

# Impact of innovation on the financial performance of KTDA managed tea factories: A case of Meru and Kirinyaga counties

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## ABSTRACT

Kenya is a key player in global tea industry and especially through Kenya Tea Development Agency (KTDA). However, KTDA has been facing the challenges of increasing cost of production in the recent past. The higher processing cost translates to low returns to the farmers resulting in conflict between the management and the farmers. To address the issue of increasing cost, a number of innovations have been undertaken with the aim of reducing the operational cost. This paper looks at the organizational innovation and process innovations and the effect they have in the reduction of operation costs in KTDA factories in Meru and Kirinyaga counties. The study used both primary and secondary data from sampled respondents. A self-administered questionnaire was used for collecting primary data and financial reports by the companies for the secondary data. Data analysis was by use of SPSS, where descriptive and inferential statistics, t-statistic, were used in assessing the relationship between the variables in the study. The study found out that the innovations adopted by KTDA have had a positive impact on the financial performance of the factories by reducing the operational cost. The paper recommends that KTDA managed factories continue adopting innovations in their operations to lower operational cost and higher returns to the farmers.

**Key words:** Financial performance, Operational cost, Organizational innovation, Process innovation.

## INTRODUCTION

Tea is one of the leading foreign exchange earners in Kenya as well as a source of income for rural populations in the tea growing zone (World Bank, 2013). Tea in Kenya is grown by both large-scale farmers and small-scale farmers (Kagira, Kimani and Kagwithi, 2012). The tea grown by the small-scale farmers is processed and marketed by KTDA (Kenya Tea Development Agency) (KTDA, 2014). The history of KTDA dates back to 1957 when the first small-holder tea factory was set up at the foothills of Mount Kenya in Nyeri County. Kenya Tea Development Agency's predecessor, the Kenya Tea Development Authority (KTDA), was established in 1964 through an Act of Parliament as a parastatal charged with the responsibility of developing and fostering the young and small-scale growers sector (Gesimba *et al.*, 2005). On June 30<sup>th</sup> 2000, KTDA (the Authority) was transformed into a private company (KTDA, the Agency) and registered under the Companies Act. In 2010, the Agency was re-structured leading to the formation of KTDA Holdings Limited, and KTDA Management Services (MS) Limited a subsidiary of KTDA Holdings Limited. KTDA (MS) currently manages 65 tea processing factories spread in all tea growing regions across Kenya (KTDA, 2013). The tea is collected by the factories and processed for local consumption and export.

KTDA is facing challenges in the management of tea processing which include the ever-escalating labour costs, energy costs and operational overheads (Ongong'a and Ochieng, 2013). The situation has been worsened by the increased cost of farm inputs such as fertilizer (the major input). The huge increase in the cost of production, and given that the cost of the farm input and operations are all loaded to the farmer, the tea farming is becoming unprofitable (Kagira, Kimani and Kagwithi, 2012). This high cost of production compares poorly with other countries. For instance, in 2008 the cost of tea production in Kenya was USD 1.33 per kg, while in Vietnam it was USD 0.81 per kg. Comparing with the situation in Kenya's neighbours in the East Africa Community, in Rwanda the cost was USD 1.32 per kg, Uganda, USD 1.20 per kg, and Tanzania USD 1.16 per kg (CPDA, 2008).

To save tea farmers from the rising costs of operations, KTDA took a bold step in adopting innovations in its business. The adopted innovations were process innovation and organizational innovation (KTDA, 2014). Process innovation entails the implementation of a new or significantly improved delivery or production method. It includes significant changes in equipment, techniques and/or software (OECD Oslo, 2005). The OSLs manual considers organizational innovations in business practices as the implementation of new methods of organizing routines and procedures for the execution of conduct of work. Organizational innovations involve the following: new practices aimed at improving learning and knowledge sharing within the organization; introduction of management systems for general production or supply operations, lean production, business re-engineering and, quality management systems (OECD Oslo, 2005). Process innovation is usually adopted with the intention of decreasing unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products (OECD Oslo, 2005). The processes innovations undertaken by KTDA were automated tea processing by adopting Continuous Fermentation Unit and converting the steam boilers from furnace fuels to firewood fuel with the aim of reducing the operational costs (KTDA, 2014). The automated tea processing systems are intelligent machines that transformed the way tea was manufactured by eliminating human intervention in the process of fermentation (KTDA, 2014). This was done with a view to reducing the labour cost as less people were required to operate the plant as compared to the old system. The system was also put in place to improve quality as the system does not depend on human intervention for the various stages of processing of tea (KTDA, 2014). Due to the rising costs of furnace fuels, KTDA opted to change from furnace fuel steam boilers to firewood steam boilers (Kagira, Kimani and Kagwithi, 2012; CPDA, 2008). This was the second process innovation.

