EFFECT OF TECHNOLOGICAL INNOVATION ON EXPORT VALUE ADDITION IN TEA SUBSECTOR IN KENYA

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CITATION: Mbui, C. K., Namusonge, G. S. & Mugambi, F. Effect of Technological Innovation on Export Value Addition in Tea Subsector in Kenya. *International Journal of Arts and Entrepreneurship* 4 (10), 126-136.

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Abstract

The general objective of this research was to study the effect of strategic management strategies on export value addition in the tea subsector in Kenya. Specifically, the study sought to evaluate the effect of technological innovation strategies on value addition for Kenyan tea exports. The study used a descriptive survey design. The target population was the entire cadre of employees in the top and middle level management in all the registered tea factories, tea exporters and tea packers in Kenya. The sampling frame for this study consisted of all the top and middle management employees of all registered tea factories, tea exporters and tea packers in Kenya. Data was collected from human resource departments of the sampled organizations. Two questionnaires were administered to randomly sampled employees in the cadres of senior management and middle management. Additionally, this study used stratified random sampling technique to categorize respondents from the three different subsectors so as to increase the chances of getting reliable and accurate information. Primary data through use of a likert scale questions was the main instrument of data collection which underwent pilot study to test the validity and reliability of the research instrument. After collecting data through questionnaires, it was prepared in readiness for analysis using statistical package for social sciences (SPSS) to generate descriptive and inferential statistics. Data was summarised using percentages, mean and standard deviation while F-tests was used to test the hypothesis. This was done using step by step method at 95% level of confidence. Pearson's product moment correlation (r) was derived to show the nature and strength of the relationship of the variables where Coefficient of determination (R^2) was used to measure the amount of variation in the dependent variable explained by the independent variable. All the analysis was done using SPSS statistical package. The study findings indicated that the management at tea subsector were concerned with attaining high profits and thus improved performance due to exportation of value added teas. The study findings indicated that technological innovation is a key driver in determining export value addition in tea subsector. This was evidenced by the responses from the respondents who agreed that their companies had created a centre of excellent for idea generation and innovation. Technology has been found to be the lifeline of any efficient operations of a successful company. It is therefore possible to conclude that the firms had invested in management information system such as ERP which facilitated flow of information. By embracing technology the organization can lead to doing online business which is made faster and easier by use of new technological changes.

Key words*: Technological Innovations, Export Value Addition, Strategic Management Practices*

1. INTRODUCTION

Tea is the second most popular non-alcoholic beverage in the world after water. Tea drinking originated from China in the sixth century BC. Tea is the leading foreign exchange earner in Kenya, contributing to about four (4%) percent of the country's Gross Domestic Product (GDP) (Kenya Tea Development Agency [KTDA], 2014). Kenya earned from tea Kshs. 112 billion, representing 26% share of the total export earnings in 2012. Black tea in bulk constitutes to about 85% of tea exports and 15% in value added form. Value added tea earns more revenue than bulk tea to the producer and to the country and also helps to create employment, amongst other benefits. There is, therefore, a strong case for tea value addition. This will also contribute to the realization of Kenya's Vision 2030 economic pillar that supports value addition by processing, packaging and blending the bulk of agricultural products, hence value addition will contribute to the growth of the economy which is expected to grow at a rate of 10% per annum (ROK, 2013).

Value added is a term frequently mentioned when discussing the future profitability of agriculture. In general, adding value is the process of changing or transforming a product from its original state to a more valuable state. Many raw commodities have intrinsic value in their original state. With the continuous shifting to a global economy, the international market for value-added products is growing. Market forces have led to greater opportunities for product differentiation and added value to raw commodities because of; increased consumer demands regarding health, nutrition, and convenience; efforts by food processors to improve their productivity and technological advances that enable producers to produce what consumers and processors desire (Biegon, 2009).

Efficiency is an important factor of productivity growth as well as stability of production in developing agricultural economics. In view of slow growth and increasing instability in tea production in Kenya, the tea economy of Kenya is expected to be benefited to a great extent from the study on technical efficiency studies. Estimates on the extent of inefficiencies could help decide whether to improve efficiency or to develop new technology to raise tea productivity in Kenya. In an economy where recourses are scarce and opportunities for a new technology are lacking, studies will be able to show the possibility of raising productivity by improving the industry's efficiency.

