadership, differentiation, and focus strategy have been identified as the main competitive strategies adopted to improve a company's competitive position.

Differentiation strategy is the second generic competitive strategy where an agribusiness firm seeks to be unique in its agro-industry. This competitive strategy can be viewed as a defensive mechanism employs by agribusiness firms to create competitiveness that outperform its competitors (Porter, 1980). This competitive strategy enables the customer to consider the agricultural company's product to have unique characteristics that enhance the customer to increase his willingness to pay for the product based on its value and uniqueness (Porter, 1985).

In a differentiation strategy, an agribusiness firm attempts to differentiate the farm produce that has more product attributes that potential buyers perceive as important and rewarded for its uniqueness with a premium price (Stark *et al.,* 2002). Differentiation strategy makes agricultural companies distance themselves from mass producers in the agro-industry. It has also made companies achieve superior product quality throughout the agricultural value chain. Not only do most agricultural companies employ a differentiation strategy to maximize profit but adoption of this strategy also promotes higher product quality which leads to greater market demand (Porter, 1985).

In this study, the differentiation is based on different potato varieties grown and marked by small-scale potato enterprises. This generic strategy makes potato enterprises achieve and sustain a competitive advantage. Entrepreneurial potato farmers can be regarded as differentiators because they always seek various ways of differentiating their farm produce that lead to a premium price greater than the cost of differentiating. In addition, potato farmers aim at cost parity to their competitors by reducing cost in all areas that do not affect differentiation. The differentiation strategy requires that the agribusiness firm choose product attributes in which to differentiate itself that is different from its rivals. An agricultural firm seeks differentiation in its target segment and focuses on the special needs of buyers in certain market segments.

Conversely, agriculture is the major driver of Kenya's economic growth contributing 51% of the country's Gross Domestic Product (World Bank, 2018). The sector employs more than 40% of the total population and 70% of the rural population solely depend on the sector for their livelihoods and survival (Agricultural Transformation and Growth Strategy, 2019). Irish potato (*Solanum tuberosum*) is a major economic crop and the fourth most cultivated and consumed food crop after cereal crops (Sharma *et al.,* 2014). This tuber crop is grown on about 20 million hectares in over 158 countries (World Potato Congress, 2020) with an annual production of 320 million tonnes (Muthoni *et al.,* 2013). In Sub Saharan Africa, Kenya is the fifth largest producer of potatoes with an annual production of 1.4 million tonnes worth Kenya Shillings 30 to 40 billion annually (KEPHIS, 2019). The potato sector contributes about 1.9 % of the economy's GDP (Mwangi *et al*., 2013). Potato is an important food security and cash crop for 3.8 million smallholder farmers in the highlands of Central, Eastern, and Rift Valley (KEPHIS, 2019). The crop is second to maize and grown between 1800-3000 m above sea level by 800, 000 small scale farmers with an annual production of 1 million tonnes per two seasons (KEPHIS, 2019). It has been reported that potato crop plays a crucial role in national food nutrition and ensures food security that alleviates poverty among small scale potato farmers (MOALFI, 2016). Potato production has been increasing in recent times due to competition in the global food markets as a result of urbanization and consumer demand for food products.

Despite this, potato farming is characterized by several constraints leading to declining production and yields at a rate of 11% per year in Kenya (FAO, 2010). NPCK (2015) documented that the national average potato yield in Kenya is below 10t/ha against a potential of 40t/ha to 50t/ha mainly due to the use of poor-quality seeds. To address this potato production situation, small-scale potato farmers need to increase their level of competitiveness to achieve a competitive advantage in the potato sector. This is to ensure that the potato sector positions itself strategically to survive, grow and compete in the increasingly competitive potato market. Small-scale farmers' ability to grow different potato varieties in their farm enterprises is the key to promoting competitive advantage. Therefore, attaining sustainable competitive advantage is of great importance to the small-scale potato farmers to ensure that their farm enterprises remain profitable and viable to ensure food security and nutrition of the country.