Tea buying from buying centres was another big challenge to the factories which resulted in high cost of operations. The buying of tea required many tea collection clerks; at least one clerk was needed for each buying centre. Data reconciliation also required many data clerks to reconcile the data resulting in a lot of inefficiency (KTDA, 2014). In addition, computerization of tea collection process at the buying centres was implemented to enhance accountability and accuracy of records as a way of reducing operational costs, and enhancing information sharing among all stakeholders (Kagira, Kimani and Kagwithi, 2012). KTDA accordingly introduced Electronic Weighing Solution (EWS) (KTDA, 2014). The technology uses electronic weighing scales that measure green leaf to the gram. The data is then transmitted instantly via Safaricom's mobile network, using a Personal Data Assistant to a farmer's factory. A printer relying on Bluetooth churns out a receipt for the farmer on the spot. EWS has, therefore, helped in saving on time and human resources and having accurate data captured once at source. Automated reconciliation between weights of green leaf delivered to the factory and weights of the leaf at the buying centre has also been made possible (KTDA, 2014). In line with EWS, KTDA introduced constant weight bags. This was to ensure that farmers get true returns from their produce. Previously and for a long time, management of the tare weight adjustment has been a key concern. Due to

different weather patterns for different regions, it was difficult to determine the tea weight from regions to region or for the same regions when the weather changes. The varied application to conform with the weather often resulted in complains. The EWS and constant weighing bags have really revolutionized the tea collection at the buying centres. Reconciliation of the tea collected per day is in real time and thus there is no need of reconciliation clerks or payment of overtime for the reconciliation (KTDA, 2014).

The objective of the KTDA's undertakings of the above innovations was to try to mitigate the ever increasing costs in tea production. Various studies have shown that innovation has a positive impact on the financial performance of an organization (Jimenez and Sanz-Valle, 2011; Bell, 2005; Cho and Pucik, 2005; Gopalaksihnan and Damanpour, 1997; Damanpour, 1996; Fiol, 1996; Wolfe, 1994). However, since the implementation of the above innovations there is no documented study on whether the innovations have had any impact on the financial performance of the KTDA managed factories. This acted as the fundamental concept behind this study.

### **Problem statement**

Factories under the management of KTDA have been facing the challenge of increase in cost of operations (Kagira, Kimani and Kagwithi, 2012). This led to KTDA having all the factories under its management adopt various innovations as a way of dealing with this challenge (KTDA, 2014). In particular, all factories under the management of KTDA had to: change the manual tea processing system to automated system, the Continuous Fermentation Unit; change steam boilers from furnace fuel steam boilers to fire steam wood boilers; and, computerize the tea buying processes (KTDA, 2014). This was motivated by findings of studies that have demonstrated that more innovative organizations perform better than non-innovative organizations (Jimenez and Sanz-Valle, 2011; López-Mielgo *et al.*, 2009; Bell, 2005; Cho and Pucik, 2005; Gopalaksihnan and Damanpour, 1997; Damanpour, 1996; Fiol, 1996; Wolfe, 1994.) Studies have shown that new adopted technologies are efficient in bringing down the cost of production (López-Mielgo *et al.*, 2009). A number of researchers have also studied the impact of innovation on the performance of organizations. For instance, Koellinger (2008) studied relationship between the usage of internet-based technologies, different types of innovation, and performance at the firm level for e-businesses; Atalay *et al.* (2013) studied the relationship between innovation and firm performance on Turkish automotive supplier industry; Ismail *et al.* (2013) studied the role of innovation in SMEs performance in Malaysia; Lwamba *et al.* (2013) studied innovativeness dimension of corporate entrepreneurship on financial performance of manufacturing firms in Kenya; and, Ongong'a and Ochieng (2013) studied innovation in the Tea Industry focusing on the management of tea estates in Kenya. However, no study has focused on the effect of innovation on financial performance of the KTDA managed factories. This study thus fills this gap by assessing the effect of innovation on the financial performance of KTDA managed factories.

