Global Journal of Management and Business Research
Volume 13 Issue 1 Version 1.0 Year 2013
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4588 & Print ISSN: 0975-5853

Innovation in the Tea Industry: The Case of Kericho Tea, Kenya

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Abstract - Innovation is noted to be a necessary ingredient for the sustained success of firms. It protects both tangible and intangible assets against the erosion of the market. In Kenya, the tea industry has been hit by a downward trend in prices against the backdrop of rising production costs, the highest being labour costs. Some tea firms in Kericho have initiated mechanical tea harvesting operations, in an attempt to mitigate the rising production costs and stiff competition. This has been undertaken as an innovative measure to ensure the success of the respective tea firms. Though the initiatives seem to play in favour of the owners of the tea firms, it has been met with mixed reactions, from varied centers. First, there is incongruency between the factories processing capabilities and the availability of mechanically harvested leaf. Second, there is a feeling and resistance amongst the labourers, that machines are likely to push them out of productive employment.

The major objective of this study was to establish effects of innovation on performance of tea firms in Kericho town Kenya. The study used both primary and secondary data from sampled respondents. The research was primarily a correlational where by Kericho town was representative because of the concentration of major multinational tea firms in the country. The population of the study comprised of a five major tea firms in Kericho town. A stratified random sampling technique was used. Results were analyzed using measures of central tendency like mean, mode and median to present qualitative findings. Regression analysis was used to establish the relationships between innovation dimensions and performance indications. The study revealed that innovative strategies adopted resulted into increased revenues, high productivity levels and reduced costs. The study therefore recommends the tea mechanical harvesting operations as an important method of adopting innovation.

Keywords : *innovation, tea firms, tea industry.*

GJMBR-A Classification : *JEL Code: 820302*

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I. Introduction

A Product operationalizes both market technologies issues into a particular configuration of the four P's of marketing, product viz., price, position in the market and placement in distribution. A comprehensive definition may be unclear though it frames the development efforts, so that the innovators can fill in the details and operationalize the product into the physical configuration of attributes. This product concept enables them to learn because they can then fine-tune the idea or respond to market shift or mistakes in earlier knowledge development. Failed innovators work with an incomplete or partial product definition, so they are continually surprised by aspects of the product configuration that they have not conceptualized. With new products, too many factors emerge too quickly for the unprepared to respond to with a comprehensive product conceptualization innovators can continually assess the uncertainty of their efforts at least qualitatively and make an informed judgment, as to whether they should cancel the effort or shift to another more feasible market (Cynthia 1994).

The conventional meaning of the term marketing largely refers to new product related breakthroughs. As a result, the innovation focus in marketing literature has been relatively product intensive. Market orientation, however, involves not only improvements in product related aspects, but also facilitation of the administrative facets in an organization. This requires studying innovation with a broader scope and making the distinction between technology and administrative related innovations (Han 1998).

The role of an innovation system is to increase the efficiency of the innovation process. The system needs to move great ideas from concept to commercialization with speed and minimum use of resources. It is especially relevant for incremental innovation, where following a defined set of stages and decision points accelerates time to market and increases the return on resources invested. Innovation systems create the appropriate lines of communication within the company and with outside constituencies. As the innovation team demands specialized knowledge from other parts of the organization, systems facilitate timely access to it. They align the objectives of various constituencies. People throughout an organization need to understand the company strategy and its implications for operations. They also align organizational objectives with personal objectives. The information regarding the innovation performance needs to be communicated and compared with innovation objective (Davila, 2006).

a) Statement of the Problem

Since 2004, tea firms in Kericho have been adopting innovative strategies in creating product design and in production technology with hope of improving their productivity. In spite of this innovation, little is known regarding the extent to which innovation

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impacts on the performance of the tea firms in Kericho. This study therefore investigated the impact of innovative strategies on tea firms' performance. Some of the innovative strategies could have serious negative impacts on the living conditions of the people in the tea industry. For example, there could be mass unemployment, redundancies and accelerated poverty due to some of the innovative strategies. Innovation is a necessary ingredient for sustained success of firms. It protects both tangible and intangible assets against the erosion of the market. Innovation too is an integral part of the business and as such it has to be managed.

b) Research Objectives

The overall objective of this study was to establish effects of innovation on the performance of tea firms in Kericho town, Kenya. Specific objectives of the study were to:-

i. Identify innovative strategies adopted by tea firms in Kericho, Kenya.
ii. Establish the extent of implementation of innovative strategies within Kericho tea firms.
iii. Determine the effect of innovation on performance of the existing employees of tea firms in Kericho, Kenya.

c) Research Questions

i. What are the innovative strategies adopted by tea firms in Kericho?
ii. What is the extent of implementation of innovative strategies within Kericho tea firms?
iii. What are the effects of innovation on performance of the existing employees of tea firms in Kericho, Kenya?

d) Scope and Limitations

The study covered 3 tea firms in Kericho. Due to the financial constraints, the study concentrated in Kericho town to represent the tea firms in Kenya.

e) Justification of the Study

Innovation is the new cost driver in the tea industry. Results of this study will provide investors in tea business with information on which they could benchmark to ensure customers get quality services. The findings in this study will be useful to academicians in expanding knowledge on relevance of innovation in the tea industry. Once the tea firms use the findings to improve their service provision customers will benefit by getting value for their money. Professionals in the tea industry will also know on which innovative strategies dimension to concentrate their efforts for maximum benefit. It is widely acknowledged that technology change and innovation are major drivers of economic growth and lie at the very heart of competitive process. Since the pioneering study of Solow (1957) the contribution of technological change to economic growth has been estimated by an endless number of contributions aiming at squeezing the residual using additional production factors related to technological knowledge. The relationship between technological change and economic performance has represented the research focus of another stream of literature in the neo - Schumpeterian tradition.

