The Influence of Operating Environment on Performance of Commercial Farmers in Kiambu County, Kenya

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Abstract

This study set to assess the effect of operating environment on performance of commercial farmers. The study adopted a descriptive cross sectional survey design. Data was collected using a semi structured questionnaire and analyzed using both descriptive and inferential statistics. The study established a marginal relationship between operating environment and performance of commercial farmers. The study was limited by a focus on few constructs; self reported data, no collaborative evidence and cross sectional data. The study recommends that farmers should consider variables in the operating environment while making decision. The government should facilitate the farming of fresh fruits and vegetables by putting in place the requisite infrastructure and legislation. Future research should target other fresh agricultural products; increase the variables and constructs being investigated; target other counties with differing social economic and climatic conditions and establish why operating environment has statistically marginal contribution to performance of commercial farmers.

Keywords: Operating Environment, Fresh Fruits and Vegetables, Commercial Farmers, Performance of commercial farmers

Introduction

The micro-environmental forces that influence firm performance include customers, competitors, suppliers and intermediaries (Kotler & Keller, 2009). Fresh fruits and vegetable (FFV) consumers working in urban areas attach increased importance to FFV in their diets due to increased level of consciousness on personal health (Stanton & Herbst, 2005). These consumers prefer FFV to canned or frozen alternatives (Clarke & Moran, 1996). Narrod, Avendaño, Roy, Okello, Rich, and Thorat (2007) reported increased demand on food safety for the export market making small scale FFV farmers be sub-contracted either by large farmers or by form groups under government and NGOs support. The macro-environmental factors affecting performance of commercial famers include differences in agro ecological zones; improved transport and storage facilities (Clarke & Moran, 1996); development of rural fully equipped assembly points for the products; increased competition , improved technology (Bremmer, Lansink, Olson, Baltussen & Huirne, 2002) and increased importance of supermarkets as outlets for FFV (Neven & Reardon, 2006). There is increased competition for the limited land between agriculture and other economic activities such as housing which mitigates the need to commercialize the agricultural sector (Government of Kenya, 2012).

Kinyua-Njuguna (2013) presents firm performance as the actual output of an organization measured against its intended outputs. Edwards (2013) contends that farmers need to establish the financial performance of their farms in order to assess the profitability, debt capacity, and financial risks of their operations. Product output, price premium, profitability, and farmer satisfaction were the performance measures adopted for this study since as established by Ailawadi, Lehmann and Neslin (2002), they are easy to assign and are consistent with the focus of business executives. Kiambu County has a wide agro-ecological zone which enables it to produce tropical FFV such as bananas and mangoes as well as temperate ones such as peaches and plums. The County has a fast growing urban and sub urban population and is experiencing high unemployment (County Government of Kiambu, 2012). FFV have a high value added per unit of land since they are labour and management intensive per crop and two or more crops can be grown per year.

This makes their growing the most appropriate form of farming in the County (Government of Kenya, 2012). To increase its commercialization, FFV farmers in the County need to be empowered through provision of appropriate infrastructure and legislation.

Statement of the Problem

The Horticultural subsector in Kenya accounts for 36 per cent of the agricultural GDP with vegetables and fruits accounting for 74.2 per cent of the horticulture (Ministry of Agriculture, 2012). To achieve the aspirations in Kenya's Vision 2030 regarding the agricultural sector, there is need for farmers to take advantage of the opportunities offered by the operating environment which include climatic conditions, product attributes, and customers to improve their performance. To supplement the initiatives of the Ministry of Agriculture, Livestock, and Fisheries (MOALF) towards achieving Vision 2030, there is need to determine how environmental factors impact the performance of commercial farmers in Kiambu County.

The reviewed studies were found with shortcomings which the current study set out to overcome. The study by Evenson and Mwabu (1998) established that highlands ecological zones improved farm productivity. It involved analyzes of secondary data from the Central Bureau of Statistics and it limited performance measurement to the evaluation of volume productivity. A study in India by Talukder, Sarker, and Islam (2010) established that climatic conditions (temperatures and humidity) influenced farm performance. The study relied on convenient sampling, focused only on poultry farming and was location variant which limited its generalization. Munyaka (2010) established that legal requirements influenced performance of a commercial farm. The study focused only on poultry farming. Ndubi (2012) undertook a case study and established that the rate of mechanization and adoption of other modern technologies influenced the performance of commercial farmers.

