INSTITUTIONAL FACTORS INFLUENCING STRATEGIC CHOICE IN THE TEA SUB SECTOR IN KENYA

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Abstract

Tea subsector in Kenya shows declining profitability due to rising cost of production that is largely wage bill driven. Firms have sought to mitigate this by adopting mechanical tea harvesting technology. The uptake of this technology is surprisingly varied. The study sought to establish the influence of institutional factors namely, firm size and managerial skills on adoption of the technology in Kenya's tea subsector. The target population was therefore tea plantation firms. A descriptive explanatory survey design was used where both quantitative and qualitative data was collected by employing census technique due to small nature of the target population. Data analysis was done using descriptive and inferential statistics. F value of 72.023, significant at p<0.01 and R square of 0.83 was obtained indicating good fit and a high predictive model. Both firm size and managerial skills variables were significant at p<0.01 but had negative and positive effect on adoption respectively.

Key words: Mechanical tea harvesting technology, firm size, managerial skills, strategic choice

1 Introduction

1.1 *Background of the study*

Technology provides an opportunity for businesses to improve their efficiency and effectiveness and even to gain competitive advantage. Adopting of technology however requires resources and also presents with it a lot of uncertainties and risks (Rahab & Hartono, 2012). A decision to pursue a specific technology is of strategic importance. Strategic choice is important to individual organizations at a micro level (Astley & Van de Ven, 1983). In the strategic choice perspective, decision makers in the organization have the power to decide on structural arrangements and courses of strategic action. The intended strategy must take cognizance of the organizations parameters (Heracleous, 2003). The technological innovation and adoption therefore must take into consideration these parameters. Rahab and Hartono (2012) points out variables that are possible determinants of organizational adoption of an innovation to include organizational characteristics such as firm size and employee's knowledge. Child (1997) intoned that institutional forces determining choice can be internal. Bowman and Elfat (1998) linked performance in business organizations to strategic choice and action. It is clear from the foregoing therefore that the level of dependency of a firm on institutional elements is critical in its strategic choice.

1.2 *Statement of the Problem*

Tea is the leading foreign exchange earner in Kenya. It earned the country Kshs 104 billion in 2013 (RoK, 2014). It also employs directly and indirectly an estimated ten percent of the population (TBK, 2008). The greatest challenge in the tea subsector however has been identified as high labour cost. Labour costs constitute about 55% of total cost of production out of which 75% relates to the manual harvesting of the crop (Van de Wal, 2008). The high labour cost coupled with declining tea prices (Ongong'a & Ochieng, 2013) depicts a picture of declining profitability. This is a threat to industry's survival and spells doom to the livelihoods that depend on the subsector.

It is against this backdrop therefore that the tea subsector players must pursue appropriate strategies in order to mitigate against high labour cost and therefore ensure sustained viability of the business. Tea subsector has identified mechanical tea harvesting (MTH) technology as a technology which is relatively labour efficient (Van de Wal, 2008). A comparative analysis show that mechanical tea

harvesting is approximately 50 percent cheaper compared to manual tea harvesting (Maina & Kaluli, 2013). RoK (2014) statistics shows that 432 million tons of made tea was produced in Kenya in 2013. This translates to 1838 million tons of green leaf. Assuming a 100% adoption of MTH technology, the potential annual saving to the entire subsector based on hand harvesting rate per kg of Kshs 11.64 (EPK-KPAWU CBA, 2012) is a massive Kshs 10.7 billion. It is perplexing to note therefore that despite the existence of such a potentially viable strategy, there is still low adoption in Kenya as shown by Maina and Kaluli (2013).

This study therefore sought to investigate the aspects of institutional factors that influence strategic choice in the Kenya's tea subsector in the context of adoption of MTH technology. Besides; the nature of relationship between the institutional factors and strategic choice in the tea subsector remains largely unexplored.

1.3 Objective of the study

The main objective of the study was to investigate the institutional factors influencing strategic choice of adoption of mechanical tea harvesting (MTH) technology in the tea subsector in Kenya.

The study addressed the following specific objectives;

1. To determine how firm size as component of institutional factors influence the adoption of mechanical tea harvesting technology in the tea subsector in Kenya.
2. To investigate whether managerial skills as part of institutional factors influence the adoption of mechanical tea harvesting technology in the tea subsector in Kenya.

1.4 Hypotheses

$1H_0$: There is no significant relationship between firm size and adoption of mechanical tea harvesting technology.