2. Research Methods

The study was conducted in Molo Sub County located in the Nakuru County in 2019. This County is a major potato producing zone in the Central Rift Valley (Government of Kenya, 2018). The study used a cross-sectional survey research design with a multistage sampling technique to sample the respondents. A semi-structured questionnaire was used to elicit information from 267 respondents with the help of trained enumerators and analyzed using STATA version 15. In this study, we operationalize differentiation by $y_i = 1$ if the farmer produces different potato varieties and $y_i = 0$ if the farmer did not produce other varieties. The predicted probabilities are then constrained to lie between $0\ and\ 1$. With the probit model only the values of $0\ and\ 1$ can be observed for y_i, but there is a latent variable y_i^*that determines y_i (Abdul-Hanan and Anang, 2018). The probit model is specified as

$$E(y_i|x_i) = 1[F(\beta' x_i)] + 0[1 - F(\beta' x_i)] = F(\beta' X_i) = \emptyset(\beta' x_i \quad (1)$$

Where $\emptyset$, the cumulative distribution function of the standard normal distribution is x_i represents a vector of random explanatory variables and β is a vector of parameters to be estimated. We specify the empirical model of the probit regression as follows:

$$y_i^* = \beta_0 + \beta_1 x_1 + \beta_2 x_2 \ldots + \beta_n x_n + \varepsilon_i \quad (2)$$

Where y_i^*; the latent variable representing production of different potato varieties is, x_i is a vector of explanatory variables, β_0 is a vector of unknown parameter and ε_i is a random disturbance term.

The latent variable(y_i^*) is related to the observable binary (y_i) through the expression:

$$y_i = \begin{cases} 1\ if\ y_i^* > 0 \\ 0\ if\ y_i^* \leq 0 \end{cases} \quad (3)$$

Due to the non-linearity of the probit regression model, parameters that do not represent the marginal effects are more informative and easier to understand and explain. The results of the marginal effects provide useful guidelines for decision-making. The marginal effect is the differential of the equation with respect to 1 to x_i.

$$\frac{\partial y_i}{\partial x_i} = \left[\frac{\lambda\beta' x_i}{(1+\lambda\beta' x_i)^2}\right]\beta_i = F(\beta' x_i)[1 - F(\beta' x_i)]\beta_i = \emptyset(\beta' x_i)\beta_i \quad (4)$$

Where $\emptyset$ denotes the probability density function of the standard normal distribution.

Table 1: Description and measurement of variables used in the probit model

Variable	Description	Measurement	Hypothesizes sign
Dependent variable			
Diff	Production of different potato variety	1 if produce different variety, 0 otherwise	
Independent variable			
Age	Age of respondent	Years	+
Educ	Education level	Years in schooling	+
Hszi	Household size	Number of members	+
Exp	Farming experience	Years	+
Sto	Storage facility	1 if access storage, 0 otherwise	+
Cr	Access to credit	1 if access credit, 0 otherwise	+/-
Tri	Access to training skills	1 if access to training, 0 otherwise	+
Grp	Access to group	1 if access farmer group	+/-
Ris	Risk-taking ability	Mean of risk-taking attribute	+/-
Pro	Proactiveness behaviour	Mean of proactive attribute	+/-
Inn	Innovativeness behaviour	Mean of innovative attribute	+/-
Inf	Information-seeking	Mean of information-seeking attribute	+/-
Cos	Cosmopoliteness	Mean of cosmopolite attribute	+/-
Des	Decision-making	Mean of decision-making attribute	+/-

3. Results and Discussions

Table 2 provides descriptive results of socio-economic characteristics of small-scale potato farmers in the Molo Sub County, Kenya.

Table 2: Descriptive statistics of categorical variables

Categorical variables	Frequency	Percent
Access to credit		
Yes	82	30.71
No	185	69.29
Group membership		
Yes	97	36.3
No	170	63.7
Training skills		
Yes	109	40.8
No	158	59.2
Access to storage		
Yes	96	36
No	171	64

The results in Table 2 show that female farmers participate more in the potato farm activities than male farmers in Molo Sub-County because the majority of them own farm lands with title deed and make their own decisions on what to produce for the consumer market. According to Taiy *et al.* (2016) males participate more in potato enterprises in Mauche ward of Nakuru County than female potato farmers. Their study found that men had more access to productive resources and take part in decision-making compared to women.

This study found that only a few respondents had access to farm credits from financial institutions while the majority did not access farm credits. The farm credit was taken for purposes of purchasing farm inputs in order to support the potato enterprises this made those farmers gain a more competitive advantage and improve the performance of potato farm enterprises. It is argued that access to farm credit allows small scale potato farmers to invest confidently in the potato farm enterprise activities through purchasing of improved seed varieties, fertilizers, agro chemicals and labor wage leading to high potato productivity and increased farm incomes (Abitew *et al.,* 2015; Akudugu, 2018).