To bridge the identified gaps, the current study utilized descriptive and inferential statistics and undertook linear regression and correlation analysis of the secured data. The study simultaneously considered four performance measures namely: volume, price, profitability, and satisfaction of commercial farmers in Kiambu County. Its general objective was to assess the extent to which operating environment influenced performance of commercial farmers in the County and addressed the following research question: what is the influence of operating environment on performance of commercial farmers in Kiambu County? The hypothesized relationship stated that:

H1: There is a statistically significant relationship between operating environment and performance of commercial farmers.

Review of Related Literature

Availability and adoption of the latest in technological innovation was found by El-Osta and Johnson (n.d.) to be one of the factors contributing to high rates of production. Similarly, Ndubi (2012) established that adoption of labour intensive practices instead of mechanization of agronomic activities in an irrigation scheme in Kenya was a major cause of low productivity. On his part, Binns (2012) noted increased public investment in agro-ecological research and development as well as agriculture extension services and farmer field schools focused on sustainable practices as causes of improved performance. The Canadian Agri-Food Policy Institute (2005) also recommended an increase in the level of government support and spending on research and development, innovation, marketing and promotions to improve performance of commercial farmers.

Munyaka (2010) found that legal requirements were ranked highly among the factors that influenced performance of commercial farms. The Canadian Agri-Food Policy Institute (2005) established that regulations that affect the availability of essential inputs were not conducive to business focused commercial agriculture and that application of food safety regulations in other countries can work against local exports of primary and semi-processed products. The United Nations Development Program Ethiopia (2013) recommended a review of tax incentives and exemptions for commercial farmers, an improvement in property registration and enforcement of property rights (title deeds) for commercial farmers and a review of the land allocation systems and modalities to improve performance of commercial farming. Access to adequate infrastructural facilities in form of transport networks and connection to electricity was identified by United Nations Development Program Ethiopia (2013) as a requirement for improved performance of commercial farmers. Mbugua, Njeru, and Tirimba (2014) established that a good road network improves accessibility to farms for delivery of inputs and to the markets for delivery of produce.

Government support in identifying competitive sources of farm inputs and outlets for farm produce was found to influence performance of commercial farmers (Munyaka, 2010). Talukder, Islam, Sarker and Islam (2010) found that the prevailing climatic conditions such as temperature levels influence performance of commercial farmers. Similarly, Deininger, Nizalov and Singh (2014) established that farms located in areas with better soil quality will record better performance.

Other environmental factors found to influence performance of commercial farmers included the mechanism put in place to resolve conflicts involving farmers investing in commercial farming (United Nations Development Program Ethiopia, 2013); consolidations of agri-food supply chains; competition from both local and foreign farmers; emergence of low cost exporters; continued decrease in real commodity prices (Canadian Agri-Food Policy Institute, 2005); improvement in consumer awareness of health and environmental impacts of diets and availability of agriculture extension services and farmer field days (Binns, 2012). Additional factors which have also influenced performance of commercial are availability of special product features due to geographic place of origin (GPO) (Willoughby, 2004); increased fresh fruits and vegetables in diets due to an increase in personal health consciousness (Poole & Baron, 1996); increase in variety and quality of fresh fruits and vegetables in the market and demographic and lifestyle changes of consumers (Pearson, 2003). Similarly, improvement in transport and storage facilities; growth of supermarkets; high product standards set by both local and export customers and the development of rural fully equipped assembly points for handling the products (Clarke & Moran, 1996) have also influenced performance of commercial farmers.