2. STATEMENT OF THE PROBLEM

Despite Kenya taking the tea export leadership position in the world in terms of volume, it takes a second position in earnings after Sri Lanka (ITC//WTO, 2010). In 2010, Kenya earned US$ 1.23 Billion from exports of 441 million kilograms of tea, while Sri Lanka earned US$ 1.37 Billion (or 10% higher) from export of 314 million kilograms (or 29% lower volumes) owing to higher prices for Sri Lanka exports. This means that the average tea export price realization by Sri Lanka in 2010 was higher at US$ 4.30 per kg compared to US$ 2.80 on average realized by Kenya, a difference of 35% in terms of value realization (ITC/WTO, 2010). According to the International Trade Center (2010), Kenya records a 31% share of the value in US dollars of bulk tea exported, followed by Sri Lank and India. Whereas in terms of non-bulk teas Sri Lanka, UK, India and the UAE top the list, but Kenya does not feature.

According to the Tea Board of Kenya (2014), the main reason for lower unit earnings from tea exports by Kenya is due to low export value attributed to selling tea in bulk form. Compared to Kenya, where bulk tea exports are over 90% of the total, Sri Lanka's bulk exports are lower at about 52%. Kenya tea exported in bulk to various markets is mostly blended and packed in packages of less than 3kgs and either sold within importing countries or re-exported for consumption in other countries. Assuming Kenya adopted similar levels of tea value addition like Sri Lanka (48%), and fetched similar average price of US$ 4.30 per kg in tea export price in 2010, the country would have fetched Kshs 125 Billion in tea exports earnings, an addition of Kshs 28 Billion. This unfortunate scenario could be a result of poor management practices being applied by Kenya tea exporters.

A strategic management approach through market promotions, partnerships, product diversification, cost leadership and technological innovation is needed in the management of the entire Kenyan tea subsector which may be denying the country substantial amounts of revenue that is associated with value added tea exports (Kenya Tea Board, 2014). Ngore, Mshenga, Owuor and Mutai (2011) determined the technological factors influencing decisions by meat agribusiness operators to add value to their products. Christine (2010) carried out a study on distribution strategies used by Chai Trading Limited to penetrate the Middle East markets in bulk tea exports. Muthenya (2008) studied cost management strategies used by KTDA to grow the

Gulf Region Markets. Biegon (2009) studied market expansion challenges facing the Kenyan tea industry in exporting of value-added (branded) tea.

As a consequence, this study has considered the least investigated practices for export value addition through technological innovation. Value added tea earns more than bulk tea to the producer and to the country and also helps to create employment, amongst other benefits. There is, therefore, a strong case for tea value addition. This will also contribute to the realization of Kenya's Vision 2030 economic pillar that supports value addition by processing, packaging and blending the bulk of agricultural products, hence value addition will contribute to the growth of the economy which is expected to grow at a rate of 10% per annum (ROK, 2013). It is in this view that this study sought to establish the effects of technological innovation on export value addition in tea subsector in Kenya.

3 PURPOSE OF THE PAPER

The purpose of this paper was to establish the effect of technological innovation on export value addition in tea subsector in Kenya.

4. LITERATURE REVIEW

Baten, Kamil and Haque (2010) investigated the productive efficiency of the tea industry using a stochastic frontier approach. Their study attempts to measure the status of technical efficiency of tea-producing industry for panel data in Bangladesh using the stochastic frontier production function, incorporating technical inefficiency effect model. The study estimates that the average technical efficiency of tea producing industries in Bangladesh is 59%. The results indicated that there is a great potential exists for tea industry to further increase the value added by forty one using the available input, technology and efficiency improvement, thereby reducing the cost of production. The study identifies that the mean efficiency of tea industries for value added vary among the regions and year-wise mean efficiency seems to be unstable during the study period and therefore, continued efforts to update technologies and equipment are required in pursuit of efficiency in tea industry.