f) Conceptual Framework

Innovation is new combination of the production function; the major yard stick used to measure business success is increased revenues and minimized labour costs. This output, however, is achieved after the various inputs in organizational innovation in the tea industry undergo favorable business competition. The inputs in the tea business in this regard include, new technology of harvesting tea, highly skilled manpower, new production technique. Thus, the tea business output, in this case is denoted by more revenues generated, minimized labour costs and operational costs, and increased overall output, is a function of how these business inputs interact. It means an innovation system that is efficient increases the innovation process. This study seeks to establish the kind of relationship existing between innovation and organizational performance in the tea industry. Profitability levels are influenced by how organizational innovation inputs interact as presented by figure 1 below:

The figure illustrates how dependent/independent variables and intervening variables create impact.

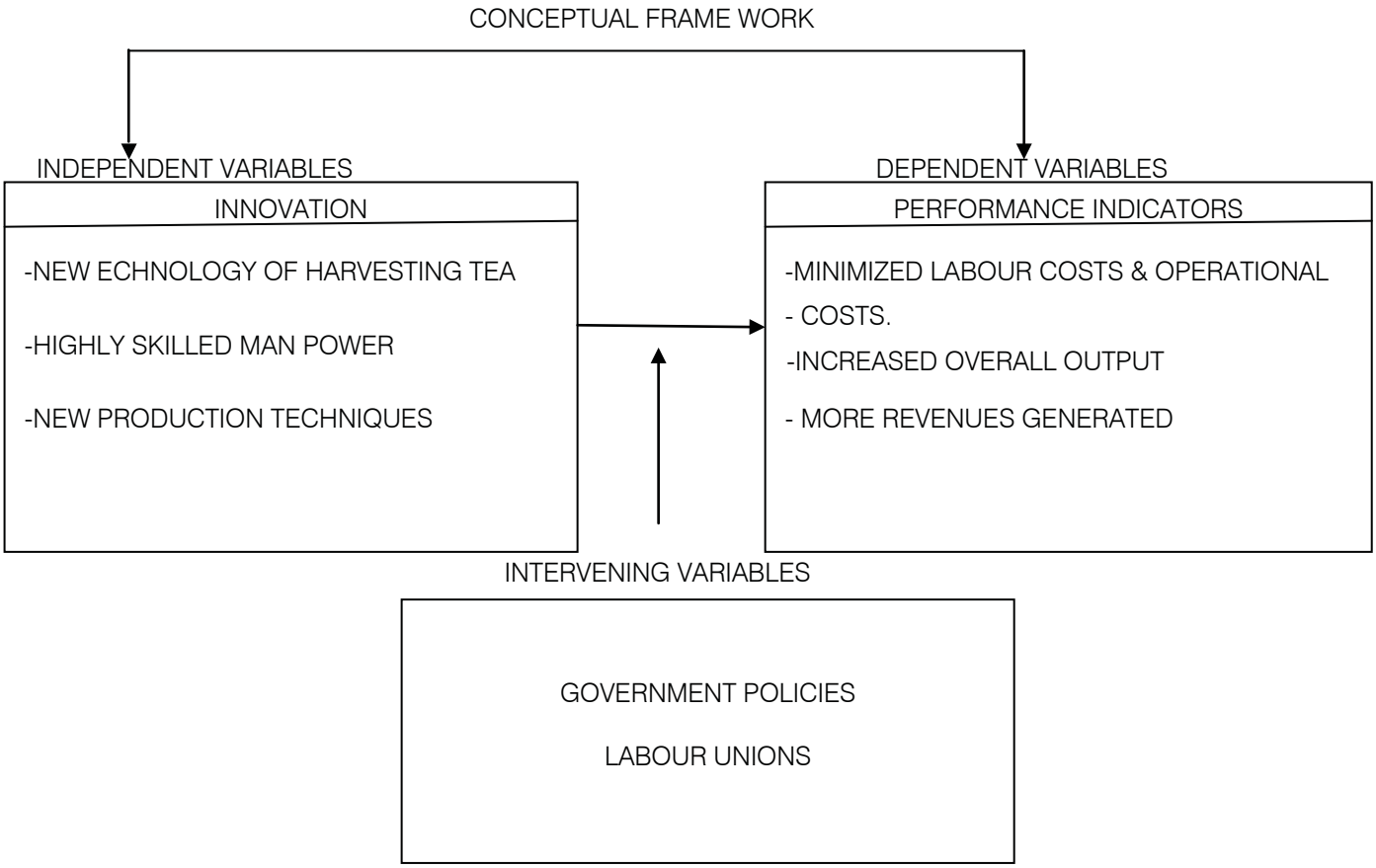

Figure : Dependent and Independent variables

Source : Authors'

The figure shows the relationship between the dependant variable (minimized labour costs and operational costs, increased overall output, and more revenues generated) and independent variable (New Technology of harvesting tea, highly skilled man power, and new production techniques. The impact of organizational innovation on firms performance illustrates the following relationships. The dependent variables are influenced by the independent variables to achieve tea firms performance in the tea industry as a result of innovative strategies. The more the tea firms adopt innovative strategies in terms of New Technology adopted to harvest tea leafs as opposed to manual labour, it leads to increased overall output as a result of minimized labour costs as a cost cutting measure. The cost of hiring labour, would be a reduced lean and efficient labour force highly trained and well remunerated. Tea firms would find it economical and cheaper to use mechanized plucking methods than manual labour. But above all the intervening variables would oppose mechanized Agriculture, because Government policies would see this as a way of multi-national tea firms pushing tea labourers out of productive employment, and hence losing a source of income.