Kiambu County has a wide agro-ecological zone ranging from the cold climate of the upper highlands to relatively dry and warm climate that enables the County to produce tropical fresh fruits and vegetables such as bananas and mangoes as well as temperate fresh fruits and vegetables such as peaches and plums. Horticulture is widely practiced in the county in both small scale units and large farms. In 2010, FFV farming in the County covered 26,407 hectares equivalent to three percent of total area under FFV in Kenya earning the County Kshs. 12.92 -13824 equivalent to 5.7 percent of the crops' total earnings in Kenya (Republic of Kenya, 2011). Kiambu County is served by a network of all weather roads which facilitate delivery of fresh fruits and vegetables to the market. There is high competition for the small land plots (averaging 0.36 Ha) between agriculture and housing estates. This makes the farming of FFV most appropriate since they are labour and management intensive and have short maturing period allowing for two or more crops per year (Government of Kenya, 2012). The County borders Nairobi City County and houses Thika, Kiambu, Kikuyu, Limuru, and Juja towns which provide a ready market for FFV (County Government of Kiambu, 2012).

Methodology

To establish the associations among factors of the operating environment and performance, a descriptive cross sectional survey design was adopted. This design facilitated in establishing and describing the relationships among the key study variables (Kothari, 2004). It was cross sectional since it was conducted once to pick the parameters of the phenomenon at a specific time with the aim of accurately capturing the characteristics of the population relating to what, where, how and when of the research topic (Cooper & Schindler, 2003).

The population of the study consisted of 213 commercial farmers of FFV in Kiambu County. The population consisted of individual farmers (male & female), women groups, resident groups, cooperatives, limited liability companies, and government departments growing between one and three crops in farms ranging between 5.5 to 0.125 acres. They engaged in farming activities to generate income. This study adopted stratified random sampling which allowed for making of probability based confidence estimates of various parameters (Cooper& Schindler, 2003). The key target was the owners or managers of commercial FFV farms. From the target population, the farmers were stratified into seven sub-counties and a proportionate sample drawn relative to the size of each. To determine the sample size, a formula proposed by Israel (2009) was applied as follows:

$n = \frac{N}{1+N(e)^2}$ Where n is sample size, N is the population size, and e is the error term (0.05). Using N = 213 in the formula, the resulting sample size (n) is 140 farmers. The data was collected using a semi structured questionnaire through the direct interrogation method (Cooper & Schindler, 2003). The questionnaire was administered directly to the respondents through the assistance of Agricultural Extension Officers (AEO) who were recruited as research assistants due to their close association with the farmers. The AEO offer technical advice and other related services to the farmers in their normal day to day activities.

The study variables were operationalized and measured using direct measures and 4 point rating scales ranging from 1=Not important to 4=Very important; 1=Not strong to 4=Very strong; 1=Not at all to 4=Great extent. Data was analyzed using both descriptive statistics (frequencies, percentages, mean, and standard deviation) and inferential statistics (chi square, linear regression and correlation analysis). Stepwise regression analyses were used to bring out the individual effects in the form: $Y_1 = a_0 + b_1X_1 + e_1$, for effect of OE on performance of commercial farmers.

Table 1: Study Hypotheses, Analysis Methods, and Interpretation of Results

Objective	Hypotheses	Analysis Methods	Interpret-action of results
Examine relationship between the operating environment and performance of commercial farmers.	H_1: There is a statistically significant relationship between operating environment and performance of commercial farmers.	Multiple linear regression model: Performance of commercial farmers = f(operating environment (OE)): $Y_1 = a_0 + b_1X_1 + b_2X_2 + \ldots b_6X_6$; where: Y_1= composite index for performance of commercial FFV farmers; a_0 = intersect constant; b_1, b_2, …, b_6= regression coefficients: whereby; X_1 = product attributes, X_2= government regulations, X_3= customer categories; X_4 = competitors; X_5 = climatic conditions ; X_6= special production/processing methods	The value of R^2, Product moment correlation (R), Regression coefficient and conduct an F test (ANOVA)

Presentation and Analysis of Empirical Results

The data used for this research was corrected from 140 farmers spread across seven sub-counties in Kiambu County. The 140 questionnaires were successfully filled and found suitable for further analysis resulting in a response rate of 100%. This compared favourably with a similar study conducted among farmers by Bremmer et al. (2002) which had a response rate of 86.5%.