While value creation is the ultimate goal of the firm, sustainable value creation requires that value is created for everyone involved: the customer, the service provider, the supplier, all the stakeholders. In the frameworks under consideration, all imply that service innovations require

all stakeholders to gain over the long-term for the interrelationships to be sustainable. However, the customer tends to be the initial focal point for driving value, (Johnson, 2010). According to Kleindl (2002) many industries have the geographic distribution of work changing significantly. For instance, service providers such as utility companies or banking or investment companies have their bill payment centers located far from some people, as a result firms have found that they can overcome this challenge and make their services accessible to users through technology. Mobile phones for instance have been the best source of technology where customers can transact without having to be physically present in the service companies. Furthermore, such arrangements can take advantage of the time differences so that critical projects can be worked on nearly around the clock. Technology provides the opportunity to fasten service provision to customers which has helped in avoiding people joining large queues just to pay for their utilities or to get other services. For instance, Kenya Revenue Authority initiative of the online PIN (personal identification number) registration assisted in registering so many people who never had their personal identification numbers just because they "feared" the long queues in the KRA towers (Kleindl, 2002).

Githii, Kimani and Kagira (2012) examined the strategies to curb challenges facing small holder tea sector in Kenya. The researchers provided some solutions to the challenges, borrowing from some supply chain management practices to culminate into competitive strategies. Various strategies to enhance competitiveness in this sector were outlined and among these strategies are: supplier and customer relationships, value addition, information technology and flexibility in internal operations/processes.

5. METHODOLOGY

This study adopted a descriptive survey design. The target population comprised of all entities in the tea subsector. The study purposely concentrated on only tea subsector because it was expected the players would have the relevant and accurate information needed in this study. This study therefore comprised of 107 tea factories, 75 tea packers and 72 tea exporters from which the target and accessible population was drawn. Target and accessible population comprised of management and supervisory employees in tea subsector in Kenya. The study concentrated on only tea factories because it was expected that the players have the relevant and accurate information needed in this study. The study used a systematic random sampling technique to

come up with 50% of the target firms (127 firms). According to Mugenda and Mugenda (2003) a sample of 10% of the accessible population is considered as adequate sample. From the 127 firms the study chose two respondents, each drawn at random from top management and middle level management. A sample of 256 respondents was selected through stratified random sampling.

Table 1.1: Sample Matrix

Category	Tea Factories	Tea Packers	Tea Exporters	Sample size
Senior Management	54	38	36	128
Middle Management	54	38	36	128
Total	**108**	**76**	**72**	**256**

Data was collected, coded and analyzed using SPSS version 20.0. The findings were presented in form of tables and pie charts and discussions and interpretation of the same given.

6. RESULTS AND DISCUSSIONS

The objective of the study was to establish the effect of technological innovation on export value addition in tea subsector in Kenya. Results in Table 2 indicated that 37.5% of the respondents agreed that their staffs are trained on how to use E-commerce, another 37.5% agreed that their systems are adequately supported by ERP and 70.8% agreed that they have a budget for new equipment. In addition 74% of the respondents agreed that their equipment meet international standards, 56.7% agreed that their equipment are automated and robust to produce for export markets and 74.5% agreed that their top leadership supports technology and innovations. The mean score for responses for this section was 3.57 which indicates that majority of the respondents agreed that technological innovations was a key determinant of export value addition in tea sector.

The study findings are consistent with Furseth and Cuthbertson (2013) who provided a new framework for technological innovation based on an extensive literature review, semi-structured interviews with some of the best known thinkers and practitioners in the field of innovation, as well as supported through case study analysis, in order to identify the components of technological innovation and their interrelationships, especially with respect to creating value

through the innovative management of business models, service systems and the resulting customer experiences. The result of this research is the technological innovation triangle, a simple but rich model, consisting of nine integrated elements in three layers. The technological innovation triangle can be used by firms to explore innovation opportunities for themselves, customers, and suppliers, as well as providing a foundation for future research in the area of technological innovation.

Results are in line with Githii, Kimani and Kagira (2012) who examined the strategies to curb challenges facing small holder tea sector in Kenya. The researchers provided some solutions to the challenges, borrowing from some supply chain management practices to culminate into competitive strategies. Various strategies to enhance competitiveness in this sector were outlined and among these strategies are: supplier and customer relationships, value addition, information technology and flexibility in internal operations/processes.