The study found that less than half of the respondents attended entrepreneurial training programmes from institutions and organizations in the potato value chain on a quarterly basis. This implies that the respondents who accessed training most likely improved their farm enterprises because the training programmes opened new avenues and opportunities to adopt improved seed varieties, production practices and techniques resulting in increased productivity and farm incomes for the smallholder potato farmers (Ahmad *et al.,* 2007).

Again, the study revealed that respondents who belonged to farmer groups received training on entrepreneurial skills, adoption of modern production methods and use of new seed varieties, accessed farm credits and purchased farm inputs at subsided prices. These respondents were also linked to potato markets resulting in the improvement of their potato farm enterprises. Tolno *et al.* (2015) and Mwaura (2014) report that membership to farmer groups enhanced potato productivity levels through the adoption of new agricultural technologies, linking of farmers to output market and increasing farm incomes. Etwire *et al.* (2013) posited that effective membership to farmer groups enables members to have competitive advantages over individual farmers in terms of purchasing power, lobby and economies of scale in the agricultural production and marketing activities.

As shown in Table 2, the study showed that some of the respondents who stored potatoes using traditional storage facilities, cold stores, diffuse light stores and concrete floor stores ascertain competitive advantage. These small-scale farmers stored potatoes to get good prices when there is a limited supply in the market. Manyasa (2015) recommends that small-scale potato farmers need to store potatoes for at least three months to smoothen supply and obtain steady market prices in Kenya. FAO (2013) reported that storing potatoes produce for future consumer markets enables the country to have sustainable food security.

Table 3: Descriptive statistics of continuous variables

Continuous variable	Mean	Std. Deviation	Minimum	Maximum
Age	44	13	20	75
Education level	9.6	3.16	0	16
Household size	4	2.0	1	15
Total land size	2.5	2.4	0.13	25
Farming experience	10.2	8.64	1	42
Entrepreneurial behaviour				
Risk taking	2.35	1.16	1	5
Proactiveness	3.02	1.28	1	5
Innovativeness	2.88	1.60	1	5
Information seeking	3.50	1.63	1	5
Cosmpoliteness	2.95	1.42	1	5
Decision making	3.09	1.34	1	5

The results in Table 3 reveal that most of the respondents were middle-aged farmers which may affect farm-level decisions and participation in farmer group activities. The study observed that majority of the farmers are in their productive ages (36-45 years) which could play a vital role in ensuring competitiveness and improving farm performance through the adoption of better farming techniques and better managerial skills (Kumar, 2016; Ondiba *et al.* 2019).

The findings show that majority of respondents had at least basic education which could make them to read and understand basic concepts about climate changes, new production methods, access to marketing information and linkages. It would help farmers get exposed to more knowledge on the adoption of improved seed varieties leading to increase potato production and supply (Esiobu *et al.,* 2015). This finding is similar with the finding of Taiy *et al.* (2016) who cited that most of the smallholder potato farmers in Kenya had a primary education level enabling them read and understands basic agricultural concepts.

As shown in Table 3, most of the respondents had a small farm household size meaning that an additional one member would be used as a source of active farm labor for farmers to address labor challenges in the potato enterprises (Abitew *et al.,* 2015). The results disagree with Gurjar *et al.* (2017) who opined that the majority of tribal winter vegetable farmers had large family-sizes of 5 members in the Jorhat district of Assam. The result reveals most of the respondents owned small land which can be used to cultivate different potato varieties. The findings concur with Boruah *et al.* (2015) who found that the majority of the vegetable farmers possessed small farmland.

The study indicates that most of the respondents in the study area had a relatively high farming experience in the potato farm enterprises which would enhance their grading skills, sorting skills, and adoption of improved potato varieties for constant production. Small scale farmers with high farming experience are expected to be more knowledgeable and skillful about climatic conditions and development of entrepreneurial behaviour and successful in their potato farm enterprises (Esiobu *et al.,* 2015).

Most of the respondents interviewed were risk-aversers. This implies that small-scale potato farmers take agricultural risks in trying new production techniques and technologies. This good entrepreneurial behaviour enables potato farmers in accepting modern agricultural production methods leading to the improvement of their farm productivity and profitability. The finding concurs with the findings of Ram *et al.* (2013) who pointed out that the majority of the vegetable growers had high risk-taking behaviour in India.