Reliability and Validity

The study sought to establish the reliability of the research instrument by computing the Cronbach's Alpha coefficient in regard to the elements in the study variables. The Cronbach's Alpha reliability coefficients indicated reliability level of the instrument at 0.7364. The level was above the acceptable minimum value of 0.50 (Cronbach, 1951) and above the recommended value of 0.7 (Nunnally & Bernstein, 1994). The internal consistency of the measures used was therefore considered to have adequately measured the relevant study variables.

Descriptive Statistics

Environmental Factors and Performance of Commercial Farmers

The performance of a firm will be influenced by both internal and external factors inherent in its operating environment. Factors in the operating environment of interest to this study were product attributes, government regulations, special production, /processing methods, climatic conditions, customer categories, and competition. The influence of operating environment on performance of commercial farmers is presented in the proceeding sections.

Summary on Environmental Factors

Factors of the operating environment found to influence performance of commercial farmers were product attributes, climatic conditions, customer categories, and competition. The extent to which each individual factor influenced performance is summarized in Table 2.

Table 2: Summary on Effects of Environmental Factors

Environmental Factors	N	Grand Mean Score	Standard Deviation	CV (%)
Product Attribute	140	2.46	0.621	48.05
Climatic Conditions	138	3.06	0.917	30.02
Customer Categories	140	1.88	1.087	56.84
Competition	138	2.14	1.084	50.71
Overall Average Score		**2.39**	**0.927**	**38.79**

The results presented in Table 2 indicate that at an overall average level, climatic conditions with the highest mean score and the lowest CV (mean score = 3.06, CV = 30.02) had the greatest influence on performance of commercial farmers. The second most important factor was product attributes (mean score = 2.46, CV = 48.05) while customer categories (mean score = 1.88, CV = 56.84) had the least influence on performance.

At an individual construct level, the results indicated that the product attributes with the highest influence on performance for FFV products are those the consumer is able to confirm such as longer shelf life, special taste/colour, and higher nutritional value. The survey results revealed a low level of product inspection and certification with only two inspecting and certifying bodies being involved. Overall, direct government control in form of regulations was found to be low within the sector. Among the special production/processing methods utilized in FFV farming, irrigation and organic farming had the highest adoption.

The climatic conditions with the greatest effect on productivity of FFV were found to be right temperatures and adequate rains. Among the possible customers for FFV, none of them was ranked by majority of the respondents as being very important. However, the wholesale FFV markets were identified as possible markets by the highest number of respondents even though few of them considered it the most important outlet for their products. The farmers reported low levels and influence of competition from all competitor categories on performance of FFV. Relatively strong competition was experienced from non-branded products from within and outside the county.

Performance of Commercial Fresh Fruits and Vegetable Farmers

The constructs used to describe performance of commercial farmers were the price, volume, profitability and satisfaction achieved by the respondent farmers. Table 3 contains a summary of the individual indicators of the achieved performance.

Table 3: Summary on Performance of Commercial Farmers

Overall summary of Performance of Farmers	**N**	**Mean score**	**Standard Deviation**	**C.V (%)**
Price premium	99	1.25	0.493	39.41
Sales Volume	126	1.59	1.089	68.62
Profitability	124	1.51	0.917	60.68
Satisfaction	140	2.72	0.619	22.77
Overall Average Score	**-**	**1.77**	**0.780**	**44.11**

The summary results in Table 3 show low overall average levels of performance of commercial farmers (mean score=1.77, CV=44.11). Farmer satisfaction recorded the highest performance (mean score=2.72, CV=22.77) implying that on average, farmers were satisfied with their undertakings. Price premium recorded the lowest performance (mean score=1.25, CV=39.41) which indicated that the farmers were not earning the price premiums they expected.

At an individual performance construct level, prices for own products were found to be lower than those for competitor branded products from within and outside the County. Own products earned higher prices than competitor non-branded products from within and outside the county. The results further indicated that there was an increase in those earning profits between the years 2012 to 2014. The respondent farmers recorded average levels of satisfaction with the three performance indicators of price, volume, and profitability. However, volume harvested and price earned had slightly higher levels of satisfaction than profitability.