a) Customer Orientation

Some researchers consider customer orientation as important as competition focus and inter-functional coordination (Narver and Slater, 1990), others consider it the most fundamental aspect of corporate culture (Deshpande, Farley and Webster, 1993) demonstrated a positive correlation between customers orientation an d innovative firms, but they do not make the distinction of whether the firms are innovative in technical or administrative aspects. Organizations committed to superior customer value, however, have been shown to be innovative throughout their entire business system as opposed to solely in products or services (Parsons, 1991).

b) Competitor Orientation

Customer focus might play a key part in the strategy to create superior customer value, but an effective strategy requires more than simply customer-centered methods. Day and Wensley(1988) propose that a balanced mix of customer and competitor orientation is a requisite for maintaining a competitive

advantage in the Market place, which is consistent with Narve and Slater's (1990) equal weighting of market orientations core components. The link between organizational innovation and performance stands as the most concordantly documented part of the postulated market-orientation, innovation, performance chain.

The rational behind organizational innovativeness showing a strong, positive influence on performance is ascribed to innovations that solved to accommodate the uncertainties (market and technological turbulence) a firm faces in its entrepreneurial environment (Ettlie and Bridges (1982). Accordingly technical innovations have a positive direct impact on performance. In Damanpours (1991) P 560, conceptualization, technical innovations pertain to products, services and production process technology, they are related to basic work activities and can concern either product or services.

c) Performance Indicators

The key performances indicators shall include minimized labour costs, increased overall output, more revenues generated. Technological change in agriculture is essential to reducing poverty, fostering development, and stimulating economic growth in many developing countries. Hence, the identification of how investments in and policies for improving agricultural education, research, and extension can efficiently promote technological change is an important issue for both researchers and policymakers (Alston, Pardey, and Taylor 2001; Alston, Norton, and Pardey 1998).

II. Literature Review

A critical issue facing companies today is how to create and maintain a sustainable competitive advantage within a turbulent and complex business environment, often in a turmoil, facing an unpredictable and unstable future. The industrial organization theory which emphasizes barriers to competition and the resource-based view, which suggests that firms are fundamentally idiosyncratic. As a consequence of the increase in complexity and turbulence in the business environment, there is a need for a more immediate response to changes in customer needs. Archibugi and Michie argue that contemporary economic systems have become more knowledge-intensive than in the past. Continuous changes in the state of knowledge produce new disequilibrium situations and therefore, new profit opportunities, and they do so at an increasing pace. Unfortunately for m any companies, so does imitation, creating a dynamic competitive process. Thus, as the competitive process eliminates an opportunity, changes in the stream of knowledge produce other opportunities.

According to Shelton et al (2006), Innovation has experienced a remarkable change in recent years as a consequence of a number of factors including the advance of science and technology and the increasing globalisation of a number of markets and activities. The growing heterogeneity of sources affecting the process of firms' innovation has led to the knowledge created out of the companies themselves achieving greater importance, and therefore to the central role to be played by the capacity of integrating inner and outer sources of technological capabilities with other competitive forces. Similarly, the acceleration of internationalisation at most economic and social levels has increased the necessity for exploiting firms' advantages at international (sometimes world) level and seeking new competitive (technological) assets in a multinational framework. Moreover, the specialised research has reached a common conclusion that sectoral features have a remarkable influence on the possibilities and organisational modes of innovatory activity.

The pioneer of innovation theory Joseph A. Schumpeter believes that innovation is a new combination of the production function, the purpose of which is to obtain potential excess profits. Innovation can be summed up into five types: (1) producing new products, (2) introducing new production methods and new process, (3) exploiting new markets, (4) developing new raw materials or semi-manufactures supply sources and, (5) introducing or redesigning new organization. Since then, researchers have put these five innovation forms into two categories, with the former four referring to technological innovation, and the fifth one referring to organizational innovation. Further, Nelson argued that technological innovation involves not only the first time introduction of new technology, but also the diffusion of technology, and such diffusing process depends greatly on the accumulation and development of all kinds of knowledge. In this paper, the analysis of innovation in SMEs covers both technological innovation (i.e. generation of new technology, and its use and diffusive process) and organizational innovation (i.e. reconstruction of clustering elements or resources, or a new organizational configuration, and achieving re-selection and optimization of strategic goals through the sharing of knowledge, networking and collaboration).

On the other hand, the significance of the spillovers of knowledge from external sources has been increasingly recognized in the process of innovation and economic development. A number of literatures suggest that knowledge spillovers are centered on spatial proximity such as industrial clusters, and that a wider and faster diffusion of knowledge spillovers can be achieved by actively stimulating cooperative relationships or motivated by several economic actors including local government, intermediary networks, (Feldman 1999, Krugman 1999, Breschi and Lissoni 2001).

a) Organizational innovation strategy

According to Davila (2006) a company's innovation strategy needs adjustment over time. A number of internal and external factors affect the selection of the best innovation strategy. These affect the choice of the innovation strategy and the shape of the portfolio or play to win or play not to lose. The purpose of innovation is to create business value. That value can take many different forms, such as incremental improvements to existing products, the creation of entirely new products and services, or reducing costs, etc. The reason to do this is because we want our enterprise to survive, and to grow, and in a rapidly changing market the only way to do either is to innovate effectively. In the history of business, it's clear the effective innovators have a better chance of surviving, and non-innovators tend not to survive at all. The method of innovation is to develop ideas, refine them into a useful form, and bring them to fruition the market where they will hopefully achieve profitable sales, or in the operation of the business where they will achieve increased efficiencies.

i. *Internal Factors*

Technical capabilities-The amount of technology innovation depends to a large extent upon the current capabilities that the company has internally or can access through its innovation network. A company that has traditionally competed on its marketing skills and incremental technology improvements will have a tough time suddenly including a semi radical technology dimension to its strategy (Mark J, 2006).