This study found that the majority of the respondents were proactive in the farm enterprises. This means that most of the potato farmers identified market opportunities ahead of other farmers to introduce new potato varieties to meet market demand. This entrepreneurial behaviour enables farmers to produce more potato varieties for the consumer market. The result is not consistent with Hajong (2014) who established that the majority of smallholder farmers possessed very low proactiveness behaviour in India.

In the study area, respondents were innovators in potato farm enterprises. The results show that most of the farmers were innovative in using locally available materials to control weeds, pests, and diseases leading to reduction in the cost of production. The finding is in line with Mariammal and Seethalakshmi (2017), who found that the majority of dairy women farmers had a high level of innovativeness behaviour in Tamil Nadu.

The study results show that respondents sought information from both informal and formal sources concerning potato farm enterprises. This entrepreneurial behaviour skill led to access to relevant information from agricultural extension officers resulting in high potato production. The findings are similar with the findings of Boruah *et al.* (2015), who discovered that most of the small-scale farmers had high information-seeking behaviour in the Jorhat district of Assam.

According to the study, most of the respondents had good cosmopoliteness behaviour which means that small-scale potato farmers attend agricultural shows and field days outside their farm environment to improve their farm enterprises. This entrepreneurial behaviour enables small-scale potato farmers in joining famer groups to access information, get farm inputs at subsided prices and market potatoes collectively. The findings disagree with studies conducted by Mariammal and Seethalakshmi (2017), which indicated that dairy farmers possessed a low level of cosmopoliteness behaviour in Tamil Nadu.

The results show that most of the respondents made informed decisions concerning the growing of certified seeds in the potato farm enterprises. The ability to make appropriate production decisions results in the use of certified seeds that lead to high potato productivity and profitability. The findings agree with Boruah *et al*. (2015), who indicated that the majority of vegetable producers possessed good decision-making ability in the Jorhat district of Assam.

Table 4: Descriptive statistics on the choice of differentiation strategy among small scale potato enterprises in Rift Valley, Kenya (n=267)

Competitive advantage strategy	Frequency	Percent
Differentiation		
Yes	91	34.1
No	176	65.9

Production and marketing of different potato varieties are one of the pathways individual smallholder potato farmers could adopt to build a competitive advantage in the small-scale potato enterprises (FAO, 2013). As shown in Table 4, only a few respondents attained competitive advantage strategy in producing and marketing different potato varieties such as Kenya Karibu, Kenya Mypa, Jelly, and Shangi. The study found that the majority of the respondents have a competitive disadvantage because they produced and marketed only one potato variety known as Shangi due to its early maturity, ready market and resistance to pests and diseases, and adaption to climatic conditions. It could be due to small-scale potato farmers' lack of information-seeking behaviour and poor decision-making behaviour. The findings disagree with Merga and Dechassa (2019) posited that smallholder farmers in Ethiopia gained competitive advantage through the use of improved potato variety to achieve the better yield, increase their farm profits and income generation.

Factors influencing the choice of differentiation strategy

Probit model was used to determine factors influencing choice of differentiation advantage strategy among small-scale potato enterprises. Prior to the analysis, pretests such as multicollinearity, normality and heteroscedasticity tests were conducted on the data to solve problems misspecification.

Table 5: Estimated probit results on factors influencing choice of differentiation strategy of small-scale potato enterprises in Molo Sub County, Kenya (n=267)

Variable	Marginal effect	Coefficient	Standard error	P>|z|
Age	-0.005	-0.016*	0.009	0.075
Education level	-0.023	-0.078**	0.031	0.011
Household size	-0.009	-0.032	0.043	0.456
Farming experience	-0.005	0.010	0.013	0.442
Access to credit	0.003	-0.028	0.234	0.906
Access to training	-0.008	0.305	0.273	0.264
Total land	0.088	-0.018	0.039	0.653
Farmer group	0.243	0.840***	0.254	0.001
Access to Storage	0.100	0.345*	0.196	0.079
Risk-taking ability	-0.021	-0.073	0.071	0.303
Proactiveness behaviour	0.079	0.272***	0.079	0.001
Innovativeness behaviour	0.015	0.051	0.070	0.470
Information seeking-behaviour	-0.014	-0.050	0.067	0.454
Cosmopoliteness behaviour	0.057	0.198**	0.092	0.031
Decision making ability	0.015	0.051	0.088	0.565
Cons	0.068	0.721	0.924	