Results of Correlation Analysis

The general objective of the study was to establish the influence of operating environment on performance of commercial farmers in Kiambu County. In order to assess the relationships among factors of the operating environment and performance of commercial farmers, a correlation analysis was conducted. Results of the analysis are presented in Table 4

Table 4: Correlation for Operating Environment and Performance of Commercial Farmers Correlations

		Performance of Commercial Farmers	Operating Environment
Performance of Commercial Farmers	Pearson Correlation	1	.164
	Sig. (2-tailed)		.052
	N	140	140
Operating Environment	Pearson Correlation	.164	1
	Sig. (2-tailed)	.052	
	N	140	140

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

* Correlation is significant at the 0.05 level (2-tailed).

The results of the Pearson's product moment correlation analysis presented in Table 4 show that operating environment and performance of commercial farmers were marginally correlated (r=0.164; p<0.04; sig. 2 tailed =0.052=0.05). This suggests that operating environment is a major determinant of performance of commercial farmers. As commercial FFV farmers undertake farming activities, they should take cognizance of the operating environment and the opportunities and challenges it may present.

Results of Regression Analysis and Hypotheses Testing

This study was based on the premise that performance of commercial farmers in Kiambu County is influenced by operating environment. In order to test the respective hypothesis, simple and stepwise multiple linear regression analyses were conducted at 95 percent confidence level. Since operating environment and performance of commercial farmers were measured using more than one construct, each performance indicator was regressed against each dimension of independent variable using simple regression analysis. To evaluate the contribution of each construct in the independent variable, stepwise multiple regression analysis was carried out.

Simple Regression: Operating Environment

To evaluate the influence of operating environment on performance of commercial farmers, simple regression analyses were conducted for each pair of variables. The results are contained in Table 5.

Table 5: Simple Regression: Operating Environment

	Operating Environment
R	0.164
R^2	0.027
F	3.838
Sig (p)	0.052
Constant	0.875
B	0.441
s.e.	0.225
Beta	0.164
T	1.959
Sig (p)	0.052

The simple regression results presented in Table 5 produced an R^2 of 0.027 for operating environment. The results imply that operating environment accounted for 2.7% of the performance of commercial farmers. The results further reveal a marginally significant relationship between operating environment and performance of commercial farmers (beta=0.234, P=0.052). Based on these results, we accept the hypothesis at 5% significance and conclude that operating environment had significant influence on performance of commercial farmers. The results also show that the regression equations for operating environment (F computed=3.838, p=0.052=0.05) was marginally related to performance of commercial farmers. The statistically marginal relationship between performance of commercial farmers and operating environment imply that commercial farmers should take cognizance of their operating environment to achieve positive results.

Multiple Regression Model: Dimensions of Operating Environment and Performance of Commercial Farmers

To assess the influence of operating environment on performance of commercial farmers, the research had set the following hypothesis:

H1: There is a statistically significant relationship between Operating Environment and Performance of commercial farmers in Kiambu County.

The simple regression results of operating environment regressed against each dimension of performance are presented in Tables 6

Table 6: Regression of Operating Environment on Performance of Commercial Farmers Coefficients[a]

i). Price

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.380	.414		3.334	.001
	Operating environment	-.055	.174	-.032	-.313	.755

a. Dependent Variable: Price

ii). Volume

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.567	.789		.718	.474
	Operating environment	.443	.340	.116	1.303	.195

a. Dependent Variable: Volume

iii). Profitability

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.709	.672		1.056	.293
	Operating environment	.347	.289	.108	1.203	.231

a. Dependent Variable: Profitability

iv). Satisfaction

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.901	.427		4.454	.000
	Operating environment	.354	.183	.163	1.935	.055

a. Dependent Variable: Satisfaction

The regression results in Table 6 reveal a weak and statistically insignificant linear relationship between operating environment and three performance constructs namely price (beta -0.032, p-value=0.755); volume (beta 0.116, p-value=0.195) and profitability (beta 0.108, p-value=0.231). However, there was a marginally significant relationship between satisfaction of commercial famers and operating environment (beta=0.163, p=0.055). As per these results, a unit change in operating environment resulted in a negative and statistically insignificant effect on prices earned by commercial farmers. This is due to the fact that an increase in such factors like level of government control and level of competition may contribute to lower prices. The statistically insignificant relationship between operating environment and price, volume and profitability suggest that operating environment on its own will not influence the three measures of performance and will marginally contribute to farmer satisfaction.