First, Organizational capabilities -the ability to nature innovation also depends on whether the company has the organizational capabilities to do it than shifting to a more radical innovation approach will not happen if the organizational and management capabilities are not present. Secondly, Success of the current business model-the difficulty that successful companies have in changing has been repeatedly documented. It has been described as core capabilities becoming core rigidities or the inability to grow internal ventures in successful companies. The greater the success, the greater the potential resistance to change. Thirdly, Funding- having the necessary economic resources in an obvious, albeit sometimes forgotten, requirement. However too much funding may be as dangerous as too little. For example the start ups of the late 1990's and early 2000 were funded with a lot more money than they actually needed. The result was a waste, misallocation of resources chasing business models that were inadequately tested. A less generous funding environment forces innovation teams to carefully plan and test the assumptions of the model before scaling up top management Vision- The last internal factor is top managements vision. Management has a large set of options to position, the company and managements talents has a very relevant role in selecting and evolving the company's innovation strategy (Jin, K 2006).

ii. *External Factors*

Internal factors are not only formative forces, external forces can also shape the innovation strategy. Capabilities in the external network - Accessing relevant capabilities is crucial.

Development of new technology or business models usually requires collaborations with other organizations that have complementary resources, for this you need a network that reaches inside and outside of your organization. The ability to create sustainable alliances to create sustainable alliances with these partners become important in deciding the innovation strategy going forward.

According to Olaisen (1997), industry structure is an important factor. A careful analysis of this structure points out where the main obstacles and opportunities for innovation reside. Understanding the dominant industry value chain, who dominates and why, and the structure of the barriers to entry are important inputs to the design of an innovation strategy.

Competition, which refers to the quality and speed of innovation of the competitors as well as own innovations will determine the shape of the market in the years to come. While own organization may be well positioned in the current market, competitors could change or new competitors could enter especially if the competitive dynamics change drastically. Useful Questions usually include: do strategies of the competitors open any doors for one to adopt a plan to win approach? Does their approach make a play not to lose strategy relatively attractive? Without a clear innovation leader present in the arena, is an outsider likely to jump into the game and change the rules? Rate of technological change: As the world becomes technologically advanced, the file of a product will become shorter and shorter when new advances outdate your product, it is important to identify the change approaching before your product goes stale. Successful long term products can sometimes blind companies to new trends that will ultimately be picked up their competitors, the competitor's dilemma updating and improving your company's innovation strategy must address these elements. However no formulae will yield the best strategy, each company is unique even though they may share the same competitive environment (Daniel, J 2004)

What is considered a threatening situation for one company, resulting in a play not to lose strategy could be considered an opportunity for another. When deciding what innovation strategy to pursue, risk management comes quickly to mind. Assuming that no significant disruptions occur to the competitive arena, as

we move up and right on the innovation matrix, the level of risk that we take is higher (Davila, 2006).

For companies intent on leading and changing the industry the centre of gravity of investment will move more towards the semi radical and radical changes innovation quadrants. These companies rely on being first and creating value through larger steps of technology on business model innovation. However, in order not to increase their risk unnecessarily, these companies invest enough in incremental innovation to be fast followers and quickly assimilate the little steps that their more conservative players take. The centre of gravity and the breadth of the innovation portfolio determine the level and type of risk that needs to be managed during execution (Michael et al, 2002)

b) Organizational Innovation and Performance

According to Hitt (2002) the current literature on organizing for innovation as part of the entrepreneurial/management contains at its heart a contradiction. A number of authors have argued that innovation requires a different kin2 of organization than administrative management. The organization needs to empower individuals to act on opportunities (Amit Brigham and Markman, 2000). They need to develop the cellular organizational form in which each cell shares characteristics with the other cells. But a research stream with many different sources both old and new argues that these characteristics cannot co-exist with the traditional organization.

Burns and Stalker (1961) argue that organizations cannot be both organic and mechanistic. Ghemawat and Ricart Costa (193) argued that an organization cannot be efficient in both a static sense and dynamic sense. March (1991) argues that organizations must trade off gains in average performance through "exploration" similar to discovery or entrepreneurial management against the reduction in variance in returns gained through "exploitation (similar to coordination, or administrative management). Organizational learning increases the return to exploitation in the short run but is likely to weaken overall returns in the long run. According to Georgellis, (1999) entrepreneurial organizations in the private and public sectors have been the subject of increased attention over the last two decades.

Subscribing to the Schumpeterim view that careful management alone does not address the requirements of competitive system previous studies focused on innovation as offering the best prospect of theorizing an entrepreneurial organization. As Schumpeter (1951) argues, innovation and investment that enable business to be blazing new trials are crucial for business success. Without innovation, automatic decline is inevitable. The argument has been carried into the present period by Drucker (1985), who highlights the importance of innovation as a key characteristic of an entrepreneurial business. Previous studies examining the relationship between firm size and diffusion of innovation find that small firms may lag behind large firms in adopting innovations owing to required critical, threshold firm size that will make innovations profitable. (David 1969, Davies, 1979).

According to Georgellis(1995) in early 1990's there was a renewed interest in mapping organizational processes in an effort to design more efficient and streamlined processes that will help organizations to achieve breakthrough in reducing costs and increasing productivity. This was often seen as especially useful for large business and multi-national corporations that had become operationally flabby (Hammer and Champy, 1993; Johnson et al, 1993). This pre occupation with operation al effectiveness however coincided with a renewed interest in innovation as a source of competitive advantage (Porter 1991, Hamer and Prahalad, 1994) it seems therefore that innovation management can concentrate on the engineering processes to improve operation or it can concentrate on new products and services.