$2H_0$: There is no significant relationship between managerial skills and adoption of mechanical tea harvesting technology.

2 Literature review

2.1 The Independent Variable: Firm size

Kimberley and Evanisko (1981) opines that innovation adoption is positively related to organizational size. Kelley and Helper (2006) posit that a firm's propensity to adopt a new technology is a function of organizational capabilities related to size. Mole et al (2004) posits that firm size is important partly

because of its role as the source of capabilities. Dosi (1988) conceive that heterogeneity in the size of businesses affects the expected profitability of the innovation among firms thus explaining variation in adoption of new technology among businesses.

The importance of firm size is further affirmed by Schumpeter (1912) who argues that large firms are more likely to undertake innovation because larger firms are more likely to have the financial resources required for purchasing and installing a new technology. Furthermore a firm will have an incentive to invest in a new technology only if it can later obtain profits that justify the initial investment. Hall (2002) argues the potential risks associated with the use and development of new technology affects the speed diffusion and large firms are sometimes better able to spread the potential risks associated with new technology. The relationship between size and adoption behaviour however is not always positive and should not be assumed to be so. A negative relationship sometimes does exist (Kimberly and Evanisko, 1981).

Thong (1999) showed that approximation of firm size can be done using firm's resources including financial and human capital. Love et al. (2005) have also argued that business size can be measured by the number of employees

and sales volume. The operationalization of the firm size variable in the study used number of employees in the firm.

2.2   Independent Variable: Managerial Skills

Prahalad and Hamel (1990) posit that capabilities and competences in a firm will require the viewing of assets and resources of the firm from a knowledge-based perspective. Caldera and Ward (2001) argue that development of skills, organizational learning and technology integration are the mechanisms by which firms learn and accumulate new skills to outperform competitors. The skill level of workers is an important determinant of diffusion of a technology to individual firms. Workers are crucial for successful implementation and operation of a new technology. Adoption of new technology might be slow if it requires complex new skills (Hall & Khan, 2002). Kelley and Helper (2006) propounded that previous experience with related technologies influences adoption of technology. This is because such experience makes it easier for managers to avoid costly disruptions of production, or at least anticipate their occurrence and hence minimize their effects. This experience should lead to lower costs of adoption, hence increasing its probability.

Harisson, Kelley and Gant (1996) argue that a complementary body of theory on the differential capacity of firms to absorb and make good use of new technical information emphasizes differences in internal expertise. Rahab and Hartono (2012) argue that obstacles in developing of necessary skills and technical knowledge make many businesses to postpone adoption of the innovation until they have sufficient internal expertise.

In this study, management skills were measured using the experience in years management and the organization had interactively acquired in pursuing mechanization. This was based on the observation by Kelley and Helper (2006) that previous experience in similar technologies influences adoption of technology.

2.3   Dependent Variable: Adoption of mechanical tea harvesting technology

Rodgers (1995) argues that all firms or individuals who get exposed to technology must make a decision about whether to adopt or reject. This can be done instantaneously or through a process. Rodgers further pointed that decision makers of technology adoption consider relative advantage offered by the technology, aspects of compatibility complexity, trialability and observability.

Adoption of technology can therefore be seen as the cumulative or aggregate result of a series of individual calculations that weigh the incremental benefits of adopting a new technology.

Tea harvesting operation is very critical and constitutes a significant percent of cost of production. The tea crop is largely harvested manually. Mechanical tea harvesting technology is therefore a comparatively labour efficient tea harvesting technology. It offers quick and enhanced labour productivity and reduces the cost of harvesting.

In the study, technology adoption was measured by computing the proportion of total production in tea plantation firm that was harvested mechanically.

3   Research methodology

3.1   Research Design

Explanatory research design was used in this study. The design was considered appropriate because the study sought to determine relationship between variables. Explanatory design focus on developing causal explanations in a not so well understood relationships.

3.2 Sample and Sampling procedure

The target population was all tea producing firms in the plantation segment in the tea subsector in Kenya totalling 42 (Source-AFFA, Tea Directorate, November 2014). Due to the small size of the target population, census approach was used. The target respondents were therefore 42 members of management in the top, middle or junior cadre in each organization. The management were regarded as the most suitable since they are important in decision making and also in the implementation of any new technology in their enterprise.