Results of combined elements of operating environment regressed against the aggregate mean scores of performance (price, volume, profitability and satisfaction) are presented in Table 7

Table 7A: Results of Goodness-of-Fit of the Regression of Performance of Commercial Farmers on Operating Environment Coefficients[a]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.164[a]	.027	.020	.75586
a. Predictors: (Constant), Operating Environment				
Dependent variable: Performance of Commercial Farmers				

Table 7B: Significance of the Regression of Performance of Commercial Farmers on Operating Environment Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.875	.526		1.665	.098
	Operating environment	.441	.225	.164	1.959	.052

a. Dependent Variable: Performance of commercial farmers

Regression of aggregate mean scores of performance of commercial farmers against operating environment produced an R^2 of 0.027 as shown in Table 7A. This implied that operating environment explained 2.7% of the variation in scores for performance of commercial farmers. The results also revealed a marginally significant relationship between operating environment and performance of commercial farmers (beta=0.164, p-value=0.052). Therefore, we accept the stated hypothesis at 5% and conclude that Operating Environment has a marginally significant influence on Performance of commercial farmers. Based on the results in Tables 7A and 7B, a simple regression equation can be used to estimate performance of commercial farmers in Kiambu County as follows:

$Y = 0.875 + 0.164OE$

Where
Y= Performance of Commercial Farmers
OE= Operating Environment
0.875= y-intercept; constant
0.164= an estimate of the expected increase in performance of Commercial Farmers in response to a unit increase in operating environment

As shown by the results in Table 7B and the model above, regression coefficient of 0.164 implies that a unit increase in operating environment would lead to a 0.164 increase in performance of commercial farmers. The value of performance when operating environment is at zero will be 0.875 as shown by the constant intercept. The results imply that operating environment will have a positive but statistically marginal influence on performance of commercial farmers.

Discussion of the Results

The foregoing discussions are based on the results of correlation and hypothesis tests and the results established in descriptive analysis. Operating environment consisted of five measurement constructs namely product attributes, government regulations, customer categories, competitors and climatic conditions. The analysis of the combined construct of performance of commercial farmers on operating environment and on individual constructs of performance produced statistically marginal results. These results are supported by the findings by Evenson and Mwabu (1998) that highlands agro-ecological zones positively contributed to high yields. Similarly, Talukder et al. (2010) found that the prevailing climatic conditions such as temperature levels influence performance of commercial farmers. Deininger et al. (2014) established that farms located in areas with better soil quality will record better performance.

Consumers were also found to value product attributes associated with a unique geographic place of origin. This was in agreement with the findings by Willoughby (2004) that consumers will prefer products with special product features due to their place of origin. At an individual construct level, operating environment had a marginally significant influence on personal satisfaction of a farmer while the influence on the other performance constructs was not statistically significant. This implied that the farmer may be generally happy with product attributes, government initiatives, climatic conditions, and other factors of the operating environment. This is in agreement with the findings by Clemens (2002) that farmers will strongly identify with their local environment and with government support and facilitation, can develop a place of origin based brand to improve the performance of their products.

Recommendations

Based on the study findings, the following recommendations are made to commercial farmers. First, since operating environment has positive influence on performance of commercial farmers, farmers should put into consideration such constructs of the operating environment as government regulations, product attributes, customer categories and competitor activities while making production decisions. Secondly, since the results of the study indicated that operating environment had marginally significant influence on performance of commercial farmers, farmers should avoid over reliance on favorable operating environment as a means of achieving premium performance. They should instead undertake extra initiatives such as marketing practices and acquiring adequate knowledge and funding to maximize results.

The third recommendation is that for the country to achieve the stated aspirations in regard to the agricultural sector as contained in Vision 2030 there should be a concerted effort to promote superior farming practices of fresh fruits and vegetables. The ministry should set up the requisite infrastructure and provide the facilitation and resources required to enlighten and support farmers in their fresh fruits and vegetable farming initiatives. Qualified personnel should be availed to enhance farmers' farming initiatives.