### **Objective of the study**

The objective of the study was to establish the effect of innovation and financial performance of the KTDA managed factories.

Specific objectives of the study were:

- i. To establish whether there is any relationship between process innovation and financial performance in KTDA managed factories.
- ii. To determine the relationship between organizational innovation and the financial performance of the KTDA managed tea factories.

## **Hypothesis**

Innovations have no significant effect on the financial performance of KTDA managed factories.

## **Purpose of the study**

The purpose of the study was to fill the knowledge gap on whether adoption of innovation has any effect on the financial performance of KTDA managed factories. The main objectives of adopting innovation by the KTDA managed factories were to mitigate the ever increasing operational costs. The study was thus necessary to assess the effect of innovation on the financial performance.

## **Significance of the study**

This study is of great significance to a number of stakeholders among them tea factory managers and future researchers. The tea factory managers are expected to benefit immensely from the findings of this study as it may help them know whether they achieve the objectives. This study also made available literature on the effect of innovation on financial performance of tea processing factories.

## **LITERATURE REVIEW**

Schumpeter (1934) analysed different types of innovation including new methods of production, new products, the exploitation of new markets, new sources of supply, and new ways to organize business (Armbruster, 2008). Drucker (1985) defines innovation as the process of equipping in new, improved capabilities or increased utility. Schumpeter (1934) reports that there is a positive relationship between the innovation and the performance of organization. An organization that adopts innovation performs better than those that do not. From Schumpeter's work, Model Five manifestations of innovation are proposed in his definition. These are: creation of new products or qualitative improvements in existing products; use of a new industrial process; new market openings; development of new raw-material sources or other new inputs; and, new forms of industrial organizations (Vyas, 2009).

Scholars have confirmed that continuous innovation activity is the key source of long term firm success and firms which fail to engage in innovation are putting themselves at great risk (Kotler, 2000; Rosenbush *et al.*, 2011).

Studies have shown that organizations which adopt innovations tend to have better performance than those that do not adopt any innovation. The highly innovative organizations are always ahead of the park and their product and services are attracting more customers resulting in higher turnovers as they have a competitive advantage over other organizations (Porter and Miller, 1985). Laforet (2011) observes that organization adopt innovation not only to meet the customer needs but also as a way of adopting more efficient system and thus reduce the cost of operation. Innovations have commercial importance due to their potential for increasing the profitability and the efficiency of organizations. The key reason for innovativeness is the aspiration of firms to obtain increased performance and increased competitive edge (Gunday *et al.*, 2012). A study by Fagerberg *et al.* (2004) shows that innovative countries had more productivity and income than the less-innovative ones. The effects of innovations on firm performance differ in a wide range from market share and profitability to productivity, sales and efficiency (OECD Oslo, 2005).

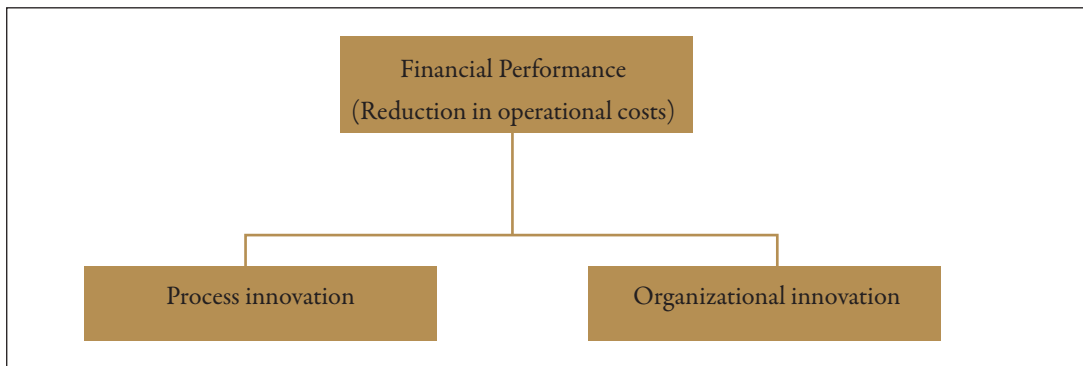
Innovation is one of the key factors in firms' success and survival (Jimenez and Sanz-Valle, 2011; Bell, 2005; Cho and Pucik, 2005; Gopalaksihnan and Damanpour, 1997; Damanpour, 1996; Fiol, 1996; Wolfe, 1994) and sustainable competitive advantage (Standing and Kiniti, 2011; Bartel and Garud, 2009; Johannessen, 2008; Mumford and Licuanan, 2004).