From the foregoing it is evident that innovation is a necessary ingredient for sustained success of firms. It produces changes that are essential to the survival of a company. Since 2004 tea firms in Kericho have adopted innovative strategies in creating product design and production technology with a hope of improving their productivity. Despite these efforts, very little knowledge currently exists with regard to the effects of innovation on employees within the firms. The current study therefore is an attempt to unveil these effects i.e. if they do exist.

III. Methodology

This section dealt with the methodology used and various techniques used in data analysis and results presentation.

a) Study Areas

i. *Kericho Town*

Kericho town is situated in the famous rift valley province, Kenya. It is a tea growing zone, over 70% of the population is engaged in agricultural activities mostly as small-scale farmers. Three multinational ten firms namely James Finlay's Kenya Limited, Unliver Kenya limited & George William son Tea Company Limited was selected randomly according to their performance for the study.

b) Research Design

This was a two month study which involved correlation analysis investigations and both quantitative and qualitative data was collected from primary and secondary sources. Data was collected in Kericho town specifically from James Finlays Kenya Limited, Uniliver Kenya Limited and George Williamson Tea Company

Limited. Structured questionnaires, key informant interviews (KII) and observation guides were used to determine the relationships between innovation and performance in the tea obtained in the tea industry. Secondary data was obtained from internal company reports, journals, and company newsletters, to supplement primary data.

c) Study Population

There are five major tea firms in Kericho town involved in large scale tea production. Namely James Finlay's Kenya Limited, Uniliver Kenya Limited, Sotik Highlands produce Company Limited, George Williamson tea company limited based on their performance output.

d) Sample Size

The sample size was determined from the respondents working in major multinational tea companies, managers &employees in Kericho town, Kenya, who gave their informed consent to participate in the study. The sample size was derived from the target population with in tea firms in Kericho based on their past performance. This was 21 respondents

e) Data Sources And Data Collection Methods

Primary data was collected using structured questionnaires, key information interviews and observation guides were used and collected from estate managers in the plantation fields and labourers. Secondary data was also collected to supplement primary data through company internal reports and News letters.

f) Data Analysis And Presentation

Quantities data analysis was aided by statistical package for social science (SPSS). Data analysis was done using measures of central tendencies like means mode, and medium to present qualitative findings. Percentages were used to convert qualitative information into numerical format.

IV. Results And Discussion

a) Organizational Innovation

i. Technology

Table 4.1 : Development of new Technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NOT AT ALL	4	13.3	13.3	13.3
	TO A LITTLE EXTENT	5	16.7	16.7	30.0
	TO A MODERATE EXTENT	6	20.0	20.0	50.0
	TO A GREAT EXTENT	9	30.0	30.0	80.0
	TO A VERY GREAT EXTENT	6	20.0	20.0	100.0
	Total	**30**	**100.0**	**100.0**	

Source : Field Data

From the table 4.1 above, the respondents were asked about the effect of their respective firm's innovativeness on development of new technologies. The tea pickers responded as follows: 30% to a graet extent agree innovativeness affect development of new technologies while 20% to a very graet extent agree and 20% to a moderate extent agrees while 16.7% to a little extent agree while 13.3% do not at all agree.

ii. *Adoption of new technologies*

Table 4.2 : Adoption of new technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	10	33.3	33.3	33.3
	TO A LITTLE EXTENT	9	30.0	30.0	63.3
	TO A MODERATE EXTENT	6	20.0	20.0	83.3
	TO A GREAT EXTENT	3	10.0	10.0	93.3
	TO A VERY GREAT EXTENT	2	6.7	6.7	100.0
	Total	**30**	**100.0**	**100.0**	

Source : Field Data

From table 4.2 above, it is noted that adoption of new technologies, the majority 33.3% do not at all their firms are adopting new technologies despite their development. This is followed by to a little extent (30%), moderate extent (20%), a great extent 10% and a very great extent at 6.7%. The essential elements of innovation and adoption of new technology system include (a) a knowledge and education domain, (b) a business and enterprise domain, and (c) bridging institutions that link the two domains. The knowledge and education domain and is composed of the agricultural research and education systems. The business and the set of value chain actors and activities that both use outputs from the knowledge and education domain,and innovate independently. Between these domains are the bridging institutions—extension services, political channels, and stakeholder platforms—that facilitate the transfer of knowledge and information between the domains.

iii. *Use of information technologies*

Table 4.3 : Use of Information Technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	8	26.7	26.7	26.7
	TO A LITTLE EXTENT	4	13.3	13.3	40.0
	TO A MODERATE EXTENT	7	23.3	23.3	63.3
	TO A GREAT EXTENT	5	16.7	16.7	80.0
	TO A VERY GREAT EXTENT	6	20.0	20.0	100.0
	Total	**30**	**100.0**	**100.0**	

Source : Field Data

The respondents were further asked on the use of information technologies. The survey revealed that the firms' use of information technology is to a very great extent (20%), to a great extent (16.7%), to a moderate extent (23.3%) while 13.3% to a little extent acknowledge use of information technology in their innovation while 26.7% do not at all.

b) Products

i. *Developments of new products*

Table 4.4 : Development of New products

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	9	30.0	30.0	30.0
	TO A LITTLE EXTENT	4	13.3	13.3	43.3
	TO A MODERATE EXTENT	7	23.3	23.3	66.7
	TO A GREAT EXTENT	8	26.7	26.7	93.3
	TO A VERY GREAT EXTENT	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Source : Field Data

In terms of product innovation, 30% of the respondents replied that they do not at all develop new products, while 13.3% to a little extent develop new products, 23.3% (moderate extent), and 26.7% to a great extent innovate for product development with only 6.7% deveping new products to a very great extent.