Finally, the government should realize that operating environments influence performance of commercial farmers. The government should therefore enact the requisite legislation to promote innovative initiatives by fresh fruits and vegetable farmers. The government should also protect unique regional product attributes from infringements by both local and foreign competitors. The government should provide practical demonstration by promoting new methods in the farming and marketing of fresh fruits and vegetables produced in its own farms and also support similar initiatives in its irrigation schemes across the country.

Suggestions for Further Research

The study focused only on fresh fruits and vegetables among all other agricultural products offered to the market in their fresh unprocessed form. This limits the generalization of the study to only a small section of the agricultural sector. To expand the scope of the study, future research should cover other fresh agricultural products. The variables and constructs of the study were not exhaustive and it is possible to extend the number of variables and constructs covered to include macro environmental factors so as to expand the study's scope and level of generalization. The study population was limited to Kiambu County which has unique climatic and socio-economic characteristics that favour the commercialization of fresh fruits and vegetables sub-sector of the horticultural sector. While the findings of the study provide useful insight into the interrelationship among the study variables, the unique characteristics of the County may limit the extent of generalization to other counties. This calls for an extension of the study to other counties with differing social economic and climatic conditions to confirm the hypothesized relationship in the current study.

This study focused on the relationship between operating environment and performance of commercial farmers. The arising interactions resulted in marginally significant relationships. More studies should be conducted to uncover why operating environment had marginal contribution to performance of commercial farmers. A study designed with farmer characteristics as the independent variable and operating environment as moderating variables would lead to different interactions and different levels of relationships. Such a study would also add to the current level of knowledge in this subject matter. The current study adopted a descriptive cross sectional survey design which involved collecting data once at a specific time. The study relied on data provided by the respondents to evaluate the contribution of different variables to performance of commercial farmers. Some constructs in the operating environment take time to generate results.

A time series design would enable the gathering of continuous data to demonstrate the effect of the elements throughout the life cycle of the product. A study should be designed to correct collaborative secondary data to confirm the self reported data provided by the respondents. This would reduce subjectivity in the provided data and strengthen the reliability of the study findings.

References

Ailawadi, K. l., Lehmann, D. R., & Neslin, S. A. (2002). A product-market-based measure of brand Equity, *Marketing Science Institute.*

Binns, P. (2012). Opportunities and challenges facing farmers in transitioning to a green economy agriculture practice. *United Nations Environment Programme, Perspectives*, 5. Retrieved on September 16, 2015 from http://www.unep.org/civil-society/Portals/24105/

Bremmer, J., Alfons, G. J. M., Lansink, O., Olson, K. D., Baltussen, H. M. & Huirne, R. B. M. (2002). Analysis of farm development in Dutch agriculture and horticulture. *International Management Congress.*

Canadian Agri-Food Policy Institute (2005). Factors affecting current and future farm income prospects. *CAPI Farm Income Project Synthesis* 62. Retrieved on September 16, 2015 from http://www.capi-icpa.ca/archives/pdfs/

Clarke, J. & Moran, A. (1995). An investigation into the current market for fruit in the UK and the measures taken to promote an increase in consumer consumption. *Nutrition & Food Science, 6,* 5–10.

Cooper, D. R. & Schindler, P. S. (2003). *Business research methods* (8th ed.). Tata, McGraw-hill Publishing Co. Ltd.

County Government of Kiambu (2013). County Integrated Development Plan 2013-2017.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika,* 16 (3): 297–334.

Deininger, K., Nizalov, D. & Singh, S. K. (2014). Determinants of productivity and structural change in a large commercial farm environment: Evidence from Ukraine. Retrieved on September 16, 2015 from https://www.kent.ac.uk/economics/

Dunaway, T. M. (2013). *Farm financial performance of Kentucky farms (*Unpublished master's thesis, University of Kentucky, Kentucky).

Edwards W. (2013). Farm financial statements. *Iowa State University, Extension and Outreach.*

El-Osta, H. S. & Johnson, J. D. (n.d.). Determinants of financial performance of commercial dairy farms. Retrieved on September 16, 2015 from http://www.ers.usda.gov/media/929960/

Government of Kenya (2012). National Horticultural Policy. Agricultural Sector Coordation Unit, Kilimo House: Nairobi, Kenya.