McAdam and Keogh (2004) studied the relationship between a firm's performance in relation to its innovation and research. Their findings show that a firm's inclination to innovations was of great importance in the competitive environments. Geroski (2005) investigated the effects of innovations on organization and noted that innovative firms seem to be less susceptible to cyclical sectoral and environmental pressures than non-innovative firms. López-Mielgo *et al.* (2009) observe that innovations, especially process innovations, have a positive influence on the total quality management efforts of the organizations' flexibility and cost efficiency. This was also confirmed by Koufteros and Marcoulides (2006) and Peters (2008) who in their studies found that innovation has effect on operational flexibility and decreased related costs. In the current global and dynamic competitive environment, the ability to innovate or adopt innovation is strongly considered as the single most important factor in developing and sustaining competitive advantage (Tiddy, 2001).

Innovations provide organizations with a strategic orientation to overcome the problems they encounter while striving to achieve desired profitability (for instance, Drucker, 1985; Hitt *et al.*, 2001; Kuratko *et al.*, 2005). Organizations adopt process innovations as a way of decreasing the unit costs of operation (OECD Oslo, 2005). Process innovation, due to its cost-cutting nature, can have a more critical effect to organizations' performance (Fagerberg *et al.*, 2004). Organizational innovations increase a firm's performance by reducing administrative and transaction costs, improving employee satisfaction hence leading to high productivity, getting access to non-tradable assets such as non-codified external knowledge, and reducing the costs of supplies (OECD Oslo, 2005; Hamel, 2006, 2007, 2009). Measures of outcome of innovation have been based on financial and non-financial metrics (Avlonitis *et al.*, 2001; Cooper and Kleinschmidt, 1995). The performance of an organization from financial aspect is measured by using variables of sale improvement, output of assets and capital return, profitability, output of equity and cost of production (Jaying and lie, 2008).

### CONCEPTUAL FRAMEWORK

The researchers used the conceptual framework of the study to examine the relationship between the independent variables and the dependent variables.



**Figure 1: The relationship between the innovations undertaken by KTDA and the effect they have on the financial performance.**

The relationship between the innovations undertaken by KTDA and the effect they have on the financial performance is as given in Figure 1. In this case, the financial performance is taken as the reduction in cost of production.



## METHODOLOGY

### Research design

This study employed the descriptive survey designs. Descriptive surveys portray an accurate profiler of persons, events, or situations (Robson, 2002). In addition, they allow one to collect quantitative data which can be analyzed using descriptive and inferential statistics (Robson, 2002). The research was aimed at collecting information from respondents on the opinion and experience on the innovations undertaken by KTDA.

The target population was the 65 KTDA managed factories in Kenya and the employees of the same factories. A sample of 13 factories in Meru and Kirinyaga counties were selected. The two counties were selected as they have similar characteristics that influence the performance of the Tea Industry. A sample of 57 employees was selected from the 13 factories.

The research instrument employed for collecting primary data was a questionnaire with a five-point Likert Scale to measure respondents' perception in relation to the innovation impact on the financial performance (with 1 = strongly agree, and 5 = strongly disagree).

### Data collection and analysis

The data was collected from 13 factories in Meru and Kirinyaga counties. Data was both primary and secondary data. Responses were received from a sample of 57 employees from the 13 factories. The targeted respondents were the production managers, production assistant managers, production supervisors and field services coordinators. The secondary data was from the financial reports prepared by the factories accounts offices.

Primary data was collected and analyzed using descriptive statistics comprising of the mean and the standard deviation. The qualitative data was converted to quantitative for the analysis. The study looked at the financial performance of the tea factories before the innovation and after innovation. The financial data was analyzed by use of averages and t-test was done. The study compared the average cost of operations of the factories.

## RESULTS AND DISCUSSION

### Implementation of performance measurement

The study sought to know the perception of the employees on the implementation of various performance measures. The responses are provided in Table 1.