3.3 Research Instrument and Data collection

Questionnaires consisting of structured and open ended questions were used to collect primary data. The structured questions were designed to collect some quantitative data whereas the open ended questions were designed to capture opinions of the respondents with regards to the variables under investigation. Once administered, the questionnaires were coded, checked for completeness and consistency. The questionnaires were then analyzed using both descriptive and inferential statistics in which statistical package for social sciences (SPSS) tool was employed.

Correlation analysis was carried out to establish the nature of association between the independent variables and the dependent variable. This was then followed by regression analysis which was aimed at determining predictability of the dependent variable of adoption of mechanical tea harvesting technology by the independent variables of firm size and managerial skills

4 Results and discussion

The objective was to establish the institutional factors that influence the strategic choice in the context of mechanical tea harvesting technology in the tea subsector in Kenya. Out of 42 questionnaires that were distributed, 31 were completed and returned. This represented a response rate of 73%. This was considered adequate based on Mugenda and Mugenda (2003) who together with Bailey (2000) asserted that a response rate of 50% is adequate.

The variables data was first summarized using of descriptive statistics i.e. mean, standard deviation and minimum and maximum values as shown in Table 1.

	MTH Adoption	Managerial Skills	Firm Size
Mean	32.10	3.61	2061.97
Std. Deviation	35.893	3.972	3178.660
Minimum	0	0	40
Maximum	100	12	13000

Table 1: Descriptive statistics

4.1 Qualitative analysis

Table 2 indicates that 80.6% of the respondents perceived that firm size has influence on the adoption of MTH technology. The nature of influence as captured from the feedback was mixed. Those reasons given by respondents who felt that the influence was positive were that first, large firms have the capacity to absorb large capital outlays that is associated with mechanization; also, big firms are seen as having a high demand of labour which is expensive and in short supply a scenario that could make it easier for large firms to pursue mechanization. Moreover, the respondents felt that, large firms have capacity to be present in the entire supply chain and therefore interact with the market. This could make it adaptive and respond to the market better. Finally, respondents saw as being able to have the capacity to train its employees on the new technology. The above opinions

corroborated the widely held theory that a positive relationship exists between farm size and adoption of technology (Kimberley & Evanisko ,1981 ; Kelley & Helper, 2006; Mole et al, 2004).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	6	19.4	19.4	19.4
	Yes	25	80.6	80.6	100.0
	Total	31	100.0	100.0	

Table 2: Perceived influence of firm size on adoption of MTH technology

Some respondents however held a contrary opinion regarding the nature of influence. The reasons they gave were that small firms are seen as being able to pursue mechanical tea harvesting technology faster due to ease of decision making. Also, since small firms are simple, logistics of mechanical tea harvesting technology is seen to be better handled in small scale. Moreover, small firms were seen to be more exposed to vagaries of high overhead costs and related diseconomies of scale which make them more responsive to technologies that are cost effective. This argument was supported by the caveat by Kimberley and Evanisko, (1981) that empirical studies had shown that it is not in all situations that relationship between firm size and technology adoption is positive.

The perception regarding the influence of managerial skills showed that 71% were in the affirmative that managerial skills indeed was a determinant of adoption of the technology. As regards the nature of the influence, there was general consensus that positive relations existed and the reasons provided were that possession of technical skills makes managers appreciate the technology's contribution to the business thus making the acceptance of the technology faster. It also ensures that technology is applied in an efficient way that is devoid of operational hiccups. Further, such skills make it possible for the improvements to be made that results in better efficiency and effectiveness in technology use. It was also observed that having the skills at the onset of the technology was not necessarily important but the ability to learn in the process of adoption was critical for a success implementation of the technology. These opinions tended to agree with earlier findings by Kelley and Helper (2006) and Rahab and Hartono (2012).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	29.0	29.0	29.0
	Yes	22	71.0	71.0	100.0
	Total	31	100.0	100.0	

Table 3: Perceived managerial skill influence of adoption of MTH technology

4.2 Correlation between firm size, managerial skills and adoption of mechanical tea harvesting technology

A correlation analysis was done to establish the relationship between independent and dependent variables. Pearson *r* was used to compare the strength of the association between the variables of firm size and managerial skills and the dependent variable of mechanical tea harvesting adoption. Table 4 show that pearson *r* for firm size was -.103 whereas that of managerial skills indicated a strong correlation at .844.