Table 4.5 : Increased Variety of Products

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	4	13.3	13.3	13.3
	TO A LITTLE EXTENT	9	30.0	30.0	43.3
	TO A MODERATE EXTENT	6	20.0	20.0	63.3
	TO A GREAT EXTENT	7	23.3	23.3	86.7
	TO A VERY GREAT EXTENT	4	13.3	13.3	100.0
	Total	30	100.0	100.0	

Source: Field Data

On whether innovation increases variety of products, the respondents agreed to a little extent (30%), moderate extent (20%), to a great extent (23.3%) and to a very great extent (13.3). Implicit throughout the system are farmers—both as consumers and producers of knowledge and information, as producers and consumers of agricultural goods and services, as bridging institutions between various components, and as value chain actors. Beyond the borders of the system, though nonetheless important, are influencing factors such as linkages to other sectors of the economy (manufacturing and services); general science and technology policy; international actors, sources of knowledge, and markets; and the political system.

ii. *New Packaging*

Table 4.6 : New packaging

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	6	20.0	20.0	20.0
	TO A LITTLE EXTENT	11	36.7	36.7	56.7
	TO A MODERATE EXTENT	5	16.7	16.7	73.3
	TO A GREAT EXTENT	2	6.7	6.7	80.0
	TO A VERY GREAT EXTENT	6	20.0	20.0	100.0
	Total	30	100.0	100.0	

Source : Field Data

New packaging as innovation strategy has impacted on the products to a little extent (36.7%), to a moderate extent (16.7%), to a graet extent (6.7%) and to a very graet extent (13.3 and not at all to 20%.

c) Marketing

i. *Adoption of new marketing strategy*

Table 4.6 : Adoption of New marketing Strategy

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	7	23.3	23.3	23.3
	TO A LITTLE EXTENT	8	26.7	26.7	50.0
	TO A MODERATE EXTENT	3	10.0	10.0	60.0
	TO A GREAT EXTENT	3	10.0	10.0	70.0
	TO A VERY GREAT EXTENT	9	30.0	30.0	100.0
	Total	30	100.0	100.0	

Source : Field Data

The degree of adoption of marketing technology is a crucial factor in the tea sector of the as the yield is concerned. A study was carried out to ascertain the present situation. Though the mean adoption level was 20%, Adoption level was positively correlated to education, number of dependents, labour use pattern, and subsidies and further, it was negatively correlated to performance.

ii. Organizational performance

Table 4.7 : Organizational Performance

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	4	13.3	13.3	13.3
	TO A LITTLE EXTENT	10	53.3	33.3	46.7
	TO A MODERATE EXTENT	3	10.0	10.0	56.7
	TO A GREAT EXTENT	4	13.3	13.3	70.0
	TO A VERY GREAT EXTENT	9	10.0	10.0	100.0
	Total	30	100.0	100.0	

Source : Research Data

Tea is among the most labour-intensive of all the plantation crops. It has both an agricultural and a manufacturing dimension. According to well-established precepts, 60 per cent of the income from tea is agricultural, the balance being of an industrial nature. A brief account of both the agricultural and manufacturing activities follows, with particular reference to labour absorption, with the aim of facilitating an insight into the kind of productivity gains that are possible in an effort to improve the viability of this sector. To a little extent as is shown by the 53.3%, organisational performance. this activity is overwhelmingly labour-intensive, despite the tendency lately in some areas of the region to use shear harvesters during the heavy cropping period when labour is scarce. Plucking accounts for about 70 per cent of the workdays on estates and about 40 per cent of the total cost of production.

d) Competition

Table 4.8 : To what extent has Innovation Strategies Impacted on outdoing competitors in the Tea industry?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NOT AT ALL	7	23.3	23.3	23.3
	TO A LITTLE EXTENT	7	23.3	23.3	46.7
	TO A MODERATE EXTENT	8	26.7	26.7	73.3
	TO A GREAT EXTENT	5	16.7	16.7	90.0
	TO A VERY GREAT EXTENT	3	10.0	10.0	100.0
	Total	**30**	**100.0**	**100.0**	

Source: Field Data

From the results, these factors combined with the growing recognition that agricultural innovation is far more complex and less linear than once believed—imply a need to refine the conceptual and analytical tools used to identify how policies and investments can best promote innovative behavior and practices in the agricultural sector, thereby promoting poverty reduction and sustainable livelihood improvements among the rural poor.

e) Labour

Table 4.9 : To What extent has tea firms been able to cut on labour costs as a result on using tea picking firms?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NOT AT ALL	9	30.0	30.0	30.0
	TO A LITTLE EXTENT	4	13.3	13.3	43.3
	TO A MODERATE EXTENT	7	23.3	23.3	66.7
	TO A GREAT EXTENT	4	13.3	13.3	80.0
	TO A VERY GREAT EXTENT	6	20.0	20.0	100.0
	Total	**30**	**100.0**	**100.0**	

Source : Field Data

As of 21st June 2011, the company's shares had an average market value of kshs 91, and a dividend yield of 2.22%. The global share market value has stagnated between 13%-17% for the last 3 years. Although the introduction of tea plucking machines in the tea industry should reduce overall production costs, thus increasing revenue, Unilever Tea Kenya Ltd is not keen to embrace the new technology (opting to remain labour intensive), and this might make it less competitive in the industry. It therefore seems like the market value of their shares will remain stagnant, or might be headed for a tumble. However, the recent increase in rainfall should result in high tea productivity.