**Table 1: Performance Measurement.**

Descriptive Statistics			
	N	Mean	Std. Deviation
Financial performance measurement	57	4.5614	.50063
Employee performance measurement	57	4.4211	.49812
Customer satisfaction	57	3.9649	.84441
Processing management measurement	57	4.6140	.79629
Planned activities	57	4.1930	.58060
Impact on society	57	3.3684	.95677
Valid N (listwise)	57		

It can be observed from Table 1 that financial performance measurement and processing management measurement are implemented at a high rate in the factories.

### **Achievement of the objectives of adopting Electronic Weighing Solution**

The study sought to know the achievement of the EWS against the objectives of implementing it. The responses from the employees are presented in Table 2.

**Table 2: Effectiveness of the Electronic Weighing Solution.**

Descriptive Statistics			
	N	Mean	Std. Deviation
Reduce cost of labour	57	4.0351	.59656
Improve data processing	57	4.5439	.50250
Improve control of tea collection	57	4.6491	.48149
Improve on time needed	57	4.7193	.45334
Real time monitoring	57	4.3509	.48149
Valid N (listwise)	57		

The majority of the employees agreed that the objectives of EWS had been well achieved (Table 3).

### **Achievement of CFU objectives**

The objective of CFU was mainly to cut on the increasing labour costs, improve on quality of made tea, and increase efficiency of processing. The respondents were requested to give their perceived rating on the achievement of the objectives intended from this innovation. The ratings are presented in Table 3.

**Table 3: Achievement of firewood boilers.**

Descriptive Statistics			
	N	Mean	Std. Deviation
Cut on labour cost	57	4.5439	.50250
Cut on energy cost	57	2.9474	.91459
Improve quality of made tea	57	4.7018	.46155
Improve efficiency	57	4.8947	.30962
Valid N (listwise)	57		

### **Achievement of the objectives of firewood boilers**

The respondents were requested to give the rating of the achievement of the objectives of the firewood boilers as shown in Table 4.

**Table 4: Achievement of firewood boilers.**

Descriptive Statistics			
	N	Mean	Std. Deviation
Improve quality	57	3.3333	.91287
Environmental sustainability	57	3.3684	.97526
Cost of energy	57	4.5439	.78080
Cost of labour	57	3.0702	.52981
Valid N (listwise)	57		

The main objective, that is, cutting on fuel cost, was given a high rating as can be observed in Table 4. Accordingly, from the employees’ responses, the various innovations had achieved the intended purposes.

**Cost of processing**

From the employees’ responses, the innovations in regards to the cost of processing achieved the intended purposes. The researchers went further to analyse the financial data from the 13 companies. Average processing cost before innovation and after innovation was calculated as shown in Table 5.

**Table 5: The cost of processing.**

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Cost of production before innovation	106.7692	13	14.53246	4.03058
	Cost of production after innovation	92.3077	13	10.64882	2.95345

A paired sample t-test was computed as shown in Table 6.

In Table 6, the t-statistic is 3.973 and a p-value of 0.002. At 95% degree of confidence, since p-value less than 0.05, the researchers rejected the null hypothesis and concluded that the difference is statistically significant. This means that innovation has a positive impact on the financial performance KTDA managed factories.

**Table 6: T-test-statistic.**

Paired Samples Test									
Mean		Paired Differences					t	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	Cost of production before innovation- Cost of Production After Innovation	14.46154	13.12514	3.64026	6.53010	22.39298	3.973	12	.002

**Cost of fuel**

The study compared the cost of fuel before innovation and after innovation. The findings are tabulated in Table 7.

**Table 7: Cost of fuel.**

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Cost of production before innovation	12.1538	13	2.37508	.65873
	Cost of production after innovation	7.0769	13	.53409	.14813



It was established that the average cost of fuel has gone down from Ksh 12.1538 to Ksh 7.0769 after the innovation was adopted (Table 7). The researchers carried a t-test to evaluate whether there was any significant difference between the cost of fuel before the innovation and after innovation. The results are given in Table 8.

**Table 8: T-test carried to evaluate whether there was any significant difference between the cost of fuel before the innovation and after innovation.**

Paired Samples Test									
Mean		Paired Differences					<i>t</i>	<i>df</i>	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	Cost of production before innovation-Cost of production after innovation	5.07692	2.45668	.68136	3.59237	6.56148	7.451	12	.000

The *t*-statistic is 7.451 and *p*-value is 0.000. At 95% confidence interval, the *p*-value is less than 0.05, and thus the researchers rejected the null hypothesis and concluded that the difference is statistically significant (Table 8). This means that innovation has a positive impact on the financial performance of KTDA managed factories.