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		MTH Adoption	Firm Size	Managerial Skills
MTH Adoption	Pearson Correlation	1	-.103	.844**
	Sig. (2-tailed)		.582	.000
Firm Size	Pearson Correlation	-.103	1	.280
	Sig. (2-tailed)	.582		.127
Managerial Skills	Pearson Correlation	.844**	.280	1
	Sig. (2-tailed)	.000	.127	

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

Table 4: Correlation of firm size, managerial skills and adoption of MTH technology

Regression analysis between firm size, managerial skills and adoption of mechanical tea harvesting technology

Multiple linear regression analysis using the selected variables of firm size, managerial skills

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32362.741	2	16181.371	72.073	.000a
	Residual	6286.345	28	224.512		
	Total	38649.086	30			

a. Predictors: (Constant), Firm Size, Managerial Skills

b. Dependent Variable: MTH Adoption

and adoption of mechanical tea harvesting was done and the outcome is shown in Table 5. R squared of .837 means that firm size and managerial skills explain 83.7% of adoption of MTH technology. This therefore suggests overall model of firm size and managerial skills is a strong predictor of adoption of mechanical tea harvesting technology.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.915a	.837	.826	14.984

a. Predictors: (Constant), Firm Size, Managerial Skills

Table 5: Model summary

The overall model illustrated by F value of 72.073 in Table 5 implies goodness of fit in the linear model with p value of 0.000 which is less than significance level 0.05.

4.1.1 Firm Size

The coefficients in Table 5 show that firm size is negatively correlated with adoption of MTH technology. A unit increase in firm size leads to -0.368 units decrease in adoption. This is significant at p value of 0.000 against a 0.05 level of significance. Based on this findings therefore, the hypothesis that firm size is not significantly related to adoption of MTH technology is therefore rejected.

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Table 6: ANOVA

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	9.740	3.833		2.541	.017
	Managerial Skills	8.558	.717	.947	11.930	.000
	Firm Size	-.004	.001	-.368	-4.633	.000

a. Dependent Variable: MTH Adoption

Table 7: Coefficients

4.1.2   Managerial Skills

The coefficients in Table 7 further indicate that management skills have a positive influence on adoption of MTH technology. A unit increase in managerial skills results in a 0.947 unit in adoption of technology. This is significant at p value of 0.000 which is less than 5% level of significance. This results leads to the rejection of the hypothesis that managerial skill does not significantly influence the adoption of MTH technology.

5   Conclusion and recommendation

5.1   Conclusion

The study sought to find out institutional factors that influence strategic choice in the context of adoption of mechanical tea harvesting technology in the tea sub sector in Kenya. The empirical findings from inferential statistics indicate however that a significant negative relationship between firm size adoption of mechanical tea harvesting technology as indicated by the beta coefficients -0.368 and p value of 0.000 exist. This shows that level of adoption of MTH technology is higher in small firms rather than in large firms. The findings though contradicting the widely held theory of positive relationship between firm size and technology adoption, they tend to agree with the exception made by Kimberley and Evanisko (1981) that positive relationship is not always the norm.

On management skills, the coefficient of 0.947with a p value of 0.000 was significant at a 5% significance level. This implies that management capabilities positively influence the adoption of mechanical tea harvesting technology. The finding is in agreement with earlier studies by Kelley and Gant (1996) and also Kelly and Helper (2006) who argued that

previous experience and internal expertise are critical in absorption of technology. The inferential statistics corroborate the qualitative data from the study. Having prior knowledge and gaining knowledge through organizational learning of the skills is paramount in technology adoption process.

5.2   Recommendation

The study therefore makes the following recommendations based on the findings;

1.   Though the general opinion of management based on their qualitative feedback is that large firms are better placed in adoption of technology, the quantitative data shows the opposite. The inferential statistics show that smaller firms are pursuing adoption more than the larger firms. Smaller firms stand to gain as they do not have an advantage of economies of scale that go with the size of operation. The smaller firms therefore are advised to pursue more the adoption of the mechanical tea harvesting technology in order to overcome the labour cost challenges that has the potential to wipe them out of business.

2.   Management skills are important for technology diffusion. The study demonstrates this fact clearly and the suggestion is that adoption of mechanical tea harvesting can further be enhanced if more training of managers on the requisite technical skills is done. Moreover, organizations are better off learning the technology and efficiently utilizing it through gradual adoption.

5.3   Suggestion for further research

While this research looked at internal elements of the organization that influences the adoption of mechanical harvesting technology, this is not exhaustive as other internal elements such as firm's strategic positioning, and ownership type. Also, external factors such as stakeholder pressure need to be brought in so as to holistically understand why organizations choose to do what they do.

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