Table 4.10 : How has it affected the manual tea pickers who were laid off?

		Frequency	Percent	Valid Percent	Cumulative Percent
	NOT AT ALL	3	17.0	10.0	10.0
	TO A LITTLE EXTENT	7	13.3	23.3	33.3
	TO A MODERATE EXTENT	6	20.0	20.0	53.3
	TO A GREAT EXTENT	7	23.3	23.3	76.7
	TO A VERY GREAT EXTENT	7	23.3	23.3	100.0
	Total	**30**	**100.0**	**100.0**	

Source: Field Data

The respondents either to agreat extent or a very great extent both at (23.3%) have been affected by the manual tea pickers who were laid off. Shears or machine plucking does not damage the leaf quality, the

bush health or even the quality of made tea. In conclusion, mechanization of tea harvesting can reduce not only cost of plucking, but it can also increase the welfare of pluckers, give higher productivity per labor, decrease investment on labor housing, increase the efficiency in field activity and also solve the problem of availability of pluckers. Finlay's are more open-minded about the tea plucking machines, which should reduce their production costs. The innovation framework also includes reference to the frame conditions that foster or impede innovation, including public policies on innovation and agriculture; informal institutions that establish the rules, norms, and cultural attributes of a society; and the behaviors, practices, and attitudes that condition the ways in which individuals and organizations within each domain act and interact.

Revenues Generated

Table 4.11 : Revenues Generated

	Frequency	Percent	Valid Percent	Cumulative Percent
VERY MUCH DECREASED	11	36.7	36.7	36.7
IMMEDIATELY DECREASED	7	23.3	23.3	60.0
NOT CHANGED	7	23.3	23.3	83.3
MODERATELY INCREASED	3	10.0	10.0	93.3
VERY MUCH INCREASED	2	6.7	6.7	100.0
Total	**30**	**100.0**	**100.0**	

Source : Field Data

The main challenge of the companies is ensuring that there's enough water supply for the plantations. High rainfall in 2006 should serve to increase productivity – increase in rainfall and stabilization of the dollar will increase output and value of output, and therefore revenue should increase. Prospects of cutting down on plastic bag use would have a positive effect on the revenue of the company. Worker's trade union (supporting them in their fight against tea plucking machines) that have any negative bearing in their share prices and publicity. Operating profit increased by 7.7%, but net profit decreased due to increasing financing costs from the parallel manual harvesting and a high tax bill.

Table 4.12 : Labour Costs

	Frequency	Percent	Valid Percent	Cumulative Percent
VERY MUCH DECREASED	8	26.7	26.7	26.7
IMMEDIATELY DECREASED	7	23.3	23.3	50.0
NOT CHANGED	6	20.0	20.0	70.0
MODERATELY INCREASED	4	13.3	13.3	83.3
VERY MUCH INCREASED	5	16.7	16.7	100.0
Total	**30**	**100.0**	**100.0**	

Source: Field Data

Asked about the labour cost, firms generally agree harvesting all teas by hand would never have allowed tea consumption to grow as it has, since supply would not have been able to keep up with demand, and therefore costs would have remained high. Hand harvesting is, therefore, common in areas where there is a sufficient labor force that are properly trained to go into the tea gardens at harvest time and whose wages, while often high relatively to other professions in their local economy, are low enough to make the tea harvest still saleable at competitive prices on the open market (a delicate balancing act all companies face). Since the performance of an agricultural innovation system influences the overall performance of the agricultural

sector, measuring sectoral performance is vital to assessing an innovation system. As discussed earlier, it is a researchable task to identify the relative contribution of the different components of the innovation to overall sector performance. The several agricultural sector performance indicators that are influenced by the performance of the innovation system, dividing them between those that are commonly accepted and used widely in the literature ("classical indicators") and those that are more oriented toward capturing aspects of innovation that are highlighted in the innovation systems literature, such as the demand orientation, learning processes, interactions and relationships, and informal institutions. (Rajendra, K 1998)

Overall Output.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	VERY MUCH DECREASED	4	13.3	13.3	13.3
	IMMEDIATELY DECREASED	6	20.0	20.0	33.3
	NOT CHANGED	5	16.7	16.7	50.0
	MODERATELY INCREASED	8	26.7	26.7	76.7
	VERY MUCH INCREASED	7	23.3	23.3	100.0
	Total	30	100.0	100.0	

Source : Field Data

According to the findings, the overal output has moderately increased (26.7%) much increased (23.3%), immediately increased (20%) while 13.3% and 16.7% were very much decreased or not in that manner respectively. This is as compared to 60-70 kg of green leaf per person per day with hand plucking. However, identifying the most promising investments and policy interventions in this field has become a more difficult task as the objectives have shifted from increasing outputs and yields to transforming agriculture into a more responsive, dynamic, and competitive sector. This shift has become increasingly relevant with the emergence of major structural changes in the global food and agricultural system, including the integration of agriculture into global markets, the emergence of consumers as key drivers of technological change, the growth of private investment in new agricultural technologies, and the revolution in information and communication technologies (World Bank 2006).

a) Summary of the Findings

The data obtained from various machines in tea harvesting estates vary depending on the make and experience of the operators. Approximate figures however indicate a harvest of about 400 kg of green leaf per day for a single-man hand-held machine, and of 1,000 - 1,500 kg of green leaf per day for two-man hand-held machine. This is as compared to 60-70 kg of green leaf per person per day with hand plucking.