## CONCLUSION

The main objective of this study was to investigate the impact of innovation on the financial performance of KTDA managed factories. The study looked at the process innovation and organizational innovation. Under process innovation, the study analysed at the adoption of continuous fermentation unit and adoption of the firewood boilers. The objective of implementing CFU was to mitigate the rising cost of labour, and improve on quality and efficiency. The firewood boiler innovation was adopted as a way of cutting cost of fuels as the cost furnace fuel had gone up to high levels. For organizational innovation, adoption of EWS was considered. The results from the study indicate that innovation had a positive impact the financial performance of KTDA managed factories. This study agrees with other studies by different researchers who have studied the impact of innovation on financial performance of the organizations. Therefore, it is concluded that the move by KTDA to adopt innovations was positive and it (KTDA) should continue adopting innovations for the benefits of the farmers.

## REFERENCES

- Armbruster, H.; Bikfalvi, A.; Kinkel, S. and Lay, G. (2008). *Organizational Innovation: The Challenge of Measuring Non-Technical Innovation in Large-Scale Surveys*. Fraunhofer Institute Systems and Innovation Research, Breslauer Strasse 48, D-76139 Karlsruhe, Germany and Department of Business Administration and Product Design, University of Girona, Campus de Montilivi, Edifici P-I, 17071 Girona, Spain.
- Bartel, C. and Garud, R. (2009). The role of narratives in sustaining organizational innovation. *Organization Science*. 20(1): 107-117.
- Bell, G.G. (2005). Clusters, networks, and firm innovativeness. *Strategic Management Journal*. 26: 287-295.

- Cho, H. and Pucik, V. (2005). Relationship between innovativeness, quality, growth, profitability, and market value. *Strategic Management Journal*. 26(6): 555-570.
- Damanpour, F. (1996). Organizational complexity and innovation: Developing and testing multiple contingency models. *Management Science*. 42(5): 693-716.
- Elias Kiarie Kagira, E.K., Kimani, S.W. and Githii, K.S. (2012). Sustainable methods of addressing challenges facing smallholder tea sector in Kenya: A supply chain management approach. *Journal of Management and Sustainability*. 2(2): 75-89.
- Gunday, G. *et al.* (2012). Effects of innovation types on firm performance. *Journal of Production Economics*. 133(2): 662-676.
- Ismail, K. *et al.* (2013). Role of innovation in SMEs performance: A case of Malaysian SMEs. *Mathematical Methods in Engineering and Economics*. 145-149.
- Jimenez, J., D. and Sanz-Valle, R. (2011). Innovation, organizational learning and performance, *Journal of Business Research*. 64 (4): 408-417.
- Johannessen, J.A. (2008). Organisational innovation as part of knowledge management. *International Journal of Information Management*. 28(5): 403-412.
- Kotler, P. (2003). *Marketing Management*. Prentice Hall International. USA.
- Murat Atalay, M. and Sarvan, F. (2013). *The Relationship between Innovation and Firm Performance: An Empirical Evidence from Turkish Automotive Supplier Industry*. 2<sup>nd</sup> International Conference on Leadership, Technology and Innovation Management. 226-235.
- OECD and Eurostat (2005). *Oslo Manual-Third Edition: Guidelines for Collecting and Interpreting Innovation Data*. Paris.
- Ongong'a J.O. and Ochieng, A. (2013). Innovation in the Tea Industry: The case of kericho tea, Kenya. *Global Journal of Management and Business Research*. 13(1): 52-68.
- Schumpeter, J.A. (1934). *The Theory of Economic Development*. Harvard University Press, Cambridge.
- Standing, C. and Kiniti, S. (2011). How can organizations for innovation? *Technovation*. 31: 287-295.
- Vyas, V. (2009). *Innovation and New Product Development by SMEs: An investigation of Scottish food and drinks Industry*. Edinburgh Napier University PhD Thesis, Edinburgh.
- Wolfe, R. (1994). Organizational innovation: Review, critique and suggested research directions. *Journal of Management Studies*. 31: 405-431. Online: [www.ktdaTea.com](http://www.ktdaTea.com).