Evenson, R. E. & Mwabu, G. (1978). The effects of agricultural extension on farm yields in Kenya. Yale University: *Economic Group Center discussion paper 798*.

Israel, G. D. (2009). Determining sample size. Institute of food and agricultural sciences. Florida: University of Florida.

Kim, H., Kim, W. G. & An, J. A. (2013). The effect of consumer based equity on firm's financial performance. *Journal of Consumer Marketing, 20, 4*(5), 335-351.

Kinyua-Njuguna, J. W. (2013). *Strategic social marketing, operating environment and performance of community based HIV and Aids organizations in Nairobi County, Kenya.* (Unpublished PhD Thesis, University of Nairobi, Kenya).

Kothari, C. R. (2004). *Research methodology, methods and techniques* (2nd ed.). New Age International (P) Ltd. Publishers.

Makki, F. (2014). Canada horticulture sector performance review – 2007 crop year. *Agriculture and Agri Food Canada*.

Mbugua, S. K., Njeru, A. & Tirimba, O. I. (2014). Factors affecting the performance of small and micro enterprises in Limuru Town Market of Kiambu County, Kenya. *International Journal of Scientific and Research Publications,* 4 (12). Retrieved on September 16, 2015 from http://www.ijsrp.org/research-paper-1214/

Munyaka, G. D. (2010). *Factors affecting the performance of small and medium scale poultry farming enterprises in Karuri, Kenya.* (Unpublished master's thesis, University of Nairobi, Kenya). Retrieved on September 16, 2015 from http://erepository.uonbi.ac.ke/bitstream/handle/11295/

Narrod, C., Avendaño, B., Roy, D., Okello, J., Rich, K., Thorat, A. (2007). *The role of public-private partnerships and collective action in ensuring smallholder participation in high value fruit and vegetable supply chains*. Capri Working Paper, 70: International Food Research Institute.

Ndubi, D. K. (2012). Factors affecting performance of public commercial enterprises in Kenya: a case of Bura Irrigation Commercial farm. Retrieved on September 16, 2015 from http://ageconsearch.umn.edu/bitstream/208495/2/.

Neven, D. & Reardon, T. (August, 2006). Kenyan Supermarkets and Horticultural Farm Sector Development. *International Association of Agricultural Economists Conference*; Australia: Gold Coast.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. New York: McGraw- Hill.

Offermann, F. & Nieberg, H. (2000). Economic performance of organic farms in Europe: economics and policy. *University of Hohenheim, Department of Farm Economics, 5.*

Park, C. W., Eisingerich, A. B., Pol, G. & Park, W. J. (2013). The role of brand logos in firm performance. *Journal of Business Research, 66,* 180-187.

Pearson, D. (2003). Australia Fresh Fruits and Vegetables: Why do so many of them remain unbranded? *Australasian Agribusiness Journals Review*, 11.

Poole, N. & Baron L. (1996). Consumer awareness of citrus fruit attributes. *British Food Journal, 98(*1*),* 23–28.

Republic of Kenya. (2011). Statistical Abstract 2011. Nairobi: Government Printers

Saina, E. K., Kathuri, N. J., Rono, P. K., Kipsat, M. J. & Sulo, T. (2012). Food security in Kenya: the impact of building rural farmers capacity through agriculture education in secondary school. *Journal of emerging trends in education research studies, 3(*3*),* 338-345.

Talukder, S. T., Sarker, S. & Islam, M. M. (2010). Effects of environment on layer performance. *Journal of Bangladesh Agricultural University*, 8(2): 253–258. Retrieved on September 16, 2015 from http://ageconsearch.umn.edu/bitstream/208495/2/.

United Nations Development Program Ethiopia (2013). An assessment of Operation and performance of commercial farmers in Ethiopia. 4. Retrieved on September 16, 2015 from http://www.et.undp.org/content/dam/ethiopia/docs/

Willoughby, C. (2004). What consumers look for in new products. *Oklahoma State University: Food and Agricultural Products Centre.*