Unlike in Kenya where introduction of tea harvesting machines was met with resistance from the onset, none of the estates which had adopted mechanical plucking in the Southern Africa region experienced any major hostility from labour towards mechanization. This is presumably because it was mostly being introduced in areas where people were not much interested in tea plucking - as opposed to Kenya where labour supply exceeds demand. Closer home, some farms in Tanzania have been experimenting with mechanical tea harvesting - small hand held machines and large track driven equipment - since mid-1980s.

Certainly, experts say that if trends across the globe are anything to go by, mechanical harvesting of tea is turning into a flood capable of breaking hard barriers, and may see wider adoption of the technology even in small scale units as more sophisticated machines find their way to larger estates with vast areas of tea on flat land. Even as parties in the Kenyan scene continue to discuss a more humane approach to the situation, pundits say that local tea pickers should nonetheless prepare to take advantage of emerging opportunities in the mechanized tea technology. Though the opportunities might not be as many as they might have been in the decades of manual tea picking, returns will nonetheless be higher for skilled labourers who will operate the more technologically advanced tea plucking systems.

According to the firms, leaf quality generally improves with better machines and proper adaptation. Provided quality is assured, machine picked leaves are just as acceptable as those that are manually harvested. Specialised tea harvesters are receiving attention in the industry globally. Unlike what is available in our tea

zones, there are better machines that place tea harvesting on another level altogether. One such machine is the T1000 Magic Carpet tea harvester, designed to cover as much as one hectare per hour while floating over the tea bushes with precision and producing a better quality harvest. Technological evolution usually has an impact, both positive and negative. This is no different for the Kenyan tea sector. It is true that tea harvesting machines are taking over jobs and exposing thousands of workers to the pangs of the twin scourges of unemployment and poverty. On the other hand, mechanisation is, in the real sense, an evolution of cost-effective tea harvesting. However, the pros and cons of this technological advancement seem to have been blown out of proportion, resulting in a tug of war between the concerned parties. Since mechanical harvesting of tea is still in its infancy in Kenya, most plantations adopting the technology are using simple hand-held harvesters. It is a difficult start and is expected to affect the quality of tea. The type of firm's according to the distinction between local and multinational is very much in accordance with previous works (Molero & Garcia, 2008), our results do not find extraordinary differences between companies belonging to national or multinational groups.

Tea is an essential item of domestic consumption and is the major beverage in Kenya. Tea is also considered as the cheapest beverage amongst the beverages available in Kenya. Tea Industry provides gainful direct employment to more than a million workers mainly drawn from the backward and socially weaker section of the society. It is also a substantial foreign exchange earner and provides sizeable amount of revenue to the State and Central Exchequer.

The easing of human labour through the use of technology began in prehistory. The historic process of mechanisation has progressed from the most elementary force-transmitting devices such as levers to today's sophisticated information-processing machines. Throughout this progress, however, the constant purpose has been to supplement or complement human efforts in work.

During the last two years, the application of harvesting machines in tea production has been one of the outstanding developments in the tea sector. Wherever this (agricultural mechanisation) has been successfully implemented, the burden and drudgery of agricultural work has been greatly reduced while the output per worker (labour productivity) has been greatly increased. In the industrialised world, the mechanisation of tea agriculture released millions of workers from agriculture, enabling them to work in other industries and thus contribute to industrial expansion. Tea harvesting may be looked at from different points of view. From the mechanical point of view, agricultural mechanisation may be described as the replacement of human labour with mechanical power. In as much as agriculture is an economic activity, the mechanisation tea harvesting can also be seen in economic terms to be there placement of labour with capital. From the farmer's point of view, agricultural mechanisation may be described as the proper choice and use of agricultural equipment from among the available alternatives or, in a manner.

Harvesting machines imported from more developed countries would generally have been manufactured at higher labour costs and possibly sold at higher profit margins than those prevailing in a less developed country that imports the machines. This is probably a major reason for the recent trend of the more developed countries exporting factories rather than products to some less developed countries, in order to cut production cost. The importation of machines will probably necessitate the importation of the spare parts that will be required in order to maintain the machines in operation. It emerged that not to mention the cost of the spare parts, probable delays in the acquisition of the spare parts from their distant origins would lead to long machine downtimes, perhaps at times when the use of the machines is most crucial. The farmer without a machine is better off than the farmer with a machine that is broken down, cannot be repaired, and therefore cannot be used.

v. Recommendations

The association between human capital (personnel) and the innovation changes has mixed signs: positive for product innovation and negative for labour process. All the remaining factors maintain the same sign in both cases. Mechanised agriculture requires substantial capital investment that calls for proper management but also provides the firms more time to attend to management issues. Therein lies the mental challenge. Finally, from the point of view of those who work in agriculture, there are affective reasons that could compel them to opt for mechanisation, such as the satisfaction and prestige that comes with the ownership and use of modern equipment.

There is need for reorganisation of the Kenyan tea harvesting and farming system in general requires consolidation of the small farm holding into larger ones. The end result would be to root out small-scale farming and make place for a system of larger, mechanised and economically viable farm holdings. Though this option may be economically sound, in the short term it is likely to be politically unacceptable and close to being socially immoral. For most rural Kenyans small-scale farming is not only the only means of livelihood, it is also a traditional way of life that they would not want to abandon. Moreover, even for those who would be willing to give up small scale farming, there would still be the problem of finding a new occupation. However, for the long term, this option should still be worth considering.

Although a number of qualifications must be introduced regarding the organisation of innovative process, our study finds more similarities than differences regarding the innovatory efficiency. Thus notwithstanding, we find out some differences for companies which are not members of a group(regardless of its nationality) particularly in sectors named as "traditional" or of low to medium technological intensity.

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