Table 2: Technological Innovation Descriptive

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Likert Mean
Our staff are trained on how to use E-commerce	10.4%	21.4%	30.7%	30.2%	7.3%	3.03
Our systems are adequately supported by ERP	9.4%	14.1%	39.1%	24.0%	13.5%	3.18
We have a budget for new equipment	0.5%	9.9%	18.8%	47.4%	23.4%	3.83
Our equipment meet international standards	3.1%	4.7%	18.2%	43.8%	30.2%	3.93
Our equipment are automated and robust to produce for export markets	5.7%	9.9%	27.6%	38.5%	18.2%	3.54
Our top leadership support technology and innovations	3.1%	8.9%	13.5%	41.7%	32.8%	3.92
Average	5.4%	11.5%	24.7%	37.6%	20.9%	3.57

Regression analysis was conducted to empirically determine whether technological innovation is a significant determinant of export value addition in tea subsector in Kenya. The coefficient of determination R^2 and correlation coefficient (r) shows the degree of association between the independent variable and export value addition. The results of the linear regression indicate $R^2 =$ .568 and R= .754 as shown in Table 3. This is an indication that there is a strong relationship

between independent variable; technological innovations and the dependent variable export value addition.

From the model summary table below adjusted R^2 was 0.566 this indicates that technological innovations explain 56.6% of variations in export value addition in tea subsector. Therefore further research should be conducted to investigate these other factors that affect export value addition in tea subsector in Kenya.

Table 3: Model Summary for Technological Innovation

Indicator	Coefficient
R	0.754
R Square	0.568
Adjusted R Square	0.566
Std. Error of the Estimate	0.33407

The technological innovation coefficients are presented in Table 4.49. The results show that technological innovation contribute significantly to the model since the p-value for the constant and gradient are less than 0.05. The fitted equation is as shown below

$Y= 2.291 + 0.523X_5$

The findings imply that one positive unit change in technological innovations led to a change in export value addition at the rate of 0.523. This confirms the positive effect of technological innovation on export value addition in tea subsector in Kenya. The study findings are consistent with Furseth and Cuthbertson (2013) who provided a new framework for technological innovation based on an extensive literature review, semi-structured interviews with some of the best known thinkers and practitioners in the field of innovation, as well as supported through case study analysis, in order to identify the components of technological innovation and their interrelationships, especially with respect to creating value through the innovative management of business models, service systems and the resulting customer experiences. The result of this research is the technological innovation triangle, a simple but rich model, consisting of nine integrated elements in three layers. The technological innovation triangle can be used by firms to explore innovation opportunities for themselves, customers, and suppliers, as well as providing a foundation for future research in the area of technological innovation.

Results are in line with Githii, Kimani and Kagira (2012) who examined the strategies to curb challenges facing small holder tea sector in Kenya. The researchers provided some solutions to the challenges, borrowing from some supply chain management practices to culminate into competitive strategies. Various strategies to enhance competitiveness in this sector were outlined and among these strategies are: supplier and customer relationships, value addition, information technology and flexibility in internal operations/processes.

Table 4: Coefficients of Technological Innovation

Variable	Beta	Std. Error	t	Sig.
Constant	2.291	0.121	18.995	0.000
Technological Innovation	0.523	0.033	15.806	0.000

7. CONCLUSIONS AND RECOMMENDATIONS

Technological innovation was found to statistically significant in explaining value addition in tea subsector in Kenya. Technology has been found to be the lifeline of any efficient operations of a successful company. It is therefore possible to conclude that the firms had invested in management information system such as ERP which facilitated flow of information. By embracing technology the organization can lead to doing online business which is made faster and easier by use of new technological changes. All in all it is evident that value creating relationships enhance competitive advantage which then enhances market share, profits, customer satisfaction and sales growth. The findings are in line with Baten, Kamil and Haque (2010) who measured the status of technical efficiency of tea-producing industry for panel data in Bangladesh using the stochastic frontier production function, incorporating technical inefficiency effect model and found that there is a great potential exists for tea industry to further increase the value added by forty one percent using the available input, technology and efficiency improvement, thereby reducing the cost of production. This therefore implies that the mean efficiency of tea industries for value added vary among the regions and therefore continued efforts to update technologies and equipment are required in pursuit of efficiency in tea industry.

Technology is revolutionizing the world in all faculties. It is however surprising that it is not the choice means of information collection and monitoring particularly with regard to internal and external tea exporting company environmental assessment. The management of the tea exporting

companies should enhance the use of technology in all if not most of their areas of operation. The government should support the tea exporters by reviewing the multiple taxes and ensure that the global intense competition from multinational companies is reduced to see the Kenyan tea subsector flourish.

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