Log-likelihood	-136.83
Wald chi2(15) =	68.95***
Pseudo R2 =	0.20

Note: * ** * statistically significant at 1, 5 and 10%**

As shown in Table 5, the results indicate that the age of small-scale potato farmers had a negative and significant effect on differentiation at 10% level. A unit increases in additional year reduces the probability of planting different potato variety by 0.015. This is so because old small-scale potato farmers were not able to take risk to produce different potato varieties demanded by the consumer market to build and maintain a sustainable competitive advantage. It could be due to that most of the respondents interviewed fall under the middle age group and were females. The finding disagrees with Donkor *et al.* (2019) whose study reveals that age plays a crucial role in influencing smallholder rice farmers' decision to adopt and use improved technologies in rice production and marketing in Ghana.

The education level of small-scale potato farmers was found to have a negative and significant influence on differentiation at 5% significance level. A unit increase in years spent in school decreased the probability of producing different potato varieties by 0.078. The likely explanation for this is that access to formal education does not provide potato farmers with more knowledge about adopting improved potato seed varieties. The study found that majority of these farmers do not access information from extension officers and participate in farmer group activities to learn about new seed production techniques to adopt. The findings of the study disagreed with that of Mersha and Demeke (2017) who stated that farmers who were empowered with more knowledge and best skills through education, employed effectively in the potato enterprises increase in farm productivity in Ethiopia.

Group membership of small-scale potato farmers had a positive effect on differentiation at 1% significance level. A unit increase in one member increases the probability of planting different potato varieties by 0.842. The main reason is that some of the respondents in farmer groups had more market information about consumer demand for more varieties. The results are consistent with the findings of Donkor *et al.* (2019) and Oyo and Baiyegeunhi (2018) who found that smallholder rice farmers that belonged to farmer-based organization adopt new agricultural technologies in the Upper East and Northern Region of Ghana and adapt to different climate changes in rice production in Nigeria.

Having access to storage facilities was found to negatively influence differentiation at 10% significance level. A unit increase in additional storage facility decreases the probability of producing different potato varieties by 0.349. This shows that small-scale potato farmers who had access to storage facilities store potatoes and sell within three months got low farm income. The reason is that stored potatoes lose their quality and quantity due to the type of storage facility used during storage. Most of the respondents used traditional storage structures. The findings disagree with Tadesse *et al.* (2018), Kiaya (2014) and Kitinoja and Alhassan (2012) who stated that storing potatoes for the future market make potato farmers more competitive and increase food accessibility and availability which tend to ensure food security across Africa.

The proactiveness behaviour of small-scale potato farmers had a significant effect on differentiation at 1% significance level. A unit increases in proactiveness behaviour score increases the probability of engaging in other farm enterprises by 0.270. The explanation is that potato farmers who exploited more market opportunities had a market for their new potato varieties produced. The finding is in agreement with Shalla (2017) and Kraus *et al.* (2012) cite that entrepreneurs who proactively create and build a sustainable competitive advantage in Small and Medium Enterprises leading to enterprise growth and development.

Cosmopoliteness behaviour for small-scale potato farmers positively influenced differentiation at 5% significance level. A unit increase in cosmopoliteness behaviour score increases the probability of differentiation by 0.193. This means that potato farmers who had cosmopoliteness behaviour used this behaviour in producing different potato varieties to satisfy market demand. The result is in line with the findings of Lodhi (2017) who found that cosmopoliteness behaviour motived smallholder farmers to run their micro-enterprises efficiently and effectively in Raipur district, India.

4. Conclusions and Recommendations

The study concludes that age and education level of small-scale farmers, membership to farmer group, and access to a storage facility, proactiveness behaviour, and cosmopoliteness behaviour influence choice of differentiation strategy among small-scale potato enterprises in Molo Sub County, Kenya. It is recommended that small-scale potato farmers need to participate more in farmer groups to receive training on the adoption of improved seed varieties and production techniques in the small-scale potato enterprises. The government in partnership with the private sector should provide technical assistance, credit support, and storage facilities for potato farmers to enhance the competitive advantage of small-scale potato enterprises.

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